

Environmental Product Declaration

Average EPD

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

Rockfall Fences

TRUMER Schutzbauten GmbH



Programme

EPD Square | www.epdsquare.com

Programme operator

EPD Square, s.r.o.

EPD Registration number

SQ 00-015

Publication date

06.11.2024

Valid until

05.11.2029

General information

Product

Rockfall Fences

Program operator

EPD Square

Karadžičova 16, 811 09, Bratislava, Slovakia

Email: info@epdsquare.com

Registration number

SQ 00-015

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05.11.2029

Owner of the declaration

Trumer Schutzbauten GmbH

Contact person: Marco Papillion

Email: marco.papillion@trumer.cc

Manufacturer

Trumer Schutzbauten GmbH

Maria-Bühel-Strasse 7,

A-5110 Oberndorf, Austria

Email: office@trumer.cc

Place of production

Handelsstrasse 6,

A-5162 Obertrum am See,

Austria

Product Category Rules (PCR)

The CEN standard EN 15804+A2 serves as the core PCR.
In addition, EPD Square PCR v1.0, 2024 is used.

Declared Unit

kg

Mass per DU

1 kg

UN CPC code

412 – Products of iron or steel

Geographical scope

Europe

Year of study

Data representative of 2023

Comparability

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in the context of the building.

EPD author

Sarah Curpen, Silvia Vilčeková

Verification type

Independent verification of the declaration and data,
according to ISO14025:2006

Internal: ☐

External: ☒

Verified by

Eng. Shai Ben Aharon

Insert Signature Verifier

The owner of the declaration shall be liable for the underlying information and evidence.

EPD Square shall not be liable with respect to manufacturer, life cycle assessment data and evidence.

System boundaries

Cradle to gate with additional modules. That is modules A1-A3, C1-C4, D and additional modules A4-A5 are declared.

Modules declared and geographical scope

	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	✓	✓	✓	✓	✓	MND	MND	MND	MND	MND	MND	MND	✓	✓	✓	✓	✓
Geography	EU/A S.	EU/A S.	AT	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU

The table is adapted for physical products and may have to be modified when declaring service products.

Description of Organization

TRUMER Schutzbauten GmbH was founded in the early 1990s near Salzburg, Austria. At the time TRUMER worked closely alongside construction companies and stakeholders to help solve their geohazard mitigation needs. It quickly became apparent that there was much room for improvement with regards to installation efficiency, system functionality and cost of rockfall catchment fences available on the market.

In response, a unique net was developed, which was tested and proven to have lasting effects on the geohazards industry. The Omega-Net was the first high-strength net brought to the market with the strength, deformation capabilities and functional attributes to make the installation of large capacity systems a simple effort. Topping the list was its ability to fold into compact packages that could be easily transported in combination with posts by helicopter or cranes and installed without any shackles or sewing ropes. This removed the need to heave nets into position during installation.

The product spectrum of TRUMER has grown to include systems for mitigating unstable slopes (both passive and active measures), shallow landslide and debris flow mitigation and avalanche protection. TRUMER has also expanded the reach far beyond the borders of Austria to across the world, building a name on quality products known for their robustness and high level of safety.

Product information

Product name

Rockfall Fences

Product description

TRUMER uses steel components and steel wire ropes made from high quality materials, following a stringent quality assurance program. The structures were tested as per ETAG 27 and manufactured in accordance with the European Technical Assessment ETA-14/0472.

Product application

TRUMER rockfall catchment fences were developed to protect infrastructure, utilities, buildings and lives from falling debris. Typical catchment fences are installed in run-out or deposition zones, close to the elements at risk that they protect.

Fixed Post Systems

Fixed post (aka fixed-rotation or rigid) rockfall catchment fences have a robust post with an integrated base plate. The angle between the base plate and the post is fixed and cannot be altered. This is achieved through welding the base plate directly to the post beam with the help of stiffeners. The result is a self-supporting post requiring no retaining ropes for the post head.

Hinged Post Systems

Hinged rockfall catchment fences have an independent base plate and post linked together using a pin. The angle between the post and base plate is controlled by retaining ropes attached to the head of the post and anchored on the upslope side of the system. These systems are light weight and highly adaptable to difficult terrain, often being installed with helicopters. The use of retaining ropes means lower forces are experienced at the base plate and the hinged connection eliminates an overturning.

Hybrid Attenuators

Hybrid or attenuator systems have an independent base plate and post linked together using a pin. This is a similar system as the hinged rockfall catchment systems. The angle between the post and base plate is variable and is controlled by retaining ropes attached to the head of the post which are anchored on the upslope side of the system. Since there is no lower bearing rope it allows impacted material to pass through the plane made by the fence posts. The netting of the system extends down the slope below the base of the fence. This covers the lower slope, controlling the movement of debris as it progresses downward. These systems are useful in limiting energy of projectiles and controlling movement of debris along long slopes. These systems work well in areas that experience a higher frequency of rockfall in which a traditional rockfall catchment fence system higher on the slope would be costly or logistically prohibitive to maintain.

Standards:

ONR 24810: TECHNICAL PROTECTION AGAINST ROCKFALL – TERMS AND DEFINITIONS, EFFECTS OF ACTIONS, DESIGN, MONITORING AND MAINTENANCE (2017)

“WLV – GUIDELINE FOR THE VERIFICATION OF SUITABILITY AND RISK-RELATED ADDITIONAL CRITERIA FOR ROCKFALL CATCHMENT FENCES” (2010)

ETAG 27 GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL OF FALLING ROCK PROTECTION KITS (2008)

“WLV – GUIDELINE FOR THE VERIFICATION OF ROCKFALL CATCHMENT FENCES” (2005)

Geographical scope

Europe

Technical Characteristics of Rockfall barriers

Product	Type	Available Height
Fixed Post System ETA	TSC-100-oA	up to 3.0m
	TSV-500-oA	up to 3.5 m
	TSV-1000-oA	up to 5.0 m
	TSV-2000-0A	up to 5.5 m
	ISOTOP 100 E DIM	up to 3 m
	ISOTOP 100 Ev	up to 3 m
	ISOTOP 100 E3.0	up to 4.5 m
Hinged Post System ETA	TSC-100-ZD	up to 2.5 m
	TSC-250-ZD	up to 3 m
	TSC-500-ZD	up to 3.5 m
	TSC-500-ZD H4	up to 5.0 m
	TSC-1000-ZD	up to 5.0 m
	TSC-1500-ZD	up to 5.0 m
	TSV2000-ZD	up to 5.0m
	TSC-3000-ZD	up to 6.0 m
	TS-5000-ZD	up to 7.0 m
	ISOTOP 250 E	up to 3.0 m
	ISOTOP 500/1000 Ec	up to 4.5 m
	ISOTOP 500 Ev	up to 4.5 m
	ISOTOP 1000/2000/3000/5000 Ev	from 4 up to 9 m
	ISOTOP 3000 Evo	up to 6 m
Hybrid attenuator system	TS-100-ZD	up to 2.5 m
	TSC-500-ZD	up to 3.5 m
	TSC-1000-ZD	up to 5.0 m
	TSC-3000-ZD	up to 6.0 m

The detailed list of rockfall systems and their corresponding technical parameters are available at:

<https://trumerschutzbauten.com/rockfall-fences/>

Product contents information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Steel	0.987	52	[-]
Coating	0.013		
TOTAL	1	51	
Packaging materials	Weight, kg	Weight-% (versus the product)	
Carton	0.000022	0.0022	
Plastic	0.0000031	0.00031	
Wood Reels	0.0001	0.01	
Wooden Pallets	0.0044	0.44	

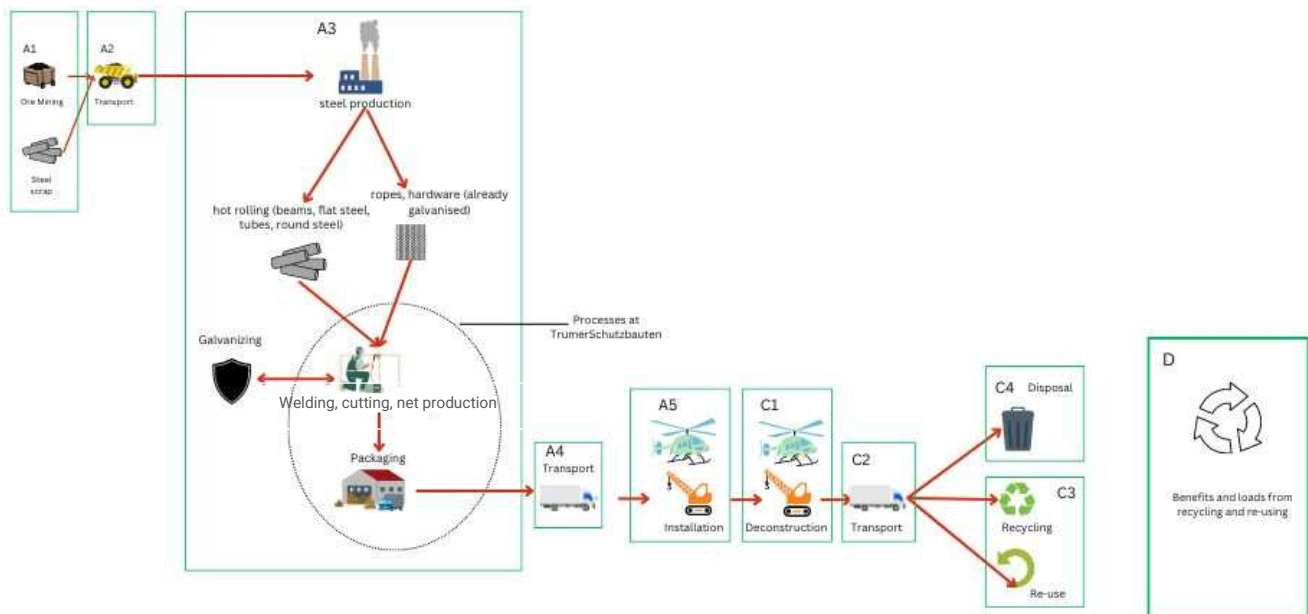
Manufacturing process (A1-A3)

The manufacturer gathers steel components which are made from primary steel (48%) and recycled steel (52%). The raw material (steel section, zinc) is transported to the manufacturing location. The sections are cut to required length using bandsaw, straightened, pierced, punched through power press, welded and outsourced to approved vendor for galvanization. The raw material is iron ore which is mined and then processed into different steel components. The manufacturer does not mine for the primary materials but imports steel parts (beams, flat steel, wire ropes, etc.) that are already processed. The different steel parts are brought to the manufacturing plant where they are processed. The different steel components are brought by sea freight and truck. The different steel components are processed at the assembly plant where they are folded, cut, welded and assembled to form the rockfall fences. They are packed with plastic tape, placed on wooden pallets and secured by wooden reels before being loaded on trucks for delivery.

The end products consist of various modular components which are manufactured and assembled at the construction site. Typically, the main components are:

- Rope net: rope strands are the raw material and being bent into shape by machine. The weaving and packaging process is being done manually.
- Ropes: each system uses ropes as a bearing and connection structure. The ropes are being purchased in bulk. Then they are being cut and pressed to fit the project requirements.
- Steelworks: each system uses posts and base plates made out of steel. The beams/tubes/plates are being purchased. The cutting/drilling/welding takes place in-House. Galvanization is outsourced.
- Brake elements: the energy absorbing elements are made out of steel and are manufactured in-House or outsourced locally (depending on type)
- Hardware: each system uses standard hardware components. These components are being bought in bulk and assembled for project specific purposes.

This streamlined process ensures quality and precision in every component.



Life cycle assessment (LCA)

Cut-off criteria

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Allocation, estimations, and assumptions

Allocation is based on annual production rate and made with high accuracy and precision. The values for 1 tonne of the products which are used within this study are calculated by considering the total product weight per annual production. In the production plant, several kinds of products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the produced products output fixed to 1 tonne and the corresponding amount of product is used in the calculations.

Database(s) and LCA software

This EPD has been created using One Click LCA Pre-Verified EPD Generator. Ecoinvent v3.8 and One Click LCA databases were used as sources of environmental data.

LCA Scenario and additional environmental information

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

Manufacturing A3

Manufacturing energy scenario

Electricity data source and quality	Austria, residual mix
Electricity CO2e / kWh	0.2
Energy data source and quality	LCA study for country specific electricity mixes based on IEA, OneClickLCA 2024
Heating CO2e / MJ (Natural gas)	0.0781
Energy data source and quality	Ecoinvent 3.8
Heating CO2e / MJ (Biomethane)	0.013
Energy data source and quality	Ecoinvent 3.8
Heating CO2e / MJ (Fuel)	0.088
Energy data source and quality	Ecoinvent 3.8
Heating CO2e / MJ (Coal)	0.062
Energy data source and quality	Ecoinvent 3.8
Heating CO2e / MJ (Municipal waste incineration)	-
Energy data source and quality	Ecoinvent 3.8

Transportation scenario (A4)

Transportation impacts that occurred from final product delivery to the construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transport distances to various delivery sites are based on delivery records for 2023.

Vehicle type used for transport	Truck>32 ton, euro 6

Assembly (A5)

The installation of the rockfall fences requires lifting and transportation by helicopter or crane. Either method is used 50% of the time. The number of helicopter hours required for installation is estimated to be 240 kg/min and the number of crane hours as 144 kg/min.

Use Phase (B1-B7)

The modules for use phase (B1-B7) are not included in the LCA.

End of Life (C1, C2 C3, C4)

The rockfall fences are de-constructed by similar methods as its installation that is by helicopter and crane. The different steel parts are then taken to different treatment facilities located 50 km away by trucks. The steel ropes and strands of the rockfall fences can be reused. They are taken to a treatment facility for re-use. The other steel parts of the rockfall fences are transported to a recycling facility.

	Value	Unit
Collected separately	-	kg
Collected as mixed construction waste	-	kg
Reuse	0.41	kg
Recycling	0.54	kg
Energy recovery	-	kg
To landfill	-	kg

Benefits and Burdens beyond boundary system (D)

95% of the steel product is considered for recovery in module D.

LCA results

Results presented below are given per declared unit – 1 kg

Mandatory impact category indicators – EN 15804+A2, PEF 3.0

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1.47E+00	8.45E-02	2.70E-01	1.82E+00	1.27E-01	3.23E-02	8.07E-02	2.49E-02	5.47E-02	2.64E-04	-2.47E-01
GWP-fossil	kg CO ₂ eq.	1.46E+00	8.44E-02	2.23E-01	1.77E+00	1.27E-01	1.97E-02	8.07E-02	2.48E-02	5.47E-02	2.63E-04	-2.49E-01
GWP-biogenic	kg CO ₂ eq.	3.38E-03	1.59E-05	4.67E-02	5.01E-02	5.16E-05	1.26E-02	4.87E-05	1.13E-05	-2.29E-03	1.72E-07	1.26E-03
GWP-LULUC	kg CO ₂ eq.	2.91E-03	4.83E-05	3.19E-05	2.99E-03	5.08E-05	3.19E-06	1.90E-05	1.17E-05	5.44E-06	2.49E-07	4.43E-04
ODP	kg CFC11 eq.	1.21E-07	1.78E-08	2.68E-08	1.65E-07	2.95E-08	1.50E-08	1.25E-07	5.60E-09	1.17E-08	1.07E-10	-2.66E-09
AP	mol H ⁺ eq.	1.63E-02	1.57E-03	1.54E-03	1.94E-02	4.10E-04	2.19E-04	9.86E-04	7.04E-05	5.68E-04	2.48E-06	-4.67E-04
EP-freshwater	kg P eq.	8.06E-05	4.84E-07	1.96E-05	1.01E-04	9.08E-07	9.90E-08	5.45E-07	2.03E-07	1.81E-07	2.76E-09	6.46E-06
EP-marine	kg N eq.	1.60E-03	3.97E-04	3.96E-04	2.39E-03	9.75E-05	6.94E-05	1.61E-04	1.34E-05	2.51E-04	8.57E-07	1.53E-04
EP-terrestrial	mol N eq.	5.87E-02	4.41E-03	5.52E-03	6.86E-02	1.08E-03	7.61E-04	1.76E-03	1.50E-04	2.76E-03	9.43E-06	-2.22E-03
POCP	kg NMVOC eq.	6.16E-03	1.17E-03	1.20E-03	8.53E-03	3.76E-04	2.26E-04	6.47E-04	5.75E-05	7.58E-04	2.74E-06	-1.82E-03
ADP-M&M	kg Sb eq.	7.34E-05	2.08E-07	2.08E-07	7.47E-05	4.60E-07	1.41E-08	8.02E-08	1.16E-07	2.77E-08	6.05E-10	1.19E-06
ADP-fossil	MJ	1.65E+01	1.15E+00	3.06E+00	2.07E+01	1.90E+00	8.95E-01	7.38E+00	3.66E-01	7.36E-01	7.22E-03	-1.31E+00
WDP	m ³	9.19E-01	4.35E-03	7.15E-01	1.64E+00	8.87E-03	1.37E-03	9.21E-03	1.91E-03	1.98E-03	2.29E-05	2.09E-01

GWP-total: Global Warming Potential; **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; See "additional requirements" for indicator given as PO₄ eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Additional voluntary impact category indicators – EN 15804+A2, PEF 3.0

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1.94E-07	5.27E-09	1.86E-08	2.18E-07	1.07E-08	4.02E-09	7.93E-09	1.70E-09	1.52E-08	4.99E-11	-3.33E-09
IRP	kBq U235 eq.	9.97E-02	5.47E-03	4.77E-03	1.10E-01	9.95E-03	4.07E-03	3.32E-02	1.98E-03	3.38E-03	3.27E-05	2.80E-02
ETP-fw	CTUe	7.04E+01	8.81E-01	1.88E+00	7.32E+01	1.58E+00	4.92E-01	3.98E+00	3.17E-01	4.42E-01	4.71E-03	-2.46E+00
HTP-c	CTUh	7.79E-09	4.52E-11	5.91E-11	7.90E-09	5.16E-11	6.77E-12	3.14E-11	1.10E-11	1.69E-11	1.18E-13	5.46E-09
HTP-nc	CTUh	4.91E-08	7.74E-10	1.43E-09	5.13E-08	1.59E-09	1.58E-10	8.96E-10	2.97E-10	3.20E-10	3.08E-12	3.20E-08
SQP	Dimensionless	4.44E+00	5.03E-01	6.42E-01	5.58E+00	1.34E+00	1.09E-01	8.89E-01	2.20E-01	9.56E-02	1.54E-02	-1.60E-01

PM: Particulate matter emissions; IRP: Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer effects; SQP: Land use related impacts / soil quality

Resource use indicators

Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	1.55E+00	1.16E-02	2.59E+00	4.15E+00	2.75E-02	2.70E-03	1.59E-02	6.29E-03	4.20E-03	6.27E-05	2.62E-01
RPEM	MJ	0.00E+00	0.00E+00	4.80E-02	4.80E-02	0.00E+00	-1.16E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	1.55E+00	1.16E-02	2.64E+00	4.20E+00	2.75E-02	-1.13E-01	1.59E-02	6.29E-03	4.20E-03	6.27E-05	2.62E-01
NRPE	MJ	1.62E+01	1.15E+00	3.06E+00	2.04E+01	1.90E+00	2.63E-01	1.05E+00	3.66E-01	7.36E-01	7.22E-03	-1.31E+00
NRPM	MJ	3.10E-01	0.00E+00	3.50E-03	3.14E-01	0.00E+00	6.32E-01	6.32E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	1.65E+01	1.15E+00	3.06E+00	2.07E+01	1.90E+00	8.95E-01	7.38E+00	3.66E-01	7.36E-01	7.22E-03	-1.31E+00
SM	kg	1.24E-01	4.50E-04	4.64E-04	1.25E-01	6.44E-04	9.49E-05	3.35E-04	1.50E-04	2.88E-04	1.52E-06	2.72E-01
RSF	MJ	8.64E-05	3.16E-06	1.56E-03	1.65E-03	7.09E-06	4.31E-07	2.31E-06	1.74E-06	9.41E-07	3.96E-08	1.93E-05
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
W	m ³	1.18E+00	1.09E-04	4.18E-04	1.18E+00	2.41E-04	2.97E-05	1.92E-04	5.14E-05	4.47E-05	7.90E-06	-1.02E-02

RPEE: Renewable primary energy resources used as energy carrier; RPEM: Renewable primary energy resources used as raw materials; TPE: Total use of renewable primary energy resources; NRPE: Non-renewable primary energy resources used as energy carrier; NRPM: Non-renewable primary energy resources used as materials; TRPE: Total use of non-renewable primary energy resources; SM: Use of secondary materials; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; W: Use of net fresh water

Waste indicators

Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	kg	2.81E-01	1.54E-03	4.74E-03	2.88E-01	2.15E-03	3.98E-04	1.84E-03	4.76E-04	0.00E+00	0.00E+00	1.85E-02
NHW	kg	2.78E+00	1.94E-02	1.54E-01	2.96E+00	3.83E-02	3.78E-03	2.04E-02	8.62E-03	0.00E+00	5.00E-02	-3.09E-01
RW	kg	3.86E-05	7.93E-06	6.50E-06	5.30E-05	1.31E-05	6.45E-06	5.34E-05	2.49E-06	0.00E+00	0.00E+00	8.03E-06

HW: Hazardous waste disposed; NHW: Non-hazardous waste disposed; RW: Radioactive waste disposed

Output flow indicators

Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
CR	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	4.10E-01	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	1.90E-02	1.90E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	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
ETE	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

CR: Components for reuse; MR: Materials for recycling; MER: Materials for energy recovery; EEE: Exported electric energy; ETE: Exported thermal energy

Environmental impacts – GWP-GHG

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - GHG	kg CO2e	1.46E+00	8.44E-02	2.23E-01	1.77E+00	1.27E-01	1.97E-02	8.07E-02	2.48E-02	5.47E-02	2.63E-04	-2.49E-01

GWP- GHG: Global Warming Potential, greenhouse gases

Information describing biogenic carbon content at factory gate

Biogenic carbon content	Value	Unit
Biogenic carbon content in product	[-]	kg C
Biogenic carbon content in the accompanying packaging	0.20	kg C

Specific data (GWP-GHG) and data variation for A1-A3

Specific data and data variation	
Specific data	<60%
Variation - product	<10%
Variation - site	Not relevant

Hazardous substances

- ☒ The product does not contain any REACH SVHC substances in amounts greater than 0.1 %.

Contact information

Programme operator

EPD Square

Karadžičova 16, 811 09, Bratislava, Slovakia

Email: info@epdsquare.com

EPD owner

Trumer Schutzbauten GmbH

Contact person: Marco Papillion

Email: marco.papillion@trumer.cc

Author of Life Cycle Assessment (LCA)

Sarah Curpen, Silvia Vilčeková, SALVIS s.r.o.

Email: curpen@salvis.sk, vilcekova@salvis.sk

EPD verifier

Eng. Shai Ben Aharon, KVS

Email: shai@kvs.co.il

Bibliography

ISO 14020:2000

Environmental labels and declarations – General principles

ISO 14025:2010

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Environmental management - Life cycle assessment - Requirements and guidelines

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Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products

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Annex

Environmental impacts – EN 15804+A1, CML/ISO 21930

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ eq.	1.41E+00	8.37E-02	2.24E-01	1.72E+00	1.26E-01	1.94E-02	7.86E-02	2.46E-02	5.41E-02	2.58E-04	-2.20E-01
ODP	kg CFC11 eq.	9.89E-08	1.41E-08	2.12E-08	1.34E-07	2.34E-08	1.18E-08	9.88E-08	4.45E-09	9.25E-09	8.43E-11	-9.37E-09
AP	kg SO ₂ eq.	1.04E-02	1.25E-03	1.11E-03	1.28E-02	3.30E-04	1.69E-04	8.29E-04	5.80E-05	4.05E-04	1.87E-06	-3.29E-04
EP	kg PO ₄ eq.	4.19E-03	1.56E-04	3.44E-04	4.69E-03	7.24E-05	3.09E-05	1.08E-04	1.31E-05	9.39E-05	4.03E-07	-2.14E-04
POCP	kg C ₂ H ₄ eq.	5.94E-04	3.39E-05	4.13E-05	6.69E-04	1.54E-05	5.05E-06	3.16E-05	2.96E-06	8.86E-06	7.84E-08	-2.72E-04
ADP-M&M	kg Sb eq.	7.32E-05	2.04E-07	1.05E-06	7.44E-05	4.49E-07	1.38E-08	7.80E-08	1.13E-07	2.73E-08	5.96E-10	1.17E-06
ADP-fossil	MJ	1.65E+01	1.15E+00	3.06E+00	2.07E+01	1.90E+00	8.95E-01	7.38E+00	3.65E-01	7.36E-01	7.22E-03	-1.31E+00

GWP: Global Warming Potential; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional requirements" for indicator given as PO₄ eq. **EP:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **POCP:** Formation potential of tropospheric ozone; **ADP-non fossil:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources;