Environmental Product Declaration

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

Hostile Vehicle Mitigation Automatic Bollard

275/K12-900A (A275-M50-900H)

275/K12EMB-900A (A275-M50-900E)

from

PILOMAT S.r.l.

Programme operator:	EPDItaly
Publisher:	EPDItaly
EPD declaration number:	PILO001
EPD registration number:	EPDITALY0412
UN CPC Code	4954
Publication date:	2023-05-25
Valid until:	2028-05-25

General information

EPD Owner	PILOMAT S.r.l. Via Zanica, 17/P, 24050 Grassobbio (BG) – Italy
Production site	Via Zanica, 17/P, 24050 Grassobbio (BG) - Italy
Programme Operator	EPD Italy
Third-party verification	EPD according to EPDItaly General Programme Instructions. Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body (external) Third-party verification by: ICMQ SpA, via De Castillia, 10 - 20124 Milano (www.icmq.it) The certification body is an approved certification body accountable for the third-party verification accredited by Accredia.
Application field	Hostile Vehicle Mitigation Automatic Bollard: - 275/K12-900A (A275-M50-900H) - 275/K12EMB-900A (A275-M50-900E)
UN CPC Code	4954 - Parts of railway or tramway locomotives or rolling stock; railway or tramway track fixtures and fittings, and parts thereof; mechanical (including electromechanical) signalling, safety or traffic control equipment for railways, tramways, roads, inland waterways, parking facilities, port installations or airfields, and parts thereof.
PCR and GPI	GPI: EPDItaly General Programme Instruction, rev. 5.2 (www.epditaly.it) Product Category Rules (PCR): Construction Products, PCR ICMQ-001/15 rev. 3 CEN standard EN 15804 serves as the Core Product Category Rules (PCR - EN 15804:2012+A2:2019
Comparability	EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804:2012+A2:2019, may not be comparable. For further information about comparability, see EN 15804 and ISO 14025.
Responsibility	Pilomat S.r.l. releases EPDItaly from any non-compliance with environmental legislation. The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDItaly declines any responsibility regarding the information of the manufacturer, the data and the results of the life cycle assessment.
Contacts	Renzo Stancanelli, Pilomat S.r.l. Via Zanica, 17/P/17/P, 24050 Grassobbio (BG) - Italy r.stancanelli@pilomat.com
LCA accountability	Federica Gilardelli (f.gilardelli@greenwichsrl.it), Giulia Perissinotto, Greenwich S.r.l. Operational headquarter: Via Presolana 2/4, 24030, Medolago (BG) - Registered office: Via Vittorio Emanuele II, 179, 24033 Calusco d'Adda (BG) – Italy.

Company information

PILOMAT S.r.l. counts itself among the top leading manufacturers of automated access control technologies in the world. The top priority is the continued development and expansion of the line of products, which is carried out entirely within the company to ensure speedy and precise responses to the various demands of the international market. We have ensured the guarantee of the reliability and longevity of our mission, through the development of our philosophy geared towards quality improvement, as well as placing ever higher quality standards into our production at competitive costs and reduced lead time and schedule.
BOLLARDS SINCE MORE THAN 40 YEARS. At PILOMAT we believe that the best feature of a product is its quality. We believe in the innovation and research of new products that understand and cater to customer demands, allowing for full functionality and security, with improved performance and greater benefits for the consumer. Tradition and experience are important values, a treasure that we always put into play in order to meet the new challenges that lie ahead. To this end, we constantly invest our resources, time and energy in research, technological innovation and instruction. The present and future of our professional capacity is held through our willingness to evaluate it any time. PILOMAT's strength is its wide range: whatever the need, ranging from residential security installation to the highest level of anti-terrorism securities, we have it all. Our products and accessories always provide for the possibility to find the ideal solution to satisfy any needs regarding management, safety, and design.

The Ministry of Transport, Department of Land Transport, the Directorate General of Motors, the Italian agency is responsible for defining the electrical and/or mechanical equipment that is installed on all public roads in Italy. The PILOMAT bollards products were the first in Italy to exceed the stringent testing and inspections carried out by the aforementioned Ministry, obtaining two approvals that formalise the installation of PILOMAT bollards on all Italian public roads.

Crash Test – K12 Rating
Certification – SD-SDT-02.01 Standard
Performed at the Texas Transportation Institute
The Texas A&M University System, Texas U.S.A.

Crash Test – M50 (K12) Rating
Certification – ASTM F2656-07 Standard
Performed at Karco Engineering, LLC.
Automotive Research Center, Adelanto CA, U.S.

Crash Test – M30 (K4) Rating
Certification – ASTM F2656-07 Standard
Performed at Karco Engineering, LLC.
Automotive Research Center, Adelanto CA, U.S.A.

Crash test – PAS68:2013 V/7500(N3)/48
Certification – PAS68:2013 Stardard
Performed at Aisico srl.
Crash test Center , Pereto (Aq) – Italy

Crash test – PAS68:2013 V/7500(N3)/80
Certification – PAS68:2013 Stardard
Performed at Aisico srl.
Crash test Center , Pereto (Aq) – Italy

Crash test – IWA-14:2013 V/7200(N3C)/80
and V/7200(N3C)/48
International certification – IWA-14:2013 Stardard
Performed at Aisico srl.
Crash test Center , Pereto (Aq) – Italy

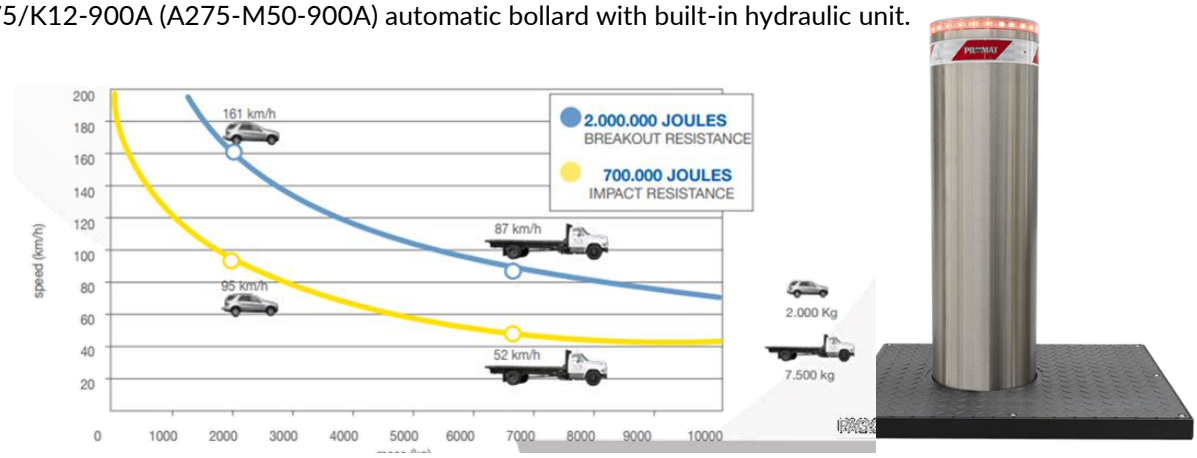
Production site

PILOMAT S.r.l. Via Zanica 17/P, 24050 Grassobbio (BG), Italy.

Products information

275/K12-900A IXS (A275-M50-900H)

The 275/K12-900A (A275-M50-900A) automatic bollard with built-in hydraulic unit.

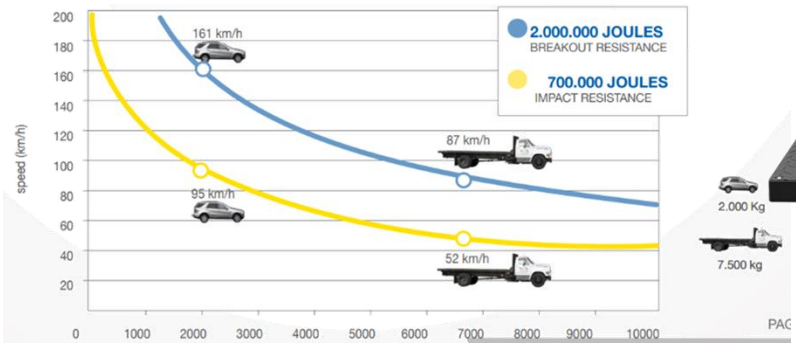


The 275/K12 (M50) series bollards have been designed to ensure the anti-terrorist protection at the highest level. Thanks to the built-in hydraulic unit, these automatic rising bollards ensure high performance over time, easy fitting and service. In addition, they can be installed up to 80m far from the control unit. High Security hydraulic bollards belonging to the High Security Line are designed for intensive use and for protecting sensitive areas. In fact, they are all certified to PAS68, IWA14 and ASTM crash tests at 80 Km / h and meet the relevant security requirements.

CYLINDER MATERIAL	S355JR NORMAL STEEL X5CrNi 18-10 (AISI 304) STAINLESS STEEL - X5CrNiMo 17-12-12 (AISI 316) STAINLESS STEEL
CYLINDER DIAMETER	271mm
CYLINDER HEIGHT	900mm
CYCLINDER THICKNESS	23mm
MOVEMENT PRINCIPLE	HYDRAULIC
CYLINDER NORMAL STEEL FINISH	ANTI-CORROSION TREATMENT - GREY ANTHRACITE STANDARD PAINTING
CYLINDER STAINLESS STEEL FINISH	GREY ANTHRACITE STANDARD PAINTING OR BRUSHING
OTHER CYLINDER FINISH	KNURLING
REFLECTING ADHESIVE STRIP	STANDARD - HEIGHT 55mm
RISING SPEED	21,5cm/s (OPTIONAL: E.F.O. RISING TIME 1,5")
LOWERING SPEED	22,5cm/s
MANUAL EMERGENCY LOWERING	STANDARD
CONNECTION LINE TO CONTROL UNIT	STANDARD 10m (MAX. LENGHT 80m - WITH HEATING RESISTANCE MAX. 50m)
VOLTAGE FOR CONTROL UNIT	230/400VAC (+/- 10%) 50/60HZ
HYDRAULIC UNIT	BUILT-IN INTO THE BOLLARD
PROTECTION CLASS	IP67
TYPE OF USE	INTENSIVE - 2.000 CYCLES/DAY
LIFE UNITS	3.000.000 CYCLES
IMPACT RESISTANCE (WITHOUT DEFORMATION)	700.000 J
BREAKOUT RESISTANCE	2.000.000 J
NOMINAL OPERATING TEMPERATURE	-40 °C +70 °C (FOR LOW TEMPERATURES SEE THE HEATING RESISTANCE)
ANTI-CORROSION TREATMENT "M"	OPTIONAL - RECOMMENDED FOR INSTALLATIONS AT LESS THAN 2KM FROM THE SEA OR WHERE SALT IS USED TO PREVENT THE FORMATION OF ICE ON ROADS DURING WINTER
LOAD CLASS (EN124)	D400
CERTIFIED	PAS68:2013V/7500(N3)/80/90:9.3/29.1 IWA 14-1.2013V/7200(N3C)/80/90.9.6 ASTM F2656/F2656M-20 C750/7200 P3

275/K12EMB-900A IXS (A275-M50-900E)

The 275/K12EMB 900A (A275-M50-900E) automatic electromechanical bollard with built-in brushless operator.

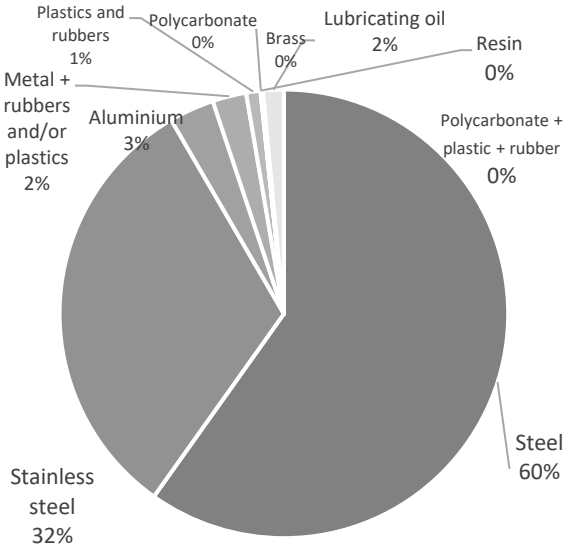


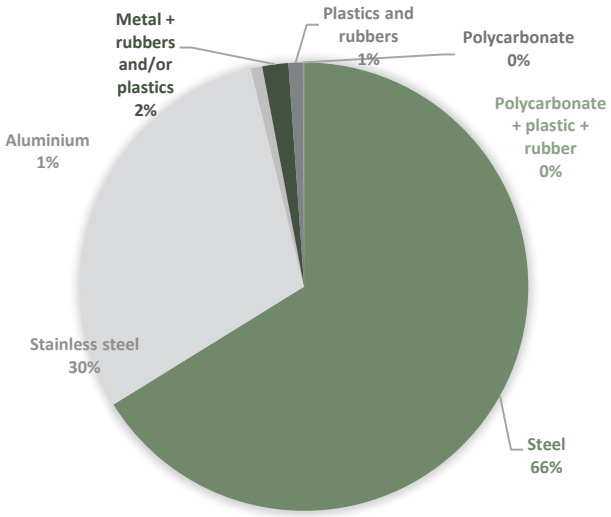
The 275/K12 (M50) series automatic bollards are unique on the market because they are operated by a brushless motor, a wear-resistant technology that guarantees a long life, ensure constant performance and therefore significantly reduces maintenance interventions. These electromechanical bollards belong to the High Security range, which includes solutions designed for areas of maximum security such as government buildings, airports, areas for events or other sensitive areas.

CYLINDER MATERIAL	S355JR NORMAL STEEL X5CrNi 18-10 (AISI 304) STAINLESS STEEL - X5CrNiMo 17-12-2 (AISI 316) STAINLESS STEEL
CYLINDER DIAMETER	271mm
CYLINDER HEIGHT	900mm
CYCLINDER THICKNESS	23mm
MOVEMENT PRINCIPLE	ELECTROMECHANICAL WITH BUILT-IN BRUSHLESS MOTOR
CYLINDER NORMAL STEEL FINISH	ANTI-CORROSION TREATMENT - GREY ANTHRACITE STANDARD PAINTING
CYLINDER STAINLESS STEEL FINISH	GREY ANTHRACITE STANDARD PAINTING OR BRUSHING
OTHER CYLINDER FINISH	KNURLING
REFLECTING ADHESIVE STRIP	STANDARD - HEIGHT 55mm
RISING SPEED	22cm/s (OPTIONAL: E.F.O. RISING TIME 2")
LOWERING SPEED	22cm/s
MANUAL EMERGENCY LOWERING	STANDARD
CONNECTION LINE TO CONTROL UNIT	STANDARD 10m (MAX. LENGHT 50m)
VOLTAGE FOR CONTROL UNIT	230/400VAC (+/- 10%) 50/60HZ
PROTECTION CLASS	IP67
TYPE OF USE	INTENSIVE - 2.000 CYCLES/DAY
LIFE UNITS	3.000.000 CYCLES
IMPACT RESISTANCE (WITHOUT DEFORMATION)	700.000 J
BREAKOUT RESISTANCE	2.000.000 J
NOMINAL OPERATING TEMPERATURE	-40 °C +70 °C (FOR LOW TEMPERATURES SEE THE HEATING RESISTANCE)
LOAD CLASS (EN124)	D400
CERTIFIED	PAS68:2013V/7500(N3)/80/90:9.3/29.1 IWA 14-1:2013V/7200(N3C)/80/90:9.6 ASTM F2656/F2656M-20 C750/7200 P3

Content information – materials by weight (including foundation box)

Material	275/K12-900A IXS (A275-M50-900H) [kg]	275/K12EMB-900A IXS (A275-M50-900E) [kg]
Steel	654,5491	719,8972
Stainless steel	170,3193	172,9702
Aluminium	17,3900	4,7000
Metal + rubbers and/or plastics	20,8205	21,0540
Plastics and rubbers	5,5072	5,8906
Brass	0,1600	0,0000
Polycarbonate	0,0500	0,0500
Resin	0,0500	0,0000
Polycarbonate + plastic + rubber	0,7818	0,5018
Lubricating oil	8 L	0,0000
Control unit	105,3903	44,4426
Total	**975,5**	**969,5**





The materials used within the bollards do not have dangerous characteristics, as required by current legislation.

Production process

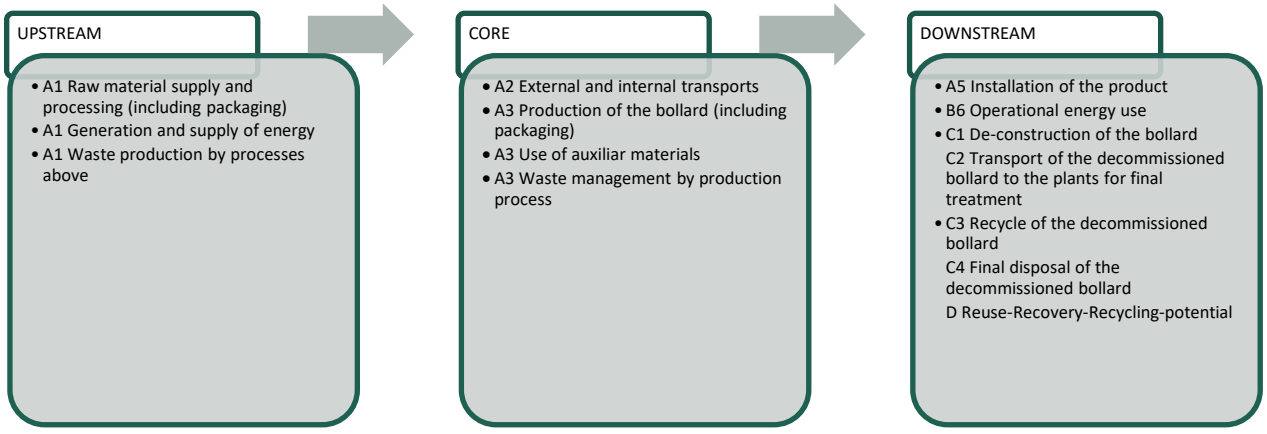
After the reception and storage of raw materials, steps relating to the production of the bollards are;

- satin finishing of the raw cylinder (external);
- assembly of mechanical components;
- assembly of electrical components;
- mechanical tests and adjustments;
- electrical cabinet assembly;
- block assembly;
- bollard block test;
- quality check;
- packing and loading on pallets for shipment.

LCA (Life Cycle Assessment) information

«LCA addresses environmental aspects and potential environmental impacts (e.g. resource use and environmental consequences of releases) throughout the product life cycle, from raw material acquisition through manufacturing and use, right through to end-of-life treatment, recycling and final disposal (i.e. from cradle to grave) [ISO 14040:2021].

Geographical scope	Global
Declared unit	1 bollard
Reference Service Life	20 years. The life expectancy of the bollards products depends on the conditions of the environment in which the product is used
Allocation	By mass
Time representativeness	2022
Database used	Ecoinvent 3.8
LCA software used	SimaPro 9.4.0.2
System boundaries	Cradle to gate with options, modules C1–C4 and module D (A1–A3+A5+B6+C+D)
Exclusions	- employee travel - packaging of auxiliary materials - ordinary and extra-ordinary maintenance - transportation of the components' packaging - transportation of electrical panel components and cables
Cut-off	max 0,58% by weight



Phase	Production			Construction		Use								End of life			Resource recovery
	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	ND	X	ND	ND	ND	ND	ND	X	ND	X	X	X	X	X
Geography	EU27	EU27	ITA	ND	ND	ND	ND	ND	ND	ND	GLO	ND	GLO	GLO	GLO	GLO	GLO

Data quality

According to EN 15804:2012+A2:2019 standard, specific data were used for the processes on which the manufacturer of the specific product has an influence:

- all data related to the Company's CORE activities were obtained directly from the Company's databases (specific data);
- data regarding weight, quantity, raw materials and waste for UPSTREAM data are derived from Company databases or from re-elaborations provided directly by Pilomat and summarized in a "Data collection checklist" (specific data). The type of material and the processes were taken from the Ecoinvent 3.8 database.

The company procures itself through the national energy system and from their own photovoltaic system, and therefore the Italian "Residual energy mix" by AIB is adopted.

As for generic data were applied criteria of geographic equivalence, technological equivalence and equivalence with respect to system boundaries.

Site-specific data refer to the year 2022. For generic data, information between 2010 and 2020 was considered.

Proxy data does not impact more than 5%.

End-of-life scenarios

Disposal scenarios were made according to global statistical data and to the scientific literature, assuming:

- average waste transportation for 100 km truck;
- 74,5% of steel recycled;
- 95% of concrete recycled.

Environmental Information 275/K12-900A (A275-M50-900H) - results per declared unit

Mandatory impact category indicators according to EN 15804

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
GWP	Kg CO2eq	8,56E+03	1,54E+01	1,78E+02	8,75E+03	6,87E+02	1,99E+03	1,32E+00	1,13E+02	2,25E+01	2,32E+01	1,60E+02	-2,11E+03
GWP-fossil	Kg CO2eq	8,41E+03	1,54E+01	2,03E+02	8,63E+03	6,79E+02	1,95E+03	1,31E+00	1,13E+02	2,24E+01	2,32E+01	1,60E+02	-2,10E+03
GWP-biogenic	Kg CO2eq	3,67E+02	1,14E-01	-4,71E+00	3,62E+02	5,35E+01	3,74E+02	4,20E-03	8,32E-01	5,45E-02	5,74E-02	9,48E-01	-5,13E+01
GWP-land use	Kg CO2eq	1,49E+01	6,11E-03	1,46E-01	1,51E+01	3,87E-01	2,91E+00	1,75E-04	4,47E-02	2,24E-03	4,00E-03	5,12E-02	-1,02E+00
ODP	Kg CFC11 eq	6,47E-04	3,60E-06	1,16E-05	6,62E-04	2,26E-05	1,56E-04	2,74E-07	2,64E-05	4,80E-06	1,49E-06	3,29E-05	-9,49E-05
AP	Mol H+ eq.	9,98E+01	7,81E-02	8,46E-01	1,01E+02	2,12E+00	4,50E+00	1,33E-02	5,72E-01	2,33E-01	3,80E-02	8,57E-01	-8,10E+00
EP-freshwater	Kg P eq.	7,53E+00	1,00E-03	5,38E-02	7,59E+00	8,44E-02	3,70E-01	6,27E-05	7,34E-03	6,95E-04	1,92E-03	1,00E-02	-7,53E-01
EP-marine	Kg N eq.	1,04E+01	2,69E-02	2,14E-01	1,06E+01	6,06E-01	1,13E+00	5,85E-03	1,97E-01	1,03E-01	1,32E-02	3,19E-01	-1,91E+00
EP-terrestrial	Mol N eq.	1,18E+02	2,94E-01	2,21E+00	1,21E+02	6,82E+00	1,17E+01	6,40E-02	2,15E+00	1,13E+00	1,45E-01	3,50E+00	-2,07E+01
POCP	Kg NMVOC eq.	3,69E+01	8,39E-02	7,31E-01	3,77E+01	1,75E+00	3,09E+00	1,77E-02	6,15E-01	3,11E-01	4,15E-02	9,85E-01	-8,07E+00
ADPF (2)	MJ	1,09E+05	2,35E+02	1,80E+03	1,11E+05	3,18E+03	5,11E+04	1,79E+01	1,72E+03	3,08E+02	1,07E+02	2,15E+03	-1,80E+04
ADPE (2)	Kg Sb eq.	1,57E+00	5,41E-05	2,13E-03	1,58E+00	3,45E-03	6,42E-03	9,43E-07	3,96E-04	1,15E-05	1,19E-05	4,21E-04	-2,49E-02
Water Use (2)	m3 world eq deprived	3,62E+03	7,04E-01	4,13E+01	3,66E+03	3,23E+02	4,14E+02	4,21E-02	5,16E+00	4,82E-01	4,94E+00	1,06E+01	-6,25E+02

Resource use indicators

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
PERE	MJ	1,91E+04	3,31E+00	7,07E+02	1,98E+04	2,21E+02	1,27E+04	1,46E-01	2,43E+01	1,73E+00	1,30E+00	2,75E+01	-1,66E+03
PERM	MJ	2,53E-01	0,00E+00	4,26E-01	6,80E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,91E+04	3,31E+00	7,08E+02	1,98E+04	2,21E+02	1,27E+04	1,46E-01	2,43E+01	1,73E+00	1,30E+00	2,75E+01	-1,66E+03
PENRE	MJ	1,16E+05	2,50E+02	1,92E+03	1,18E+05	3,39E+03	5,37E+04	1,90E+01	1,83E+03	3,27E+02	1,14E+02	2,29E+03	-1,91E+04
PENRM	MJ	5,05E-01	0,00E+00	9,76E-02	6,03E-01	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	1,16E+05	2,50E+02	1,92E+03	1,18E+05	3,39E+03	5,37E+04	1,90E+01	1,83E+03	3,27E+02	1,14E+02	2,29E+03	-1,91E+04
SM	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	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	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,12E+02	2,62E-02	1,25E+00	1,13E+02	7,86E+00	6,37E+01	1,44E-03	1,92E-01	1,76E-02	1,18E-01	3,29E-01	-1,61E+01

Waste and output flows indicators

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
HWD	kg	7,12E-01	6,14E-04	5,44E-03	7,18E-01	4,89E-03	2,85E-02	5,00E-05	4,50E-03	8,43E-04	1,95E-04	5,59E-03	-1,14E-01
NHWD	kg	1,82E+03	1,21E+01	4,93E+01	1,88E+03	1,24E+01	1,43E+02	3,71E-02	8,86E+01	4,11E-01	6,14E+02	7,03E+02	-6,39E+02
RWD	kg	3,54E-01	1,59E-03	6,63E-03	3,62E-01	1,19E-02	3,87E-01	1,20E-04	1,16E-02	2,13E-03	6,73E-04	1,46E-02	-4,33E-02
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	6,79E+01	6,79E+01	2,65E+01	0,00E+00	0,00E+00	0,00E+00	6,24E+03	0,00E+00	6,24E+03	6,34E+03
MER	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	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	0,00E+00
EET	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	0,00E+00

Additional environmental indicators

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
PM	disease inc.	5,72E-04	1,37E-06	2,66E-05	6,00E-04	1,84E-05	2,62E-05	3,54E-07	1,01E-05	4,78E-05	8,04E-07	5,90E-05	-1,25E-04
IRP (1)	kBq U235 eq.	1,00E+03	1,21E+00	1,41E+01	1,02E+03	1,79E+01	1,52E+03	8,18E-02	8,85E+00	1,39E+00	4,85E-01	1,08E+01	-7,97E+01
ETP-fw (2)	CTUe	5,58E+05	1,83E+02	4,92E+03	5,63E+05	7,86E+03	1,89E+04	1,15E+01	1,34E+03	1,80E+02	7,62E+01	1,61E+03	-5,09E+04
HTP-nc (2)	CTUh	4,21E-04	1,92E-07	2,89E-06	4,24E-04	5,84E-06	1,08E-05	8,51E-09	1,41E-06	1,31E-07	6,97E-08	1,62E-06	-3,95E-05
HTP-c (2)	CTUh	3,54E-05	5,94E-09	1,28E-06	3,67E-05	1,94E-07	4,65E-07	6,65E-10	4,35E-08	6,97E-09	4,01E-09	5,52E-08	-8,94E-06
SQP (2)	Pt	4,59E+04	1,62E+02	3,35E+03	4,94E+04	3,23E+03	1,07E+04	2,36E+00	1,18E+03	3,92E+01	2,33E+02	1,46E+03	-8,38E+03

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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

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal

PM = Particulate Matter; IRP = Ionizing radiation, human health; ETP-fw = Ecotoxicity (freshwater); HTP-nc = Human toxicity, non-carcinogenic effects; HTP-c = Human Toxicity, Cancer; SQP = Land use related impacts / Soil quality

Disclaimer: (1) This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from the ground, radon and some building materials are also not evaluated from this indicator. (2) 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.

Environmental Information 275/K12EMB-900A (A275-M50-900E) - results per declared unit

Mandatory impact category indicators according to EN 15804

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
GWP	Kg CO2eq	6,72E+03	1,64E+01	1,77E+02	6,91E+03	7,49E+02	3,32E+03	1,43E+00	1,22E+02	2,45E+01	3,48E+00	1,51E+02	-2,29E+03
GWP-fossil	Kg CO2eq	6,57E+03	1,64E+01	2,02E+02	6,79E+03	7,40E+02	3,04E+03	1,43E+00	1,22E+02	2,45E+01	3,46E+00	1,51E+02	-2,27E+03
GWP-biogenic	Kg CO2eq	3,11E+02	1,21E-01	-4,90E+00	3,07E+02	5,47E+01	4,63E+02	4,57E-03	8,96E-01	5,94E-02	4,13E-02	1,00E+00	-5,57E+01
GWP-land use	Kg CO2eq	9,47E+00	6,49E-03	1,46E-01	9,62E+00	4,21E-01	3,94E-01	1,91E-04	4,81E-02	2,44E-03	3,33E-03	5,41E-02	-1,11E+00
ODP	Kg CFC11 eq	4,83E-04	3,82E-06	1,15E-05	4,98E-04	2,46E-05	4,20E-04	2,98E-07	2,84E-05	5,23E-06	1,32E-06	3,52E-05	-1,03E-04
AP	Mol H+ eq.	8,47E+01	8,30E-02	8,42E-01	8,57E+01	2,29E+00	1,40E+01	1,45E-02	6,16E-01	2,54E-01	3,18E-02	9,16E-01	-8,79E+00
EP-freshwater	Kg P eq.	5,03E+00	1,06E-03	5,35E-02	5,08E+00	9,20E-02	7,03E-01	6,83E-05	7,90E-03	7,58E-04	4,78E-04	9,20E-03	-8,16E-01
EP-marine	Kg N eq.	7,80E+00	2,86E-02	2,13E-01	8,04E+00	6,49E-01	2,14E+00	6,37E-03	2,12E-01	1,13E-01	1,10E-02	3,42E-01	-2,07E+00
EP-terrestrial	Mol N eq.	8,93E+01	3,12E-01	2,20E+00	9,18E+01	7,32E+00	2,38E+01	6,98E-02	2,32E+00	1,23E+00	1,21E-01	3,74E+00	-2,25E+01
POCP	Kg NMVOC eq.	2,92E+01	8,91E-02	7,27E-01	3,00E+01	1,88E+00	6,67E+00	1,92E-02	6,61E-01	3,39E-01	3,51E-02	1,05E+00	-8,75E+00
ADPF (2)	MJ	8,45E+04	2,50E+02	1,79E+03	8,66E+04	3,47E+03	4,67E+04	1,95E+01	1,85E+03	3,36E+02	9,32E+01	2,30E+03	-1,95E+04
ADPE (2)	Kg Sb eq.	8,62E-01	5,74E-05	2,11E-03	8,64E-01	3,76E-03	6,67E-03	1,03E-06	4,26E-04	1,26E-05	8,70E-06	4,49E-04	-2,70E-02
Water Use (2)	m3 world eq deprived	3,12E+03	7,48E-01	4,11E+01	3,16E+03	3,51E+02	2,05E+03	4,58E-02	5,55E+00	5,25E-01	4,17E+00	1,03E+01	-6,79E+02

Resource use indicators

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
PERE	MJ	1,59E+04	3,52E+00	7,06E+02	1,67E+04	2,41E+02	1,21E+04	1,59E-01	2,61E+01	1,89E+00	9,58E-01	2,91E+01	-1,80E+03
PERM	MJ	2,54E-01	0,00E+00	4,29E-01	6,82E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,59E+04	3,52E+00	7,07E+02	1,67E+04	2,41E+02	1,21E+04	1,59E-01	2,61E+01	1,89E+00	9,58E-01	2,91E+01	-1,80E+03
PENRE	MJ	9,00E+04	2,65E+02	1,91E+03	9,21E+04	3,69E+03	5,03E+04	2,08E+01	1,97E+03	3,56E+02	9,90E+01	2,44E+03	-2,06E+04
PENRM	MJ	5,12E-01	0,00E+00	9,82E-02	6,10E-01	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	9,00E+04	2,65E+02	1,91E+03	9,21E+04	3,69E+03	5,03E+04	2,08E+01	1,97E+03	3,56E+02	9,90E+01	2,44E+03	-2,06E+04
SM	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	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	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	9,13E+01	2,78E-02	1,24E+00	9,26E+01	8,57E+00	5,49E+01	1,57E-03	2,07E-01	1,91E-02	9,96E-02	3,27E-01	-1,75E+01

Waste and output flows indicators

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
HWD	kg	5,83E-01	6,52E-04	5,41E-03	5,89E-01	5,32E-03	4,67E-02	5,45E-05	4,84E-03	9,19E-04	1,42E-04	5,95E-03	-1,24E-01
NHWD	kg	1,55E+03	1,28E+01	4,90E+01	1,61E+03	1,35E+01	1,44E+02	4,04E-02	9,53E+01	4,48E-01	5,81E+02	6,77E+02	-6,92E+02
RWD	kg	2,83E-01	1,69E-03	6,60E-03	2,91E-01	1,30E-02	1,34E-01	1,31E-04	1,25E-02	2,32E-03	6,00E-04	1,56E-02	-4,70E-02
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	3,64E+01	3,64E+01	2,65E+01	0,00E+00	0,00E+00	0,00E+00	6,80E+03	0,00E+00	6,80E+03	6,86E+03
MER	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	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	0,00E+00
EET	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	0,00E+00

Additional environmental indicators

Indicator	UM	A1	A2	A3	A1-A3	A5	B6	C1	C2	C3	C4	C1-C4	D
PM	disease inc.	4,62E-04	1,46E-06	2,65E-05	4,90E-04	2,00E-05	5,36E-05	3,86E-07	1,08E-05	5,21E-05	6,40E-07	6,39E-05	-1,36E-04
IRP (1)	kBq U235 eq.	7,82E+02	1,28E+00	1,41E+01	7,98E+02	1,95E+01	4,23E+02	8,91E-02	9,53E+00	1,51E+00	4,19E-01	1,15E+01	-8,64E+01
ETP-fw (2)	CTUe	3,79E+05	1,95E+02	4,90E+03	3,84E+05	8,57E+03	2,95E+04	1,25E+01	1,45E+03	1,96E+02	6,04E+01	1,72E+03	-5,52E+04
HTP-nc (2)	CTUh	3,16E-04	2,04E-07	2,88E-06	3,19E-04	6,37E-06	1,76E-05	9,27E-09	1,52E-06	1,42E-07	3,99E-08	1,71E-06	-4,28E-05
HTP-c (2)	CTUh	3,38E-05	6,31E-09	1,28E-06	3,51E-05	2,11E-07	6,90E-07	7,25E-10	4,68E-08	7,59E-09	1,77E-09	5,69E-08	-9,68E-06
SQP (2)	Pt	3,42E+04	1,72E+02	3,34E+03	3,77E+04	3,52E+03	8,10E+03	2,58E+00	1,27E+03	4,27E+01	2,01E+02	1,52E+03	-9,09E+03

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Additional environmental information

Biogenic carbon	275K12-900A IXS (A275-M50-900H) [kg]	275/K12EMB-900A IXS (A275-M50-900E) [kg]
In the product	0	0
In the packaging	12,23	12,23

References

General Programme Instructions of the EPDItaly. Version 5.2 (www.epditaly.it)

UNI EN ISO 14040:2021, Environmental management – Life cycle assessment – Principles and framework.

UNI EN ISO 14044:2021, Environmental management – Life cycle assessment – Requirements and guidelines.

UNI EN ISO 14025:2010, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

UNI EN 15804:2012 + A2:2019, Construction sustainability – Environmental product declarations – Key development rules by product category.

Construction Products, PCR ICMQ-001/15 rev. 3

Bureau of International Recycling aisbl. World Steel Recycling in Figures 2017 – 2021. Steel Scrap – a Raw Material for Green Steelmaking. 13th Edition

Background report. “Analisi del ciclo di vita dei dissuasori 275/K12-900A IXS e 275/K12EMB-900A IXS di PILOMAT. Report LCA_rev.03”. Written by Federica Gilardelli & Giulia Perissinotto - Greenwich S.r.l.