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TRUMER Schutzbauten

Environmental Product Declaration

Average EPD

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

Avalanche Fences

Trumer Schutzbauten GmbH

Programme
EPD Square | www.epdsquare.com

Programme operator
EPD Square, s.r.o.

EPD Registration number
SQ 00-016

Publication date
06.11.2024

Valid until
05.11.2029

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General information

Product
Avalanche Fences

Program operator
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Email: info@epdsquare.com

Registration number
SQ 00-016

Publication date
06.11.2024

Valid until date
05.11.2029

Owner of the declaration
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Manufacturer
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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 and steel

Geographical scope
Europe

Year of study
The data is 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/CN/TH	EU/CN/TH	AT	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU

MND = Modules not declared

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 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.

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

Product information

Product name
Avalanche Fences

Product description
Avalanche hazard is an important factor to consider not only for community planning in mountainous areas, but also for linear infrastructure where avoidance is often impossible or impractical. At locations affected by avalanche risk the threat can be reduced through an on-going avalanche control program or by the installation of avalanche protection structures. Avalanche control programs mitigate avalanches by artificially inducing smaller avalanches periodically (i.e. with explosives) to avoid large avalanches. Avalanche protection structures can be installed in the avalanche initiation zone or avalanche track to reduce the probability of larger avalanches starting and threatening the element at risk.

Product application
Static Defense Structures - TS-LV Snow Net & TS-LV Snow Rake

Static defense structures are mitigation measures installed in the initiation zones in order to prevent avalanches in their first stage of occurrence. Two examples are snow nets and flexible-net snow rakes. They consist of nets strung with steel wire ropes between posts and anchored to the ground. Fence systems are installed in a series, completely covering the initiation zone. During the winter, the net retains the accumulated snow. This method provides structural support to the System design and layout is carried out in conjunction with avalanche experts and follows Austrian or Swiss standards. Installation is most often in difficult to access terrain and so ease of installation is of great importance. Individual components of the system can be assembled into packages prior to installation. This greatly reduces the amount of helicopter or crane time required during the erection of the fence and the amount of manpower required. Connections between components are designed to be as simple as possible to aid in the construction and the redistribution of forces throughout the system.

Dynamic Defense Structures - TS-LV Snow Catcher

Dynamic defense structures are those that interact with an avalanche that is already in motion. There exists very little research on the use of flexible net structures for this type of mitigation, with most knowledge coming from the experience of rockfall catchment fences being impacted by avalanches. Trumer Schutzbauten, in conjunction with the Austrian Department of Natural Hazards, set up a test site for specifically this purpose where artificial or natural avalanches impact an instrumented system. Dynamic avalanche defense structures are linear systems like rockfall protection systems, which extend across the runout zone. While rockfall fences are designed to retain rock, these systems help minimize the run out distance, thus reducing the extent of the hazard zone. System design and layout is carried out in conjunction with avalanche experts on a site-to-site basis. A characteristic loading scenario is developed based on the understanding of past avalanche events and flow modelling. This information is then used to dimension the system.

Standards:

ONR 24805-24807, Permanent technical avalanche protection – terms, definitions, statical and dynamic load assumptions (2009)

ONR 24806: Permanent technical avalanche protection – design of structures (2011)

ONR 24807: Permanent technical avalanche protection – monitoring and maintenance (2010)

Geographical scope
Europe

Technical Characteristics of Avalanche fences

The results in this EPD are an average representation of different high tensile chain-link meshes manufactured by Trumer Schutzbauten. The products covered by this EPD listed below. The average was calculated considering the total consumption of raw materials, auxiliary materials, wastes and the production volume related to the product group.

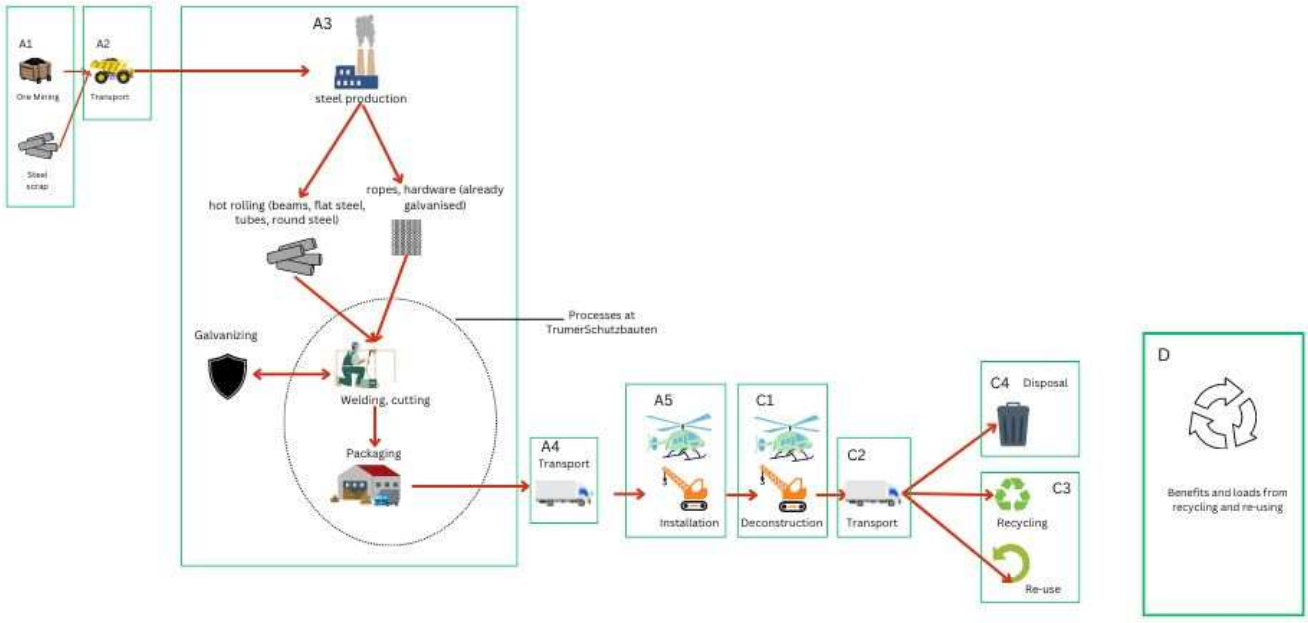
Product	Available Height	Design pressure (kn/m2)
TS-LV Snow Net	up to 4.5 m	Up to 150
TS-LV Snow Rake	up to 2.5 m	Up to 150
TS-LV Snow Catcher	up to 5.0 m	Up to 150

Product contents information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Steel	0.986	52	[-]
Coating	0.014		
TOTAL	1.00	51	
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Carton	0.000022	0.0022	
Plastic	0.0000031	0.00031	
Wood Reels	0.0030	0.3	
Wooden Pallets	0.0044	0.44	
TOTAL	0.0074		

Manufacturing process

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 ores which are 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 avalanche fences. The avalanche fences 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 only used in the dynamic avalanche barriers. Production in-House, galvanization is outsourced
- 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)

Averaging of several fence products is conducted based on a declared unit of 1 kg. This declared unit was chosen as it allows for direct comparison of environmental impacts per kilogram of material. The environmental impacts are calculated per 1 kg of the product. The final environmental impacts for each specific fence product will depend on the total weight of the declared unit used in that product's specific application. Therefore, users must adjust the declared unit proportionally to reflect the actual amount of material used, ensuring accurate impact assessment for each fence product.

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 kg 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 kg 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 (A1-A3)

The extraction and processing of raw materials (steel, coating) and the manufacturing of the pre-products that serves as input for the manufacturing process taking place at the Trumer Schutzbauten facility are included. The galvanization process is outsourced, and transportation required considered. The transport of all materials and pre-products via truck and sea freight are included. Module 3 includes the production of the mesh (core process) i.e the cutting, welding and packaging of the product.

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 given below and are based on delivery records for 2023.

Vehicle type used for transport	Truck>32 ton, euro 6
Distance to the construction site 1 (Germany)	321
Distance to the construction site 1 (Austria)	195
Distance to the construction site 1 (Switzerland)	620
Distance to the construction site 1 (Norway)	2112
Capacity utilization	100%

Assembly (A5)

The installation of the avalanche fences requires lifting and transportation by helicopter or crane. Either method is used 50% of the time. The average assembly time is 360 kg/min by crane and 216 kg/min by helicopter.

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 avalanche 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 avalanche fences can be reused. They are taken to a treatment facility for re-use. The other steel parts of the avalanche 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

Declared unit: 1kg. The results presented below are given per declared unit.

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 CO2 eq.	1.84E+00	1.81E-01	2.67E-01	2.29E+00	1.17E-01	3.21E-02	1.97E-02	5.95E-02	5.47E-02	2.64E-04	-2.05E-01
GWP-fossil	kg CO2 eq.	1.83E+00	1.81E-01	2.23E-01	2.24E+00	1.17E-01	1.97E-02	1.97E-02	5.95E-02	5.47E-02	2.63E-04	-2.07E-01
GWP-biogenic	kg CO2 eq.	3.53E-03	1.21E-08	4.33E-02	4.68E-02	4.75E-05	1.24E-02	6.99E-06	3.23E-05	-3.01E-03	-6.55E-05	1.28E-03
GWP-LULUC	kg CO2 eq.	2.97E-03	7.74E-05	3.55E-05	3.08E-03	4.68E-05	3.19E-06	3.06E-06	3.55E-05	5.44E-06	2.49E-07	6.16E-04
ODP	kg CFC11 eq.	1.06E-07	4.37E-08	2.67E-08	1.76E-07	2.72E-08	1.50E-08	1.50E-08	1.30E-08	1.17E-08	1.07E-10	-1.47E-09
AP	mol H^+ eq.	1.89E-02	1.35E-03	1.53E-03	2.18E-02	3.40E-04	2.19E-04	2.19E-04	1.71E-04	5.68E-04	2.48E-06	-1.86E-04
EP-freshwater	kg P eq.	9.69E-05	1.21E-06	1.96E-05	1.18E-04	8.37E-07	9.91E-08	9.29E-08	5.95E-07	1.81E-07	2.76E-09	4.81E-06
EP-marine	kg N eq.	1.96E-03	3.19E-04	3.93E-04	2.67E-03	7.04E-05	6.94E-05	6.94E-05	3.07E-05	2.51E-04	8.57E-07	2.14E-04
EP-terrestrial	mol N eq.	6.70E-02	3.55E-03	5.49E-03	7.61E-02	7.81E-04	7.61E-04	7.60E-04	3.44E-04	2.76E-03	9.43E-06	-1.73E-03
POCP	kg NMVOC eq.	7.92E-03	1.08E-03	1.19E-03	1.02E-02	2.94E-04	2.26E-04	2.25E-04	1.33E-04	7.58E-04	2.74E-06	-1.64E-03
ADP-M&M	kg Sb eq.	8.33E-05	4.15E-07	4.15E-07	8.48E-05	4.24E-07	1.41E-08	1.39E-08	3.76E-07	2.77E-08	6.05E-10	1.22E-06
ADP-fossil	MJ	1.99E+01	2.80E+00	3.06E+00	2.57E+01	1.74E+00	8.95E-01	8.93E-01	8.70E-01	7.36E-01	7.22E-03	-1.19E+00
WDP	m^3	9.17E-01	1.24E-02	7.06E-01	1.63E+00	8.16E-03	1.37E-03	1.34E-03	5.38E-03	1.98E-03	2.29E-05	2.22E-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	2.33E-07	1.88E-08	1.85E-08	2.70E-07	9.52E-09	4.02E-09	4.02E-09	3.43E-09	1.52E-08	4.99E-11	6.13E-09
IRP	kBq U235 eq.	1.14E-01	1.42E-02	4.78E-03	1.33E-01	9.15E-03	4.07E-03	4.03E-03	4.93E-03	3.38E-03	3.27E-05	1.75E-02
ETP-fw	CTUe	8.53E+01	2.27E+00	1.89E+00	8.95E+01	1.46E+00	4.92E-01	4.92E-01	8.11E-01	4.42E-01	4.71E-03	-4.91E-01
HTP-c	CTUh	1.02E-08	6.92E-11	6.29E-11	1.04E-08	4.52E-11	6.77E-12	6.73E-12	3.23E-11	1.69E-11	1.18E-13	5.53E-09
HTP-nc	CTUh	6.00E-08	2.23E-09	1.44E-09	6.37E-08	1.43E-09	1.58E-10	1.57E-10	7.46E-10	3.20E-10	3.08E-12	3.24E-08
SQP	Dimensionless	5.71E+00	2.92E+00	9.28E-01	9.56E+00	1.24E+00	1.09E-01	1.09E-01	4.32E-01	9.56E-02	1.54E-02	5.66E-02

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	1.84E+00	3.40E-02	2.61E+00	4.49E+00	2.54E-02	2.70E-03	2.48E-03	1.87E-02	4.20E-03	6.27E-05	2.43E-01
RPEM	MJ	0.00E+00	0.00E+00	7.76E-02	7.76E-02	0.00E+00	-1.16E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	1.84E+00	3.40E-02	2.69E+00	4.56E+00	2.54E-02	-1.13E-01	2.48E-03	1.87E-02	4.20E-03	6.27E-05	2.43E-01
NRPE	MJ	1.98E+01	2.80E+00	3.06E+00	2.57E+01	1.74E+00	2.63E-01	2.61E-01	8.70E-01	7.36E-01	7.22E-03	-1.19E+00
NRPM	MJ	0.00E+00	0.00E+00	5.27E-03	5.27E-03	0.00E+00	6.32E-01	6.32E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	1.98E+01	2.80E+00	3.06E+00	2.57E+01	1.74E+00	8.95E-01	8.93E-01	8.70E-01	7.36E-01	7.22E-03	-1.19E+00
SM	kg	1.64E-01	8.46E-04	5.76E-04	1.65E-01	5.94E-04	9.50E-05	9.45E-05	4.58E-04	2.88E-04	1.52E-06	2.72E-01
RSF	MJ	1.27E-04	6.59E-06	2.62E-03	2.75E-03	6.53E-06	4.32E-07	4.31E-07	5.47E-06	9.41E-07	3.96E-08	3.09E-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	2.11E-02	3.48E-04	4.28E-04	2.18E-02	2.22E-04	2.98E-05	2.87E-05	1.43E-04	4.47E-05	7.90E-06	-1.00E-02

PEE: 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	4.39E-01	3.14E-03	4.78E-03	4.47E-01	1.98E-03	3.98E-04	3.93E-04	1.38E-03	0.00E+00	0.00E+00	2.29E-02
NHW	kg	3.52E+00	5.02E-02	1.54E-01	3.72E+00	3.53E-02	3.79E-03	3.51E-03	2.54E-02	0.00E+00	5.00E-02	-4.08E-01
RW	kg	4.60E-05	1.93E-05	6.47E-06	7.18E-05	1.20E-05	6.45E-06	6.44E-06	5.84E-06	0.00E+00	0.00E+00	5.76E-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	7.00E-03	7.00E-03	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	1.83E+00	1.81E-01	2.23E-01	2.24E+00	1.17E-01	1.97E-02	1.97E-02	5.95E-02	5.47E-02	2.63E-04	-2.07E-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	0.02	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 %.

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TRUMER Schutzbauten

Contact information

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Bibliography

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Environmental labels and declarations – General principles

ISO 14025:2010
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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 CO2 eq.	1.76E+00	1.80E-01	2.24E-01	2.17E+00	1.16E-01	1.94E-02	1.93E-02	5.89E-02	5.41E-02	2.58E-04	-1.81E-01
ODP	kg CFC11 eq.	1.04E-07	3.46E-08	2.11E-08	1.59E-07	2.15E-08	1.18E-08	1.18E-08	1.03E-08	9.25E-09	8.43E-11	-8.37E-09
AP	kg SO_2 eq.	1.23E-02	1.08E-03	1.10E-03	1.45E-02	2.78E-04	1.69E-04	1.69E-04	1.42E-04	4.05E-04	1.87E-06	-9.19E-05
EP	kg PO_4 eq.	5.06E-03	1.61E-04	3.45E-04	5.56E-03	6.02E-05	3.09E-05	3.07E-05	3.46E-05	9.39E-05	4.03E-07	-2.54E-04
POCP	kg C_2H_4 eq.	7.81E-04	3.62E-05	4.15E-05	8.58E-04	1.39E-05	5.05E-06	5.04E-06	7.48E-06	8.86E-06	7.84E-08	-2.56E-04
ADP-M&M	kg Sb eq.	8.30E-05	4.04E-07	1.06E-06	8.45E-05	4.14E-07	1.38E-08	1.36E-08	3.68E-07	2.73E-08	5.96E-10	1.20E-06
ADP-fossil	MJ	1.98E+01	2.80E+00	3.06E+00	2.57E+01	1.74E+00	8.95E-01	8.93E-01	8.70E-01	7.36E-01	7.22E-03	-1.19E+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 resource;