

Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

SAFENCE 4RC-96 (H1-W5)

from

BLUE SYSTEMS



Programme:

The International EPD® System, www.environdec.com

Programme operator:

EPD International AB

EPD registration number:

S-P-04731

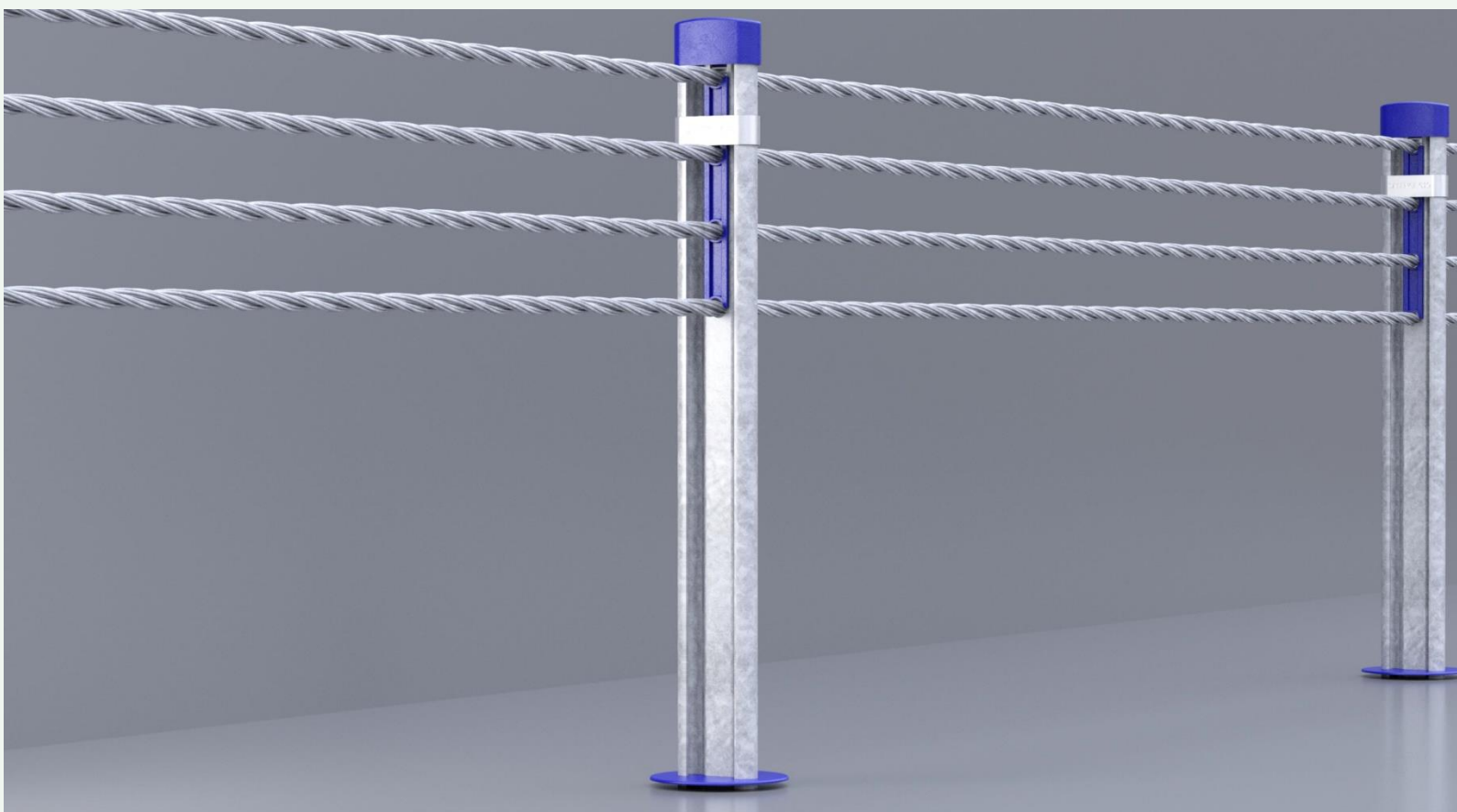
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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CEN standard EN 15804+A2:2019 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 v1.11 Construction products. C-PCR-010 (TO PCR 2019:14) v2021-04-23 Guardrails and Bridge parapets. UN CPC 532
PCR review was conducted by: <i>The technical committee of the international EPD System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Chair of the review: Claudia A. Peña.</i>
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: <i>Pär Lindman, Miljögiraff</i>
Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner 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. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Blue Systems

Contact: Daniel Maglica

Description of the organisation: Blue Systems AB commenced operations in 1992 by supplying the fishing industry with cable products and began with the production of cable barriers in 1993. Our operations have expanded into several countries since, and today Blue Systems AB is a road safety company specializing in road safety barriers. Our business concept is to offer our customers simple and environmentally friendly system solutions for road safety.

This environmental product declaration presents the performance of SAFENCE 4RC-96 (H1-W5), manufactured in Vildbjerg, Denmark.

Product-related or management system-related certifications: Management system according to EN 1317-5 in order to secure the consistency of performance for safety barriers manufactured at Brdr. Markussens Metalvarefabrik A/S.

Name and location of production site(s): Brdr. Markussens Metalvarefabrik A/S, Vildbjerg, Denmark

Product information

Product name: SAFENCE 4RC-96 (H1-W5)

Product description: Bi-directional cable barrier to be installed as median- and/or side barrier. Safence 4RC-96 utilizes 4 wire ropes and CC-post distance of 2.5 m and has the following declared performance:

Containment Level	H1
Impact Severity Class	A
Working Width Level	W5
Normalized Vehicle intrusion class	n/a
Normalized dynamic deflection	1.5 m
Ground surface at installation site	Paved road, asphalt
Installation method	Hydraulic punched holes fitted with steel sleeves to hold posts.

UN CPC code: 532

LCA information

Functional unit / declared unit: meter H1-W5 guardrail

Reference service life: 25 years

Time representativeness: Data represents the year 2022.

Database(s) and LCA software used: Ecoinvent 3.7, OpenLCA

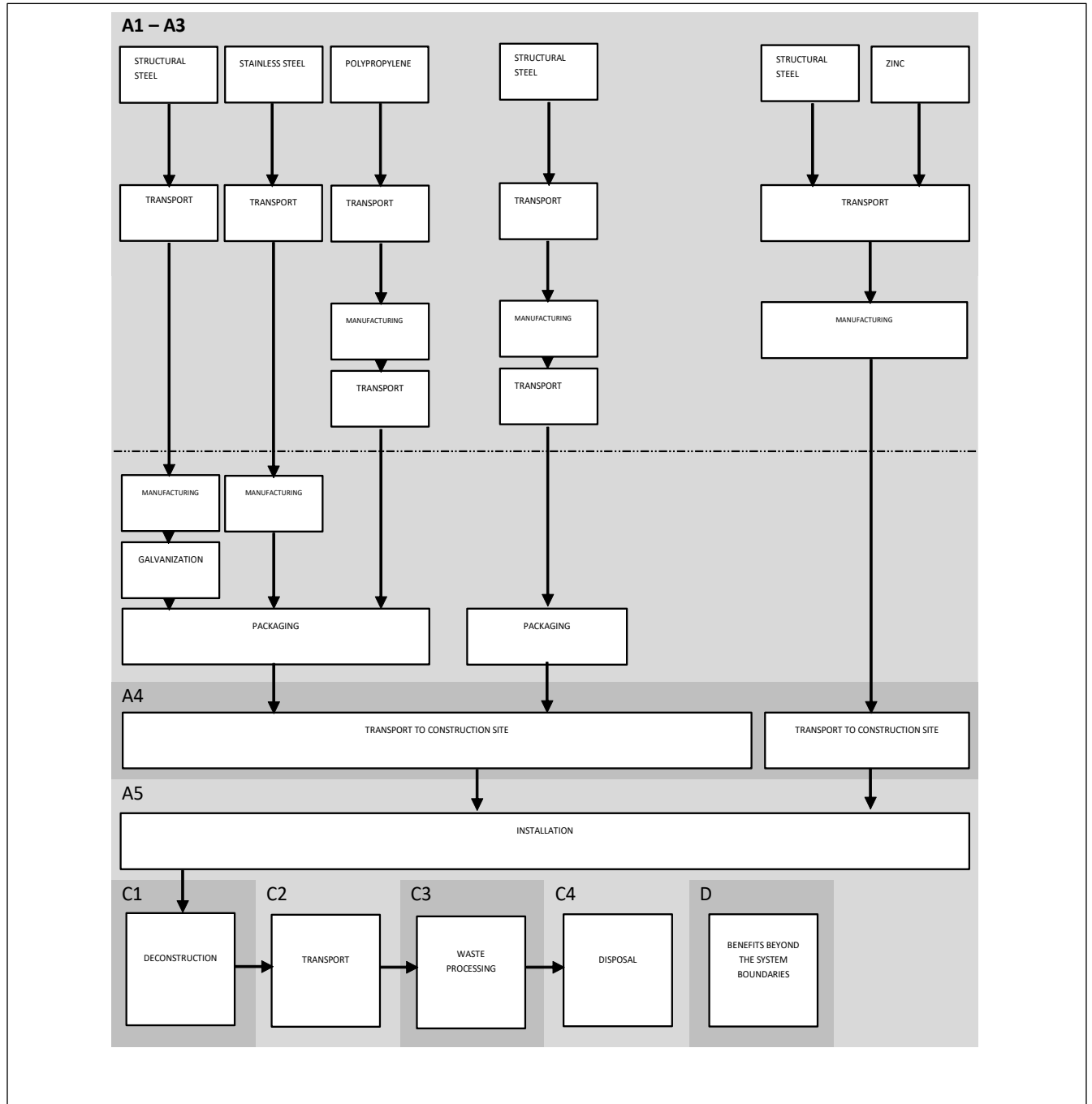
Description of system boundaries: The LCA has been conducted as a cradle to gate with options according to C-PCR 010: Guardrails and Bridge parapets (EPD International, 2021). The product stage (A1-A3), construction process stage (A4-A5), end of life stage (C1-C4) as well as benefits and loads beyond the system boundary (D) are included, whereas the use stage (B1-B7) is excluded from the product system in accordance with C-PCR 010: Guardrails and Bridge parapets (EPD International, 2021). All processes of which Blue Systems or Brdr. Markussens metalvare fabrik are managing have been measured specifically, however background and foreground data has been used when EPDs of suppliers have not been released for EN 15804+A2:2019.

Waste assumptions: With respect to the waste scenarios, steel has been calculated with a 100% recyclability rate without quality losses. Polypropylene has been calculated with 86% recyclability rate with 10% quality losses. The disposed polypropylene is incinerated for 99% and 1% is

assumed to be put in landfill. All EOL scenarios are modelled within the geographical scope of Sweden.

Description of manufacturing process: All major production processes are fully autonomous. Material is loaded onto entering stages for robot cells and processed through operations such as folding, cutting, and welding.

System diagram:



Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	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	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X		
Geography	EU	EU	EU	SE	SE	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE		
Specific data used	90,25%					-	-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	0%					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Steel: S235, S355, AISI 304	7.98	19,9%	0%
Polypropylene	0.04	0%	0%
Zinc (from HDG)	0.48	0%	0%
TOTAL	8.50	18,68%	0%
Packaging materials	Weight, kg	Weight-% (versus the product)	
Euro flat pallet	0.25	2,94%	
Polypropylene bag	0.0016	0,02%	
Wooden cable drum	0.33	3,88%	
TOTAL	0.5816	6,84%	

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
Total	0	0	0%

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2,18E+01	6,92E-01	4,62E-01	4,62E-01	4,23E-01	2,76E-01	1,53E-02	-3,96E+00
GWP-biogenic	kg CO ₂ eq.	-4,56E-01	1,67E-03	3,60E-04	3,60E-04	1,02E-03	-1,24E-02	7,29E-07	-9,04E-02
GWP-luluc	kg CO ₂ eq.	3,68E-02	2,30E-04	3,66E-05	3,66E-05	1,40E-04	2,40E-04	4,82E-08	-4,49E-03
GWP-total	kg CO ₂ eq.	2,14E+01	6,94E-01	4,62E-01	4,62E-01	4,24E-01	2,64E-01	1,53E-02	-4,06E+00
ODP	kg CFC 11 eq.	1,67E-06	1,58E-07	9,97E-08	9,97E-08	9,68E-08	2,97E-08	2,56E-11	-2,46E-07
AP	mol H ⁺ eq.	1,14E-01	3,47E-03	4,82E-03	4,82E-03	2,12E-03	2,03E-03	2,32E-06	-1,84E-02
EP-freshwater	kg PO ₄ ³⁻ eq.	1,21E-02	4,69E-05	1,40E-05	1,40E-05	2,86E-05	1,50E-04	2,39E-08	-2,42E-03
EP-marine	kg N eq.	3,01E-02	1,21E-03	2,14E-03	2,14E-03	7,40E-04	6,20E-04	1,15E-06	-3,99E-03
EP-terrestrial	mol N eq.	2,88E-01	1,32E-02	2,34E-02	2,34E-02	8,08E-03	6,90E-03	1,15E-05	-4,06E-02
POCP	kg NMVOC eq.	1,01E-01	3,76E-03	6,43E-03	6,43E-03	2,30E-03	1,93E-03	2,84E-06	-1,15E-02
ADP-minerals&metals*	kg Sb eq.	1,61E-03	2,51E-06	1,87E-07	1,87E-07	1,54E-06	2,70E-05	6,05E-10	-3,51E-05
ADP-fossil*	MJ	2,96E+02	1,06E+01	6,35E+00	6,35E+00	6,45E+00	5,24E+00	2,32E-03	-5,71E+01
WDP	m ³	1,30E+01	4,63E-02	1,44E-02	1,44E-02	2,83E-02	9,12E-02	4,70E-05	-2,81E+00
Acronyms	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; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2,13E+01	6,86E-01	4,57E-01	4,57E-01	4,19E-01	2,70E-01	1,53E-02	-3,91E+00

Disclaimers shall be added, if required by EN 15804.

Use of resources

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4,63E+01	1,40E-01	3,00E-02	3,00E-02	9,00E-02	8,67E+00	0,00E+00	0,00E+00
PERM	MJ	4,30E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	4,68E+01	1,40E-01	3,00E-02	3,00E-02	9,00E-02	8,67E+00	0,00E+00	0,00E+00
PENRE	MJ	2,83E+02	1,03E+01	6,35E+00	6,35E+00	6,45E+00	7,09E+01	0,00E+00	0,00E+00
PENRM	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
PENRT	MJ	2,83E+02	1,03E+01	6,35E+00	6,35E+00	6,45E+00	7,09E+01	0,00E+00	0,00E+00
SM	kg	1,50E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	9,00E-02	4,00E-02	1,00E-02	1,00E-02	2,00E-02	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	2,39E+01	1,03E+01	6,31E+00	6,31E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,54E+01	5,00E-02	2,00E-02	2,00E-02	3,00E-02	3,63E+00	0,00E+00	0,00E+00

Acronyms PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	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
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,04E-03	0,00E+00
Radioactive waste disposed	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

Output flows

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	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	0,00E+00	0,00E+00
Material for recycling	kg	1,70E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,57E+00	0,00E+00	-6,83E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,04E-03	-6,04E-03
Exported energy, electricity	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
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,97E-01

The result tables shall only contain values or the letters “ND” (Not Declared). It is not possible to specify ND for mandatory indicators. ND shall only be used for voluntary parameters that are not quantified because no data is available.

Information on biogenic carbon content

Results per functional or declared unit		
BIOTIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0,29

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

References

The International EPD® System, General Programme Instructions of the International EPD® System. Version 3.01.

PCR 2019:14. Construction Products. 1.11

The International EPD® System, Complementary Product Category Rules C-PCR-010, Guardrails and Bridge parapets. 2021-04-23

Maglica, D. LCA SAFENCE 4RC-96, Blue Systems, 2022-02-18

European Committee for Standardization, EN 1317-2:2010 Road restraint systems – Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets

European Committee for Standardization, EN 1317-5:2007+A2:2012/AC:2013 Road restraint systems - Part 5: Product requirements and evaluation of conformity for vehicle restraint systems

European Committee for Standardization, EN 15804+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

International Organization for Standardization (ISO), Environmental labels and declarations – Type III environmental declarations – Principles and procedures. ISO 14025:2006

International Organization for Standardization (ISO), Environmental management - Life Cycle assessment – Principles and framework. 14040:2006

International Organization for Standardization (ISO), Environmental management - Life Cycle assessment – Requirements and guidelines. 14044:2006

