

GlobalEPD

A VERIFIED ENVIRONMENTAL DECLARATION



Environmental
Product
Declaration

EN ISO 14025:2010

EN 15804:2012+A2:2019

GlobalEPD PCR-010

AENOR

STEEL VEHICLE PARAPETS

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SIMEPROVI
ASOCIACIÓN ESPAÑOLA DE FABRICANTES
DE SISTEMAS METÁLICOS DE PROTECCIÓN VIAL

**ASOCIACIÓN ESPAÑOLA DE FABRICANTES DE
SISTEMAS METÁLICOS DE PROTECCIÓN VIAL.**



The holder of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included during the period of validity.



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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programs

The European Standard EN 15804:2012+A2:2020/AC:2021 serves as the basis for PCR

Independent verification of the declaration and data in accordance with EN ISO 14025:2010

Internal

External

Verification body

AENOR

Product certification body accredited by ENAC with accreditation N° 1/C-PR468

1. General information

1.1. The organisation

SIMEPROVI (Spanish Association of Manufacturers of Steel Road Restraint Systems) is a non-profit association whose objectives include promoting the use of restraint systems made from galvanized steel in all areas, as a highly effective alternative for reducing the consequences of accidents caused by vehicles leaving the carriageway and disseminating technical developments in the sector.

SIMEPROVI, among other activities, is a member of various national organizations in the steel and road sectors, actively participates in Spanish and European Technical Standardization Committees, organizes technical conferences, and publishes publications to disseminate industry developments.

Company members are able to provide a comprehensive solution for the supply and installation of steel barriers.

This sector-specific Environmental Product Declaration (EPD) has been prepared by SIMEPROVI for the following organizations:

- Auxiliar de Señalizaciones y Balizamientos, S.L (ASEBAL). José María Escuza, 1, 2º Centro - 48013 Bilbao.
- Gonvarri Asturias, S.A. Polígono Industrial de Cancienes, s/n – 33470 Corvera de Asturias
- Industrias Duero S.L. González Dávila, 1 - 28031 Madrid

1.2. Scope of the declaration

This sector-specific environmental product declaration describes environmental information related to the cradle-to-grave production life cycle of steel vehicle parapets.

The product system studied is the production of steel vehicle parapets, defined as safety barriers installed on structures such as bridges or retaining walls to retain and redirect vehicles that leave the carriageway uncontrollably, thereby reducing the harmful consequences of these types of accidents.

1.3. Life cycle and compliance

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025:2010 and UNE-EN 15804:2012+A2:2020 Standards and the RCP-010-AENOR GlobalEPD:

Table 1-1. Product Category Rules Information

PCR	Steel vehicle restraint systems.
Registration code and version	GlobalEPD RCP-010
Publication date	2025-03
Compliance	UNE-EN 15804:2012 + A2:2020
Programme Operator	AENOR

This EPD includes the life cycle stages indicated in Table 1-2. This EPD is of the cradle-to-grave type.

Table 1-2 System boundaries. Information modules considered

Product Stage	A1	Raw material extraction	X
	A2	Transport to factory	X
	A3	Manufacturer	X
Construction	A4	Transport to construction site	X
	A5	Installation/construction	X
Use Stage	B1	Use	NR
	B2	Maintenance	NR
	B3	Repair	NR
	B4	Replacement	NR
	B5	Refurbishment	NR
	B6	Use of energy in service	NR
	B7	Use of water in service	NR
End of life	C1	Deconstruction/demolition	X
	C2	Transport	X
	C3	Waste treatment	X
	C4	Disposal	X
	D	Potential for reuse, recovery and/or recycling	X
X = Module included in the LCA; NR = Module not relevant; ND = Undeclared module			

This EPD may not be comparable with those developed in other Programmes or according to different reference documents, in particular it may not be

comparable with EPDs not developed and verified according to UNE-EN 15804+A2.

Similarly, this EPD may not be comparable if the origin of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products shall be done on the same function, applying the same declared unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the UNE-EN ISO 14025 standard.

1.4. Representativeness of the EPD.

The production of the participating companies represents more than 90% of the steel vehicle parapets market in Spain.

1.5. Differences from previous versions of this EPD.

- GlobalEPD 010-002 rev1 EN: Annex I is added.
- GlobalEPD 010-002 rev2 EN: Error correction in Table of Additional Environmental Indicators and images throughout the document.



2. The product

2.1. Identification of the product

This sectoral EPD applies to steel vehicle parapets manufactured by SIMEPROVI company members.

2.2. Product Performance

Steel vehicle parapets are safety barriers installed on bridges, retaining walls, or similar structures where there is a vertical drop. They may include additional restraint and protection for pedestrians or other road users (mixed vehicle and pedestrian systems).

Steel vehicle parapets are made up of the following components:

- Beams: elements arranged longitudinally, and which can have different profiles and thicknesses.
- Posts: elements anchored to the structure, and which can have different lengths, thicknesses, and cross sections. The spacing between posts varies from one railing to another.
- Auxiliary connecting pieces between beams and posts.
- Fastening elements (bolts, nuts, and washers).
- Anchoring elements to the structure.

The general installation process for metal railings consists of the following phases:

- Anchoring the posts to the structure.
- Assembly of the beams and auxiliary parts on the posts, using the corresponding fastening elements.

CPC Code: 532.

2.3. Product Composition

The composition of the steel barrier included in this study is:

Table 2-1. Average product composition

Substance/Component	% by weight
Steel from hot-rolled coil or sheet	88,83
Steel from wire rod	3,81
Zinc	6,00
Paint	1,36

The steel vehicle parapets are harmonized according to Standard EN 1317-5:2008 + A2 (2012) and bear the CE Marking.

This EPD also includes systems tested according to the United States NCHRP 350 (1993) and MASH (2016) standards.

To evaluate their performance under impact, full-scale tests defined in Standard UNE EN 1317-2 (2011) are used. These tests yield the following parameters that characterize the barriers:

- Containment level.
- Impact severity.
- Normalized deformation parameters: dynamic deflection, working width, and vehicle intrusion.

During the product's life cycle, no hazardous substances listed on the "Candidate List of Substances of Very High Concern (SVHC) for authorization" are used in a percentage greater than 0.1% of the product's weight.

The primary packaging used in product shipment (distribution packaging) was included in the study.

Table 2-2 Distribution packaging

Material	Kg/declare unit
Wood	5,02E-02
Paper	2,01E-07
Polypropylene	1,75E+00
Polyester	6,09E-05
Polyethylene	9,27E-08
Steel	2,28E-04
PVC	3,21E-09



3. Information regarding the LCA

3.1. Life Cycle Assessment

This EPD is based on a cradle-to-grave Life Cycle Assessment (LCA) carried out in accordance with the recommendations and requirements of international standards ISO 14040:2006 and ISO 14044:2006. The European Standard UNE-EN 15804:2012+A1:2014 and the Global EPD RCP-010 were used as reference standards.

The Life Cycle Assessment Report for the SIMEPROVI steel safety barriers sector EPD, dated November 2024, was prepared by Abaleo S.L. using the Ecoinvent 3.10 (January 2024) and Environmental Footprint 3.1 databases and SimaPro 9.6.0.1 software, which was the most up-to-date version available at the time of the LCA.

3.2. Scope of the study.

The scope of this sectoral EPD is the cradle-to-grave production of steel vehicle parapets.

The specific data on the steel vehicle parapets production process used in the LCA study come from the manufacturers' facilities with which this EPD was prepared and correspond to production data for 2021, which is considered a representative year.

The LCA does not include:

- All equipment with a useful life of more than 3 years.
- The construction of plant buildings and other capital assets.
- Staff business travel: nor staff travel to and from work.

- Research and development activities.

3.3. Declared Unit.

The declared unit is one kilogram (1 kg) of steel vehicle parapet.

3.4. Reference Service Life (RSL).

The Reference Service Life (RSL) of steel safety barriers is 50 years.

3.5. Allocation and cut off criteria.

In accordance with the criteria of the reference standard, the allocation of system inputs and outputs based on economic values has been applied due to the significant difference between product and by-product revenues. This allocation criterion has been applied to general plant consumption (raw material and energy consumption), emissions, transportation, and waste.

Scrap is generated as a by-product in the manufacturing of steel systems.

3.6. Cut-off rule

In accordance with the criteria of the reference standard, the gross weight/volume of all materials used in the manufacturing process has been included in the LCA, so as to obtain at least 99% of the unit weight of the product.

No material or energy consumption has been excluded.

3.7. Representativeness, quality and selection of data.

To model the manufacturing process of the average steel vehicle parapets, production data from the participating plants from 2021 were used. This data was considered representative of current manufacturing

conditions, and a weighted average was calculated based on the production of each plant. Data were obtained from these facilities on: material, fuel, and energy consumption; distances from suppliers; and waste generation and its transportation to the management company.

When necessary, the Ecoinvent 3.10 (January 2024) and Environmental Footprint 3.1 databases, the latest version available at the time of the LCA, were used. SimaPro 9.6.0.1 software, the most up-to-date version available at the time of the study, was used to obtain the inventory data, model the LCA, and calculate the environmental impact categories required by the reference standard.

The following criteria were applied to select the most representative processes:

- The data must be representative of the technological development actually applied in the manufacturing processes. If this information was unavailable, a representative data point for an average technology was chosen.
- The data must be as geographically accurate as possible and, where appropriate, regionalized.
- The data must be as current as possible.

To assess the quality of the primary data used in the LCA, the semi-quantitative data quality assessment criteria proposed by the European Union in its Guide to the Environmental Footprint of Products and Organizations are applied. The results obtained are as follows:

- Very good integrity. Score 1.
- Good methodological suitability and consistency. Score 2.
- Very good temporal representativeness. Score 1.
- Very good technological representativeness. Score 2.
- Very good geographical representativeness. Score 1.
- Low data uncertainty. Score 2.

According to the above data, the Data Quality Rating (DQR) takes the following value: $8/6 = 1.33$, which indicates excellent data quality.

To better understand the data quality assessment carried out, it is indicated that the score for each of the criteria varies from 1 to 5 (the lower the score, the higher the quality) and that the following table is applied to obtain the final score:

Overall Data Quality Score (DQR)	Overall data quality level
≤ 1,6	Excellent quality
1,6 a 2,0	Very good quality
2,0 a 3,0	Good quality
3 a 4,0	Reasonable quality
> 4	Insufficient quality

4. System boundaries, scenarios and additional technical information.

The product system studied in the Life Cycle Analysis of the steel vehicle parapets is from cradle to grave. The following production phases have been studied:

Module A1: Production of raw materials.

This module includes the raw material production process, which considers:

- Resource extraction and raw material production.
- Transportation to raw material processing/production centers.
- Energy and fuel consumption during raw material production.
- Consumption of other resources (such as water) during raw material production.
- Generation of waste and emissions into the air, and discharges into water and soil, during raw material production.
- Generation of electricity used in the manufacturing process.

Module A2: Transportation.

The truck and boat transportation of all materials used in production has been considered, from the production sites (suppliers) to the facilities where they are used. The transportation distances for raw materials have been provided by plant managers, who are aware of the location of their suppliers.

Module A3: Manufacturing.

This stage considers the consumption of auxiliary materials for production, as well as the transportation and management of waste generated during this life cycle stage to the treatment site. The transportation distances for waste have been provided by plant managers, who are aware of the location of their waste management facilities.



Table 4-1. Stages and information modules of the Life Cycle according to UNE-EN 15804

Life Cycle Information													Additional information	
A1 a 3			A4 - A5		B1 a 7					C1 a 4				D
Product stage			Construction Process stage		Use stage					End-of-life stage				Benefits and loads beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
X	X	X	X	X	NR	NR	NR	NR	NR	X	X	X	X	X
Supply of raw materials	Transport	Manufacturing	Transport	Construction Process	Use	Maintenance	Repair	Substitution	Rehabilitation	Deconstruction/ demolition	Transport	Waste treatment	Waste disposal	Potential for reuse, recovery and recycling
X	X	X	X	X	NR	NR	NR	NR	NR	X	X	X	X	

B6. Operational energy use
Scenario **NR**

X: Evaluated module

NR: Non-relevant module

B7. Operational water use
Scenario **NR**



Module A4: Transportation

The transportation of the finished product from the manufacturing facility to the customer has been considered, using data from 2021, distinguishing between the means of transportation used: truck, ship, or train.

Table 4-2 Parameters of module A4

Parameters	Value (per declared unit)
Liters of diesel: - EURO 6 Truck (GVW 15.79 t) - Boat	0,0436 l/tkm 0,0026 l/tkm
Medium distance - EURO 6 Truck - Boat	564,74 km 1.508,76 km
Capacity utilisation (including no-load return)	50 %
Useful capacity factor	The variability of product formats does not allow for the identification of useful capacity factor.
Direct emissions to the environment, soil and water	-

Module A5: Construction process

The material and energy consumption required for the installation of the steel restraint system on the road are included.

Table 4-3 Installation of the product

Scenario information	Result (expressed per functional or declared unit)
Supplementary materials for installation	Not required
Water use	0 m ³
Supplementary materials for installation	-
Quantitative description of the type of energy (regional mix) and consumption during the installation process	0,026 kWh
Waste of materials at the construction site before processing of waste generated at the	Wood – 8,74E-04 kg Cardboard – 1,54E-05 kg Plastic – 1,80E-05 kg Metal – 2,57E-06

Scenario information	Result (expressed per functional or declared unit)
product installation (specified by type)	
Output of materials (specified by type) as a result of waste treatment waste at the construction site, e.g. from waste collected for recycling, energy recovery, disposal (specified by route)	To recycle – 0,0009kg
Direct emissions to ambient air, soil and water	-

Module B1: Use

Not relevant. Not applicable to steel restraint systems.

Module B2: Maintenance.

Not relevant. Maintenance is considered infrequent and impacts are negligible.

Module B3: Repair.

Not relevant. It depends on traffic intensity, number of accidents, etc., and is therefore not considered exclusively product-dependent.

Module B4: Replacement.

Not relevant. It depends on traffic intensity, number of accidents, etc., and is therefore not considered exclusively product-dependent.

Module B5: Renovation.

Not relevant. It depends on traffic intensity, number of accidents, etc., and is therefore not considered exclusively product-dependent.

Module B6: Energy Consumption

Not relevant. Not applicable to steel vehicle restraint systems.

Module B7: Water Consumption.

Not relevant. Not applicable to steel vehicle restraint systems.

Module C1– Deconstruction/Demolition.

This includes the material and energy consumption required for the removal of steel restraint systems at the end of their useful life. Removal operations are estimated to be similar to installation operations.

Module C2: Transport to the waste treatment/recovery site.

It is assumed that, at the end of its useful life, the studied product is transported by road an average distance of 100 km to the waste management point, using EURO6 trucks of 16-32 tonnes.

Module C3 - Waste Treatment, and Module C4 - Waste Disposal.

To determine the recycling, landfill, and incineration percentages for the studied products, the criteria in Part C of Annex 2 V2.1 (May 2020) of the Footprint Formula Circular of the European Union Environmental Footprint methodology (COMMISSION RECOMMENDATION (EU) 2021/2279 of 15 December 2021 on the use of environmental footprint methods to measure and report the environmental performance of products and organizations throughout their life cycle) are applied.

Table 4-4 End of life

Parameter	Unit (expressed by declared unit)
Demolition	0,026 kWh
Recovery system, specified by type	0 kg for reuse 950 kg for recycling
Disposal, specified by type	27,5 kg for final disposal (landfill) 22,5 kg for incineration

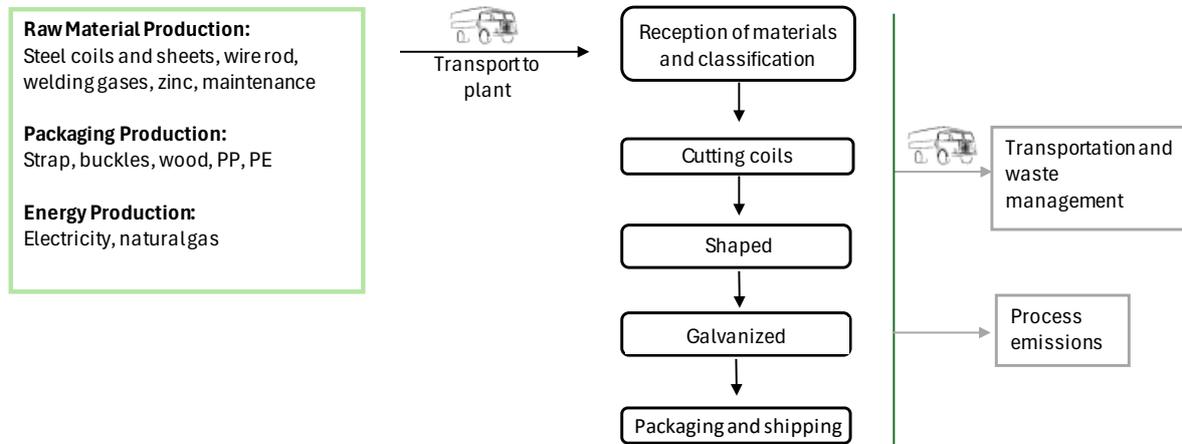
Module D: Benefits beyond the system.

Module D includes the reuse and recycling potential, expressed as net burdens and benefits related to secondary material recovered as it exits the product system, calculating the material substitution effects only for the net resulting output flow from the product stage.

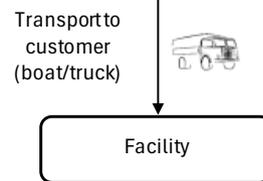
To represent this module, data related to steel consumption were considered: 56.92% of the steel used comes from blast furnaces; the remaining 43.08% comes from electric arc furnaces, excluding the percentage of scrap used from the Ecoinvent process (16.89%) from the calculation.

The boundaries of the system studied in the Life Cycle Analysis are shown below in the attached diagram:

PRODUCT STAGE. MODULES A1-A3

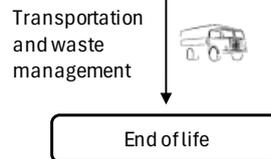


CONSTRUCTION STAGE. A4-A5 MODULES



STAGE OF USE. MODULES B1-B7

END-OF-LIFE STAGE. MODULES C AND D



5. Declaration of LCA and LCI environmental parameters.

Below are the various environmental parameters obtained from the Life Cycle Assessment (LCA) for the production of 1 kilogram of the product studied.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.

Mandatory environmental indicators according to EN 15804 (reference package EF 3.1)

Steel vehicle parapets Declared unit: 1 kilogram													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2,04E+00	5,55E-02	3,38E-01	2,43E+00	1,01E-01	8,85E-03	NR	8,84E-03	1,52E-02	4,70E-03	2,67E-04	-9,99E-01
GWP-fossil	kg CO2 eq	2,04E+00	5,55E-02	4,20E-01	2,51E+00	1,01E-01	8,85E-03	NR	8,84E-03	1,52E-02	4,68E-03	2,67E-04	-9,99E-01
GWP-biogenic	kg CO2 eq	1,24E-03	2,05E-06	-8,34E-02	-8,21E-02	3,79E-06	4,16E-07	NR	4,00E-07	5,72E-07	7,86E-06	3,18E-07	-4,26E-05
GWP-luluc	kg CO2 eq	1,05E-03	1,50E-06	8,71E-04	1,93E-03	2,57E-06	3,51E-07	NR	3,50E-07	3,73E-07	9,74E-06	8,71E-09	-7,87E-05
ODP	kg CFC11 eq	1,17E-08	9,57E-10	1,13E-08	2,39E-08	1,96E-09	1,38E-10	NR	1,38E-10	3,10E-10	7,40E-11	5,12E-12	-1,65E-09
AP	mol H+ eq	8,00E-03	9,88E-04	2,07E-03	1,11E-02	6,93E-04	4,51E-05	NR	4,49E-05	1,77E-05	3,02E-05	1,96E-06	-2,32E-03
EP-freshwater	kg P eq	1,01E-04	4,54E-08	1,98E-05	1,21E-04	8,42E-08	1,01E-08	NR	1,00E-08	1,27E-08	3,00E-07	9,49E-10	-2,40E-05
EP-marine	kg N eq	1,83E-03	2,47E-04	1,44E-03	3,51E-03	1,70E-04	2,05E-05	NR	2,05E-05	3,93E-06	9,04E-06	9,01E-07	-4,79E-04
EP-terrestrial	mol N eq	1,86E-02	2,75E-03	7,16E-03	2,85E-02	1,89E-03	2,25E-04	NR	2,24E-04	4,29E-05	9,97E-05	9,89E-06	-5,59E-03
POCP	kg NMVOC eq	6,99E-03	7,76E-04	4,31E-03	1,21E-02	6,48E-04	7,28E-05	NR	7,26E-05	3,84E-05	3,04E-05	3,04E-06	-1,91E-03
ADP-minerals & metals ²	kg Sb eq	1,11E-05	1,17E-09	8,50E-05	9,61E-05	2,92E-09	3,67E-10	NR	3,66E-10	5,02E-10	2,59E-10	1,07E-11	-1,05E-07
ADP-fossil ²	MJ	2,23E+01	7,06E-01	8,40E+00	3,15E+01	1,32E+00	1,15E-01	NR	1,15E-01	2,00E-01	9,54E-02	3,53E-03	-6,80E+00
WDP ²	m3	8,12E-01	2,85E-04	2,37E-01	1,05E+00	5,43E-04	9,74E-05	NR	9,64E-05	8,37E-05	8,17E-04	4,54E-06	-4,45E-02

GWP - Total: Global Warming Potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic:** Biogenic Global Warming Potential; **GWP - luluc :** Global warming potential of land use and land use change; **ODP:** Stratospheric Ozone Depletion Potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment; **EP-marine:** Eutrophication potential, fraction of nutrients that reach the final compartment of seawater; **EP-terrestrial:** Eutrophication potential, cumulative surplus; **POCP:** tropospheric ozone formation potential; **ADP-minerals&metals:** Abiotic resource depletion potential for non-fossil resources; **ADP-fossil:** Abiotic Resource Depletion Potential for fossil resources; **WDP:** Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Additional environmental impacts

Steel vehicle parapets													
Declared unit: 1 kilogram													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG*	kg CO2 eq	2,04E+00	5,55E-02	4,23E-01	2,52E+00	1,01E-01	8,85E-03	NR	8,84E-03	1,52E-02	4,70E-03	2,67E-04	-9,99E-01
PM	disease incidence	1,76E-07	2,40E-09	1,06E-08	1,89E-07	5,31E-09	8,78E-10	NR	8,77E-10	8,98E-10	4,66E-10	7,27E-11	-6,48E-08
IRP ¹	kBq U235 eq	3,96E-02	7,48E-05	3,31E-02	7,27E-02	1,67E-04	1,23E-05	NR	1,22E-05	2,73E-05	6,70E-04	4,54E-07	-1,40E-03
ETP-fw ²	CTUe	5,50E+01	2,51E-02	3,81E+01	9,31E+01	4,58E-02	4,19E-03	NR	4,10E-03	6,86E-03	6,61E-03	5,17E-03	-2,61E+01
HTP-c ²	CTUh	1,60E-07	6,43E-12	1,65E-09	1,62E-07	8,67E-12	8,29E-12	NR	8,27E-12	1,06E-12	1,13E-12	3,89E-13	-7,43E-08
HTP-nc ²	CTUh	3,18E-08	2,22E-10	4,01E-08	7,21E-08	5,85E-10	2,10E-11	NR	1,96E-11	1,01E-10	1,97E-11	1,49E-12	-1,58E-09
SQP ²	disease incidence	3,36E+00	1,34E-03	2,90E+00	6,26E+00	2,81E-03	3,03E-04	NR	2,90E-04	4,49E-04	1,07E-02	3,43E-03	-7,52E-01

PM: Potential incidence of diseases due to particulate matter (PM) emissions; **IRP:** Human Potential Exposure Efficiency Relative to U235; **ETP-fw:** Comparative Ecosystem Toxic Unit Potential - Freshwater; **HTP-c:** Comparative Ecosystem Toxic Unit Potential - Carcinogenic Effects; **HTP-nc:** Comparative Ecosystem Toxic Unit Potential - Non-Carcinogenic Effects; **SQP:** Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category primarily addresses the potential impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider effects due to potential nuclear accidents or occupational exposure from radioactive waste disposal at underground facilities. The ionizing radiation potential of soil, due to radon, or some building materials, is also not measured in this parameter.

Notice 2. The results of this environmental impact indicator should be used with caution as the uncertainties in the results are high and experience with this parameter is limited.

*This indicator accounts for all greenhouse gases except the uptake and emissions of biogenic carbon dioxide and biogenic carbon stored in the product. As such, the indicator is identical to the total GWP except that the CF for biogenic CO2 is set to zero.

Use of resources

Steel vehicle parapets													
Declared unit: 1 kilogram													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	1,88E+00	1,85E-03	9,20E-01	2,80E+00	4,22E-03	3,18E-04	NR	3,17E-04	6,96E-04	1,72E-02	1,36E-05	-6,34E-02
PERM*	MJ	0,00E+00	0,00E+00	8,30E-01	8,30E-01	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,88E+00	1,85E-03	1,75E+00	3,63E+00	4,22E-03	3,18E-04	NR	3,17E-04	6,96E-04	1,72E-02	1,36E-05	-6,34E-02
PENRE	MJ	2,23E+01	7,06E-01	8,40E+00	3,15E+01	1,32E+00	1,15E-01	NR	1,15E-01	2,00E-01	9,54E-02	3,53E-03	-6,80E+00
PENRM*	MJ	4,55E-04	0,00E+00	6,89E+01	6,89E+01	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,23E+01	7,06E-01	7,73E+01	1,00E+02	1,32E+00	1,15E-01	NR	1,15E-01	2,00E-01	9,54E-02	3,53E-03	-6,80E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,19E-02	1,59E-05	6,81E-03	2,88E-02	3,25E-05	3,89E-06	NR	3,83E-06	5,14E-06	6,23E-05	1,81E-07	-1,15E-03

PERE: Use of renewable primary energy excluding primary renewable energy resources used as raw material; **PERM:** Use of primary renewable energy used as raw material; **PERT:** Total use of primary renewable energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials; **PENRM:** Use of non-renewable primary energy used as raw material; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of running water resources; **NR:** Not relevant

* The energy used as raw material is declared according to option B of PCR 2019:14 – the energy used as raw material indicator reflects the energy used as raw material in the product and packaging and is not subsequently transferred in a useful form to another product system.

Waste Categories

Steel vehicle parapets Declared unit: 1 kilogram													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	1,54E-04	4,02E-06	5,68E-04	7,26E-04	8,34E-06	7,91E-07	NR	7,89E-07	1,33E-06	2,43E-07	2,29E-08	-7,80E-05
NHWD	kg	5,94E-02	1,62E-05	1,48E-02	7,43E-02	3,69E-05	3,17E-05	NR	3,57E-06	6,11E-06	4,36E-05	4,23E-02	-4,49E-03
RWD	kg	2,70E-05	4,73E-08	2,13E-05	4,84E-05	1,13E-07	7,14E-09	NR	7,12E-09	1,88E-08	5,43E-07	2,99E-10	-8,33E-07

HWD: Hazardous Waste Disposed; **NHWD:** Non-hazardous waste disposed; **RWD:** Radioactive waste disposed; **NR:** Not relevant

Output flows

Steel vehicle parapets Declared unit: 1 kilogram													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	2,62E-01	2,62E-01	0,00E+00	9,10E-04	NR	0,00E+00	0,00E+00	8,50E-01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NR	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	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU: Components for reuse; **MFR:** Materials for recycling; **MER:** Materials for energy recovery; **EE:** Exported energy; **NR:** Not relevant

Information on biogenic carbon content

Steel vehicle parapets Declared unit: 1 kilogram	
Product biogenic carbon content – KgC/declared unit	0
Biogenic carbon content packaging – KgC/declared unit	2,31-E02

The Annex indicates the coefficient of passage of the declared unit per linear meter based on the weight per meter of the steel safety barrier.

6. Additional Environmental Information.

6.1. Others indicators.

The production of bridge parapets by SIMEPROVI company members generates scrap as a co-product.

	Safety barriers <i>Declared unit: 1 kilogram</i>
Scrap – kg/declared unit	2,62E-01

6.2. Emissions to indoor air.

The steel vehicle parapets do not generate significant emissions to indoor air during their useful life.

6.3. Emissions to soil and water.

The steel vehicle parapets do not generate significant emissions to soil or water during their useful life.

6.4. Biogenic carbon content

The manufacturer declares that the product studied does not contain materials containing biogenic carbon.

6.5. Electricity mix used

The electricity mix used to characterize electricity for 2021 is that of the marketing companies, obtained from the Annual Report of the National Commission on Markets and Competition (CNMC), with the following GWP values (IPCC 2021 at 100 years):

- 0.259 kgCO₂/kWh – INTEGRACIÓN EUROPEA DE ENERGÍA S.A.U.
- 0.232 kgCO₂/kWh – IBERDROLA CLIENTES S.A.U.
- 0.258 kgCO₂/kWh – ENDESA ENERGÍA S.A.U.
- 0.259 kgCO₂/kWh – ELECTRICIDAD ELEIA S.L.

ANNEX I

Declared unit pitch coefficient per linear meter based on the weight per meter of the metal bridge parapets.

Steel vehicle parapets													
<i>Declared unit: one kilogram (1 kg)</i>													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2,04E+00	5,55E-02	3,38E-01	2,43E+00	1,01E-01	8,85E-03	NR	8,84E-03	1,52E-02	4,70E-03	2,67E-04	-9,99E-01

An example is provided below to explain how to calculate the data for the environmental parameters of the EPD, expressed in the tables above to produce 1 kilogram of steel vehicle parapet (declared unit), per linear meter. To do this, simply multiply all the data in the tables above by the weight per linear meter of barrier.

For example, if the weight per linear meter = 72 kilograms

The following table shows the data per linear meter.

The data in each cell of the table above has been multiplied by 72 kg; for example, in A1, 2,04E+00 x 72 = 1.47E+02.

Steel vehicle parapets													
<i>Results for 1 linear meter</i>													
Parameter	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,47E+02	4,00E+00	2,43E+01	1,75E+02	7,27E+00	6,37E-01	NR	6,36E-01	1,09E+00	3,38E-01	1,92E-02	-7,19E+01

References

- [1] UNE-EN 15804:2012+A2:2020/AC:2021. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
- [2] General Rules of the GlobalEPD Program, 3rd revision. AENOR. September 2023.
- [3] Product Category Rules "Steel vehicle restraint systems" RCP-010-AENOR GlobalEPD. September 2024.
- [4] UNE-EN ISO 14025:2010 Environmental labels. Type III environmental declarations. Principles and procedures (ISO 14025:2006).
- [5] UNE-EN ISO 14040:2006/A1:2021. Environmental Management. Life Cycle Assessment. Principles and framework. Amendment 1. (ISO 14040:2006/Amd 1:2020).
- [6] UNE-EN ISO 14044:2006/A1:2021 Standard. Environmental Management - Life-cycle assessment - Requirements and guidelines. Amendment 2. (ISO 14044:2006/Amd 2:2020).
- [7] Life-cycle analysis report for the sector-specific Environmental Product Declaration for galvanized steel road restraint systems, by SIMEPROVI, prepared by Abaleo S.L., February 2025. Version 1.
- [8] Ecoinvent 3.10 database (January 2024).
- [9] Environmental impact assessment methodologies applied using SimaPro 9.6.0.1.

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