



ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Road safety guardrails
Unipromet d.o.o.



EPD HUB, HUB-3999

Published on 19.09.2025, last updated on 22.09.2025, valid until 18.09.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.



GENERAL INFORMATION

MANUFACTURER

Manufacturer	Unipromet
Address	Bulevar oslobodilaca Čačka 92A, 32103 Čačak
Contact details	office@unipromet.co.rs
Website	https://unipromet.co.rs/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021, ISO 14025 and EN 1317
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options A4-B7 and modules C1-C4, D
EPD author	LCA Institut
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Nemanja Nedic, as an authorized verifier acting for EPD Hub Limited

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable.

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

PRODUCT

Product name	Road restraint systems
Place(s) of raw material origin	Turkey & Europe
Place of production	Serbia
Place(s) of installation and use	EU
Period for data	2024
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	Less than 10%
A1-A3 Specific data (%)	100

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m
Declared unit mass	39,14 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	103
GWP-total, A1-A3 (kgCO ₂ e)	104
Secondary material, inputs (%)	43,9
Secondary material, outputs (%)	85,2
Total energy use, A1-A3 (kWh)	356
Net freshwater use, A1-A3 (m ³)	0.82

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Unipromet was founded in 1989 as a private family-owned company. Currently, it employs 650 people who represent the driving force behind the company, ensuring both quality and continued success. The company specializes in the production, delivery, and installation of road safety equipment, noise barrier panels, steel pipes, vertical signage, and structures for solar power plants. Over the years, Unipromet has grown into a regional leader with an annual turnover of 102 million euros. The entire metal processing process is consolidated across 60,000 m² of covered workspace and 220,000 m² of land, located in two factories, Kraljevo and Čačak.

The company manufactures and installs protective fences in compliance with European (EN 1317 standard) and other international standards such as ASTRA (Switzerland) and NF (France), which enable export to more than 30 countries. Membership in the “Gütegemeinschaft Stahlschutzplanken eV” good quality society and the “Studiengesellschaft Stahlschutzplanken eV” development society, constant quality control according to the RAL RG-620 standard carried out in modern laboratories such as TUV and BAST from Germany and DTC from Switzerland allows access to all markets that have accepted the mentioned standards.

PRODUCT DESCRIPTION

Steel protective fences are constructive barriers whose main goal is to ensure the protection, stability and safety of drivers, passengers and pedestrians from the dangers that can arise as a result of traffic accidents. Steel protective fences represent a key and irreplaceable element of safety in modern traffic for reducing the consequences of traffic accidents and protecting all traffic participants.

Further information can be found at: <https://unipromet.co.rs/>

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	100	Turkey & Europe
Minerals	-	-
Fossil materials	-	-
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	0,0021

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m
Mass per declared unit	39.14 kg

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
x	x	x	x	x	MNR	MNR	MNR	x	MNR	MNR	MNR	x	x	x	x	x	
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recycling

Modules not declared = MND. Modules not relevant = MNR

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impact that is considered for the production phase includes the production of raw materials, auxiliary substances and various packaging materials, taking into account the quality criteria and the requirements of the standards that our product should satisfy. The study also considers the use of energy resources required for the process - consumption and losses of electricity, the amount of electricity obtained from renewable sources, water consumption, as well as the consumption of gas for production processes and fuel for the operation of work and transport machines. Losses of basic material as well as the type and amount of waste materials that appear in the production process were taken into account.

The raw material is hot-rolled steel, from which protective fences for roads are produced, and zinc, which is used as the basic material for the surface protection of products.

The product is obtained by plastic processing of steel and protected by the hot-dip galvanizing process.

During the production process, different production machines, different production phases that include the consumption of resources, energy, water and transport devices during the process, as well as different regeneration and recovery procedures are included in the work.

TRANSPORT AND INSTALLATION (A4-A5)

Transport impacts from the delivery of finished products to the construction site (A4) include direct fuel exhaust emissions, environmental impacts of fuel production, and emissions from associated infrastructure.

The average distance to the customer is discussed in part (A4), based on annual transport with truck >32 ton (554km).

The installation (module A5) includes the energy used during the installation of fences, as well as diesel fuel consumption of 1.3 l per ton of installed fence. Bolts used for the installation of the product, as well as electricity consumption for their placement, are also included. An average European scenario was used to model the end-of-life of the packaging. The distance of waste transportation to the waste treatment plant is also included.

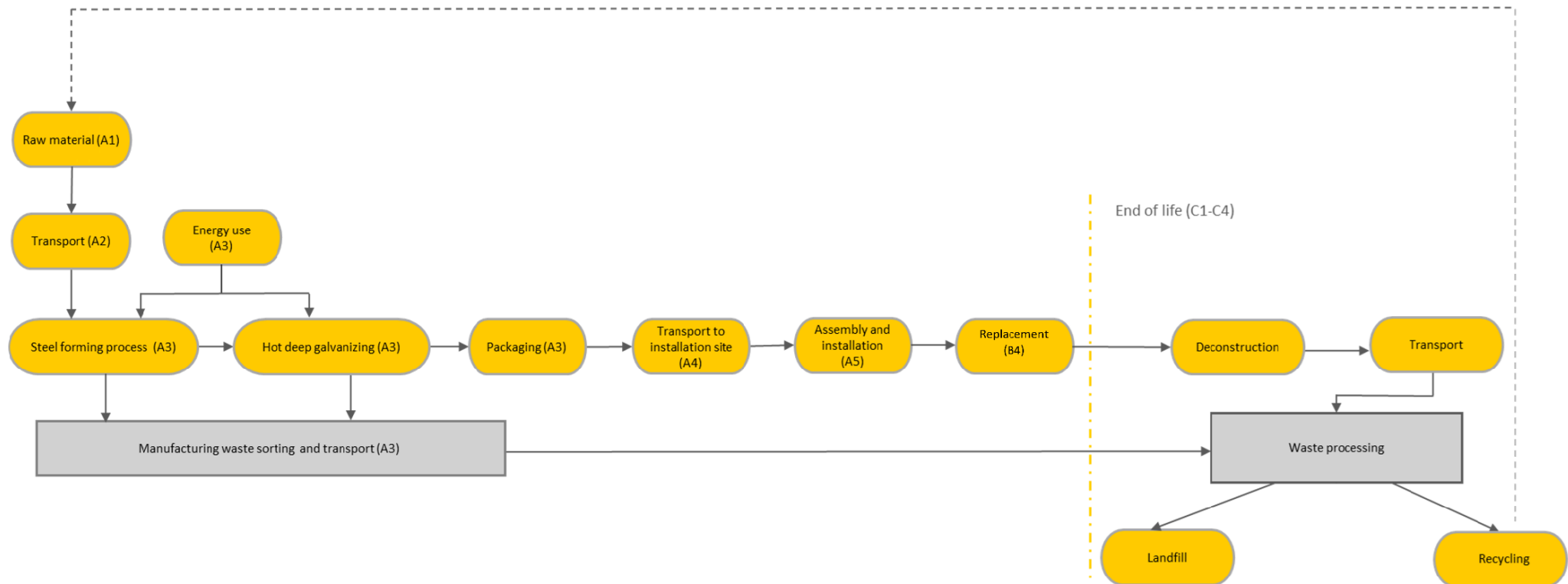
PRODUCT USE AND MAINTENANCE (B1-B7)

Replacement of the product is also included, as well as the treatment of the scrap in B4.

PRODUCT END OF LIFE (C1-C4, D)

At the end of the life cycle, it is assumed that 85% of the waste generated from the removal of protective road fences enters the product recycling process, thereby avoiding the need for raw material production. The removed fences are transported to a waste recycling facility, while the remaining 15% is assumed to be disposed of in a landfill.

LIFE CYCLE DIAGRAM



LIFE-CYCLE ASSESSMENT

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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1. Data quality has been assessed according to time, technical, and geographical representativeness in the LCA report.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are made according to the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Mass and Economic
Packaging material	Mass Allocation
Ancillary materials	Mass Allocation
Manufacturing energy and waste	Mass Allocation

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on average results of product group - by total volume
Variation in GWP-fossil for A1-A3, %	Less than 10%

This EPD is product and factory specific.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	9,99E+01	1,41E+00	2,27E+00	1,04E+02	4,20E+00	3,32E-01	MNR	MNR	MNR	7,09E+01	MNR	MNR	MNR	1,58E-02	1,69E+00	7,53E-01	3,67E-02	-2,61E+01
GWP – fossil	kg CO ₂ e	9,97E+01	1,41E+00	2,28E+00	1,03E+02	4,19E+00	3,15E-01	MNR	MNR	MNR	7,08E+01	MNR	MNR	MNR	1,57E-02	1,68E+00	7,53E-01	3,67E-02	-2,61E+01
GWP – biogenic	kg CO ₂ e	8,60E-02	3,11E-04	-7,91E-03	7,84E-02	8,32E-04	1,73E-02	MNR	MNR	MNR	6,13E-02	MNR	MNR	MNR	3,52E-05	3,68E-04	-1,60E-03	-1,17E-05	3,73E-02
GWP – LULUC	kg CO ₂ e	6,76E-02	6,27E-04	4,18E-04	6,86E-02	1,48E-03	2,67E-04	MNR	MNR	MNR	5,99E-02	MNR	MNR	MNR	4,82E-05	7,46E-04	9,30E-04	2,10E-05	6,71E-03
Ozone depletion pot.	kg CFC-11e	7,51E-07	1,99E-08	1,41E-08	7,85E-07	8,34E-08	5,72E-09	MNR	MNR	MNR	7,10E-07	MNR	MNR	MNR	2,90E-10	2,36E-08	1,01E-08	1,06E-09	-1,30E-07
Acidification potential	mol H ⁺ e	6,45E-01	4,73E-03	2,85E-02	6,78E-01	1,31E-02	1,33E-03	MNR	MNR	MNR	5,34E-01	MNR	MNR	MNR	9,24E-05	5,62E-03	8,96E-03	2,60E-04	-9,11E-02
EP-freshwater ²⁾	kg Pe	4,27E-02	1,10E-04	4,75E-03	4,76E-02	2,78E-04	1,26E-04	MNR	MNR	MNR	3,02E-02	MNR	MNR	MNR	1,46E-05	1,31E-04	4,85E-04	3,02E-06	-1,45E-02
EP-marine	kg Ne	9,91E-02	1,54E-03	2,71E-03	1,03E-01	4,42E-03	2,79E-04	MNR	MNR	MNR	7,73E-02	MNR	MNR	MNR	1,45E-05	1,82E-03	1,98E-03	9,92E-05	-1,46E-02
EP-terrestrial	mol Ne	2,01E+00	1,67E-02	1,70E-02	2,04E+00	4,81E-02	2,82E-03	MNR	MNR	MNR	1,81E+00	MNR	MNR	MNR	1,30E-04	1,98E-02	2,24E-02	1,08E-03	-2,69E-01
POCP (“smog”) ³⁾	kg NMVOCe	3,40E-01	6,65E-03	6,26E-03	3,53E-01	2,06E-02	1,20E-03	MNR	MNR	MNR	2,67E-01	MNR	MNR	MNR	4,28E-05	7,82E-03	6,64E-03	3,88E-04	-8,29E-02
ADP-minerals & metals ⁴⁾	kg Sbe	1,28E-03	4,54E-06	5,30E-06	1,29E-03	1,37E-05	2,02E-06	MNR	MNR	MNR	1,06E-03	MNR	MNR	MNR	2,12E-07	5,53E-06	5,34E-05	5,83E-08	-8,34E-04
ADP-fossil resources	MJ	1,12E+03	1,99E+01	2,79E+01	1,17E+03	5,89E+01	5,47E+00	MNR	MNR	MNR	8,83E+02	MNR	MNR	MNR	3,66E-01	2,36E+01	1,01E+01	9,01E-01	-2,55E+02
Water use ⁵⁾	m ³ e depr.	5,32E+01	9,34E-02	5,70E-01	5,38E+01	2,89E-01	8,09E-02	MNR	MNR	MNR	4,40E+01	MNR	MNR	MNR	9,97E-03	1,10E-01	1,82E-01	2,60E-03	5,16E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. 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 experience with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	1,05E+02	2,73E-01	4,21E+00	1,09E+02	1,02E+00	3,69E-01	MNR	MNR	MNR	9,43E+01	MNR	MNR	MNR	1,00E-01	3,24E-01	1,88E+00	8,70E-03	-4,16E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	6,60E-02	6,60E-02	0,00E+00	-6,60E-02	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,02E-03
Total use of renew. PER	MJ	1,05E+02	2,73E-01	4,28E+00	1,09E+02	1,02E+00	3,03E-01	MNR	MNR	MNR	9,43E+01	MNR	MNR	MNR	1,00E-01	3,24E-01	1,88E+00	8,70E-03	-4,15E+01
Non-re. PER as energy	MJ	1,12E+03	1,99E+01	2,68E+01	1,17E+03	5,89E+01	3,14E+00	MNR	MNR	MNR	8,83E+02	MNR	MNR	MNR	3,66E-01	2,36E+01	1,01E+01	9,01E-01	-2,55E+02
Non-re. PER as material	MJ	0,00E+00	0,00E+00	1,04E+00	1,04E+00	0,00E+00	1,33E+00	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,01E-01
Total use of non-re. PER	MJ	1,12E+03	1,99E+01	2,79E+01	1,17E+03	5,89E+01	4,47E+00	MNR	MNR	MNR	8,83E+02	MNR	MNR	MNR	3,66E-01	2,36E+01	1,01E+01	9,01E-01	-2,55E+02
Secondary materials	kg	1,72E+01	8,89E-03	3,12E-03	1,72E+01	2,70E-02	1,48E-02	MNR	MNR	MNR	3,24E+01	MNR	MNR	MNR	6,05E-05	1,06E-02	1,23E-02	2,27E-04	2,09E+01
Renew. secondary fuels	MJ	8,89E-03	1,13E-04	2,66E-03	1,17E-02	3,41E-04	8,23E-05	MNR	MNR	MNR	6,98E-03	MNR	MNR	MNR	4,83E-07	1,35E-04	5,73E-04	4,69E-06	-3,69E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	7,97E-01	2,69E-03	1,62E-02	8,16E-01	7,93E-03	1,90E-03	MNR	MNR	MNR	1,10E+00	MNR	MNR	MNR	3,16E-04	3,13E-03	5,37E-03	9,37E-04	-1,02E+00

8) PER = Primary energy resources. **END OF LIFE – WASTE**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	3,48E+01	3,46E-02	4,77E-02	3,49E+01	8,45E-02	7,52E-02	MNR	MNR	MNR	2,81E+01	MNR	MNR	MNR	9,25E-04	4,12E-02	6,61E-02	9,95E-04	-1,83E+01
Non-hazardous waste	kg	4,34E+02	6,48E-01	3,41E+01	4,69E+02	1,78E+00	1,06E+00	MNR	MNR	MNR	1,54E+02	MNR	MNR	MNR	7,15E-02	7,73E-01	2,39E+00	2,27E-02	4,40E+02
Radioactive waste	kg	1,41E-03	4,00E-06	2,65E-05	1,44E-03	1,87E-05	7,14E-06	MNR	MNR	MNR	1,87E-03	MNR	MNR	MNR	2,59E-06	4,69E-06	2,20E-05	1,38E-07	-1,57E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,50E-03	MNR	MNR	MNR	5,87E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	3,33E+01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,03E-02	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	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	3,35E-02	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,68E-02	MNR	MNR	MNR	0,00E+00	MNR	MNR	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e	9,98E+01	1,41E+00	2,28E+00	1,03E+02	4,20E+00	3,15E-01	MNR	MNR	MNR	7,09E+01	MNR	MNR	MNR	1,58E-02	1,69E+00	7,54E-01	3,67E-02	-2,61E+01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO₂ is set to zero.

SCENARIO DOCUMENTATION

MANUFACTURING ENERGY SCENARIO DOCUMENTATION A3

SCENARIO PARAMETER	VALUE
ELECTRICITY DATA SOURCE AND QUALITY	Electricity, medium voltage, residual mix (Reference product: electricity, medium voltage);
ELECTRICITY CO ₂ E / kWh	1.11
DISTRICT HEATING DATA SOURCE AND QUALITY	Electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted (Reference product: electricity, low voltage)
ELECTRICITY CO ₂ E / kWh	0.085

INSTALLATION SCENARIO DOCUMENTATION A5

SCENARIO INFORMATION	VALUE
ANCILLARY MATERIALS FOR INSTALLATION (SPECIFIED BY MATERIAL) / KG OR OTHER UNITS AS APPROPRIATE	-
WATER USE / m ³	-
OTHER RESOURCE USE / KG	0,07 kg of metal bolts
QUANTITATIVE DESCRIPTION OF ENERGY TYPE (REGIONAL MIX) AND CONSUMPTION DURING THE INSTALLATION PROCESS / kWh	0.478 kWh
WASTE MATERIALS ON THE BUILDING SITE BEFORE WASTE PROCESSING, GENERATED BY THE PRODUCT'S INSTALLATION (SPECIFIED BY TYPE) / KG	0.01201 kg of Plastic packaging 0,00525 kg of wood packaging
OUTPUT MATERIALS (SPECIFIED BY TYPE) AS RESULT OF WASTE PROCESSING AT THE BUILDING SITE E.G. COLLECTION FOR RECYCLING, FOR ENERGY RECOVERY, DISPOSAL (SPECIFIED BY ROUTE) / KG	0.0048 kg of plastic waste is recycled 0.0044 kg of plastic waste is incinerated 0.0028 kg of plastic waste is landfilled 0.0017 kg of wooden waste is recycled 0.0016 kg of wooden waste is incinerated 0.0020 kg of wooden waste is landfilled
DIRECT EMISSIONS TO AMBIENT AIR, SOIL AND WATER / KG	-

USE STAGES SCENARIO DOCUMENTATION - B4 REPLACEMENT

SCENARIO INFORMATION	VALUE
REPLACEMENT CYCLE / NUMBER PER RSL OR YEAR	One replacement assumed in RSL; No scheduled replacement; replaced only if damaged (accident)
ENERGY INPUT DURING REPLACEMENT, E.G., CRANE ACTIVITY, ENERGY CARRIER TYPE, E.G., ELECTRICITY AND AMOUNT (IF APPLICABLE AND RELEVANT) / kWh	-
EXCHANGE OF WORN PARTS DURING THE PRODUCT'S LIFE CYCLE, E.G., ZINC GALVANIZED STEEL SHEET (SPECIFY MATERIALS) / KG	-

END OF LIFE SCENARIO DOCUMENTATION

SCENARIO INFORMATION	VALUE
COLLECTION PROCESS — KG COLLECTED SEPARATELY	39.14 kg of metal waste
COLLECTION PROCESS — KG COLLECTED WITH MIXED WASTE	-
RECOVERY PROCESS — KG FOR RE-USE	-
RECOVERY PROCESS — KG FOR RECYCLING	33.27 kg of metal waste
RECOVERY PROCESS — KG FOR ENERGY RECOVERY	-
DISPOSAL (TOTAL) — KG FOR FINAL DEPOSITION	5.871 kg of steel
SCENARIO ASSUMPTIONS E.G. TRANSPORTATION	250 km to recycling plant & 50 km to landfill

TRANSPORT SCENARIO DOCUMENTATION A4

SCENARIO PARAMETER	VALUE
FUEL AND VEHICLE TYPE. EG, ELECTRIC TRUCK, DIESEL POWERED TRUCK	Market for transport, freight, lorry 16-32 metric ton, EURO5 (Reference product: transport, freight, lorry 16-32 metric ton, EURO5)
AVERAGE TRANSPORT DISTANCE, KM	554,12 km
CAPACITY UTILIZATION (INCLUDING EMPTY RETURN) %	-
BULK DENSITY OF TRANSPORTED PRODUCTS	-
VOLUME CAPACITY UTILIZATION FACTOR	≥ 1

SCALING TABLE

REFERENCE SCALING TABLE FOR 1KG OF STEEL GUARDRAILS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	2.55E+00	3.60E-02	5.80E-02	2.66E+00	1.07E-01	8.48E-03	MNR	MNR	MNR	1.81E+00	MNR	MNR	MNR	4.04E-04	4.32E-02	1.92E-02	9.38E-04	-6.67E-01
GWP – fossil	kg CO ₂ e	2.55E+00	3.60E-02	5.83E-02	2.63E+00	1.07E-01	8.05E-03	MNR	MNR	MNR	1.81E+00	MNR	MNR	MNR	4.01E-04	4.29E-02	1.92E-02	9.38E-04	-6.67E-01
GWP – biogenic	kg CO ₂ e	2.20E-03	7.95E-06	-2.02E-04	2.00E-03	2.13E-05	4.42E-04	MNR	MNR	MNR	1.57E-03	MNR	MNR	MNR	8.99E-07	9.40E-06	-4.09E-05	-2.99E-07	9.53E-04
GWP – LULUC	kg CO ₂ e	1.73E-03	1.60E-05	1.07E-05	1.75E-03	3.78E-05	6.82E-06	MNR	MNR	MNR	1.53E-03	MNR	MNR	MNR	1.23E-06	1.91E-05	2.38E-05	5.37E-07	1.71E-04
Ozone depletion pot.	kg CFC-11e	1.92E-08	5.08E-10	3.60E-10	2.01E-08	2.13E-09	1.46E-10	MNR	MNR	MNR	1.81E-08	MNR	MNR	MNR	7.41E-12	6.03E-10	2.58E-10	2.71E-11	-3.32E-09
Acidification potential	mol H ⁺ e	1.65E-02	1.21E-04	7.28E-04	1.73E-02	3.35E-04	3.40E-05	MNR	MNR	MNR	1.36E-02	MNR	MNR	MNR	2.36E-06	1.44E-04	2.29E-04	6.64E-06	-2.33E-03
EP-freshwater ²⁾	kg Pe	1.09E-03	2.81E-06	1.21E-04	1.22E-03	7.10E-06	3.22E-06	MNR	MNR	MNR	7.72E-04	MNR	MNR	MNR	3.73E-07	3.35E-06	1.24E-05	7.72E-08	-3.71E-04
EP-marine	kg Ne	2.53E-03	3.93E-05	6.92E-05	2.63E-03	1.13E-04	7.13E-06	MNR	MNR	MNR	1.97E-03	MNR	MNR	MNR	3.70E-07	4.65E-05	5.06E-05	2.53E-06	-3.73E-04
EP-terrestrial	mol Ne	5.14E-02	4.27E-04	4.34E-04	5.21E-02	1.23E-03	7.20E-05	MNR	MNR	MNR	4.62E-02	MNR	MNR	MNR	3.32E-06	5.06E-04	5.72E-04	2.76E-05	-6.87E-03
POCP (“smog”) ³⁾	kg NMVOCe	8.69E-03	1.70E-04	1.60E-04	9.02E-03	5.26E-04	3.07E-05	MNR	MNR	MNR	6.82E-03	MNR	MNR	MNR	1.09E-06	2.00E-04	1.70E-04	9.91E-06	-2.12E-03
ADP-minerals & metals ⁴⁾	kg Sbe	3.27E-05	1.16E-07	1.35E-07	3.30E-05	3.50E-07	5.16E-08	MNR	MNR	MNR	2.71E-05	MNR	MNR	MNR	5.42E-09	1.41E-07	1.36E-06	1.49E-09	-2.13E-05
ADP-fossil resources	MJ	2.86E+01	5.08E-01	7.13E-01	2.99E+01	1.50E+00	1.40E-01	MNR	MNR	MNR	2.26E+01	MNR	MNR	MNR	9.35E-03	6.03E-01	2.58E-01	2.30E-02	-6.51E+00
Water use ⁵⁾	m ³ e depr.	1.36E+00	2.39E-03	1.46E-02	1.37E+00	7.38E-03	2.07E-03	MNR	MNR	MNR	1.12E+00	MNR	MNR	MNR	2.55E-04	2.81E-03	4.65E-03	6.64E-05	1.32E-01

Note on scaling of results

The results presented in this EPD are valid per declared unit (1 m of steel guardrails).

For variants of the product with different weights but identical material composition and production processes, the environmental impacts scale proportionally with the mass of the product. This table is representative for 1kg of steel guardrails. For example, if 1 kg of guardrail has a GWP of x kg CO₂e, then 2 kg of guardrail will have a GWP of 2x kg CO₂e, and so on proportionally for higher quantities. This proportional scaling applies to all modules that are calculated per unit of mass (A1–A3, A4, A5, B4, C1–C4, D).

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15802+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Nemanja Nedic, as an authorized verifier acting for EPD Hub Limited
19.09.2025

