

Environmental Product Declaration

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

Fire-resistant doors (Hinged fire doors, sliding fire doors, Large- Dimension hinged fire doors)

from

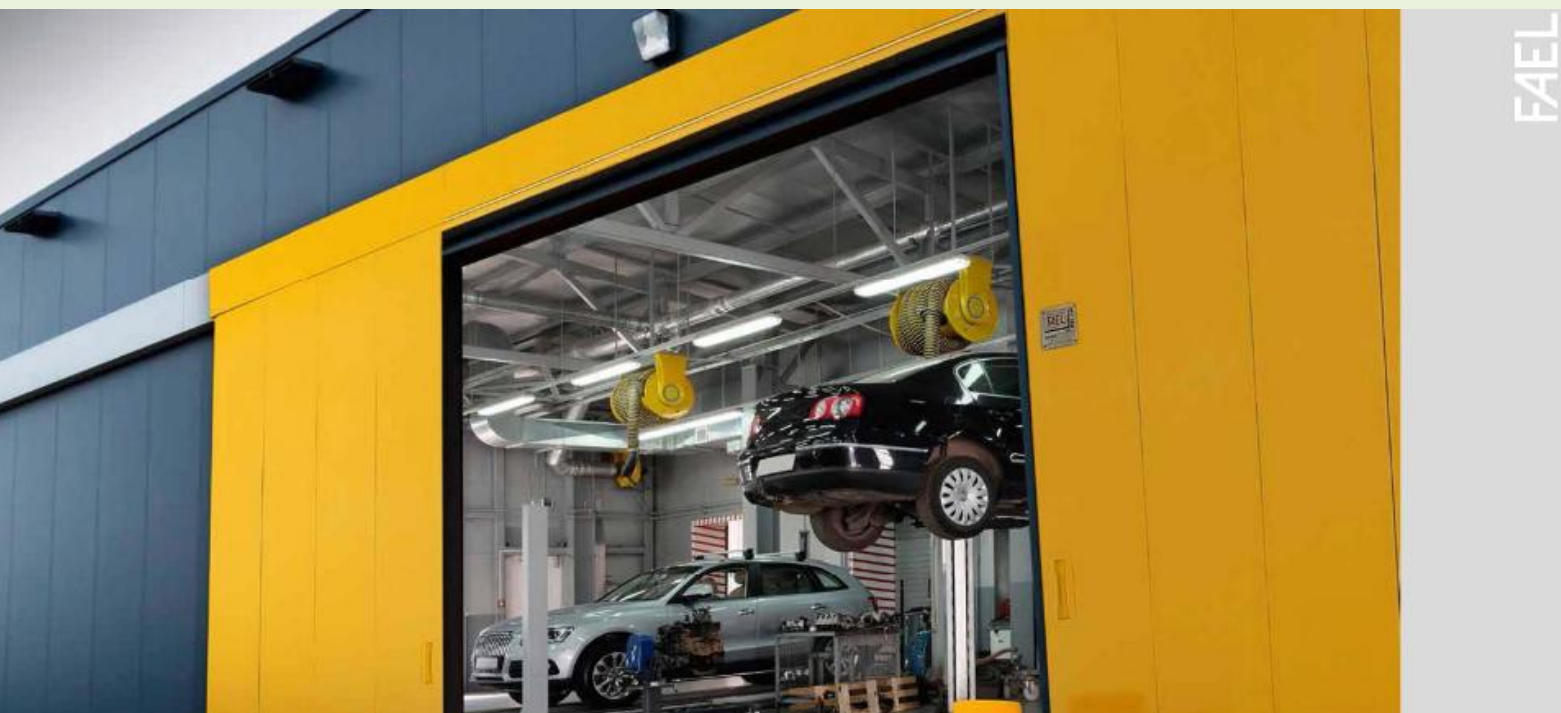
Fael Security S.r.l.

The EPD covers multiple products



Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products, based on a representative product
EPD registration number:	EPD-IES-0032514:001
Version date:	2026-09-09
Validity date:	2031-09-09

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com



GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>Construction products, PCR 2019:14, VERSION 2.0.1, UN CPC code: 42120 Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium</i>
PCR review was conducted by: <i>The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com.</i> <i>Chairs of the PCR review: Rob Rouwette (chair), Noa Meron (co-chair)</i>
c-PCR: <i>WINDOWS AND DOORS (EN 17213:2020), C-PCR-007 (TO PCR 2019:14), VERSION 1.0.1</i>

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: <i>Certinalia S.L.U. is an approved certification body accountable for the third-party verification</i> Name of the verifier: <i>Maria Feced Mateu</i> Approved by: International EPD System Accredited by: ENAC (accreditation no. 125/C-PR283)>
Procedure for follow-up of data during EPD validity involves third party verifier:
☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have



identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

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



INFORMATION ABOUT EPD OWNER

Owner of the EPD: Fael Security S.r.l.

Address: Via Ettore Majorana 4, 72100, Brindisi (BR), ITALY

Contact: Riccardo Romanin, romanin@fael.com

Address and contact information of the LCA practitioner commissioned by the EPD owner: Forethinking Srl Società Benefit, info@forethinking.com, <https://www.forethinking.com/>



Description of the organisation: Fael Security S.r.l. is a company specialized in the production of fire-resistant closures, mainly serving construction companies and window and door manufacturers operating both nationally and internationally. Founded more than 35 years ago by the Romanin family, the company has progressively established itself in the market thanks to its consolidated technical know-how and its ability to develop tailor-made solutions, with particular attention to non-standard products.

The product range includes a wide variety of systems, such as hinged doors, sliding doors, and glazed fire-resistant systems, both fixed and openable, designed and manufactured in compliance with high quality standards throughout all stages of the production process, from design and manufacturing to installation and after-sales service.

Fael Security integrates innovation and digitalization principles into its processes, enabling advanced control of production flows and a high level of product customization. At the same time, the company promotes an approach oriented toward the circular economy, based on the efficient use of resources, the extension of product life cycles, and the recovery and recycling of materials.

Fael Security S.r.l. has implemented a management system aimed at ensuring quality, environmental sustainability and occupational health and safety, in accordance with internationally recognized standards. The company is certified according to EN ISO 9001:2015 for quality management, ISO 14001:2015 for environmental management and ISO 45001:2018 for occupational health and safety management. Furthermore, Fael Security has obtained the Legal Rating with a score of 3 stars, confirming the company's commitment to transparency, compliance and responsible business practices.

PRODUCT INFORMATION

Product name: Fire-resistant doors manufactured by Fael Security S.r.l.

Product identification: The products covered by this study belong to three main product families: hinged fire doors (EI 60–EI 120), sliding fire doors (EI 120 Crosswalk) and Large-Dimension hinged fire doors (ROTOR EI 120). These systems are available in a wide range of dimensions and configurations to meet different project requirements.

For the purpose of this LCA study, reference flows were determined using representative standard dimensions corresponding to average sizes within the dimensional ranges of the products manufactured by Fael Security. The selected dimensions are 1,02 m × 2,16 m for hinged doors and 3,0 m × 3,0 m for both sliding and large-dimension hinged door. These dimensions are consistent with the typical dimensional ranges of the products manufactured by Fael Security: sliding fire doors have surface areas ranging from 3 m² to 16 m², large dimension hinged fire doors (ROTOR) from 6 m² to 10 m², and fire-resistant hinged doors from 2 m² to 4.5 m².

As fire-resistant hinged doors represent the most commercially relevant product family within the company's portfolio, a 1,02 m × 2,16 m fire-resistant hinged door was selected as the representative product for the EPD.

The products covered by this study are manufactured in accordance with the applicable product standards, including UNI EN 16034:2014 for doorsets with fire-resisting and/or smoke control characteristics and, where applicable, UNI EN 13241:2016 for industrial, commercial and garage doors. Fire resistance performances are verified according to UNI EN 1634-1. The main certified technical performances of the products covered by this study are summarised in the following table, together with the applicable reference standards.

Technical property	Fire-resistant hinged door	Fire-resistant sliding door	Large dimension fire-resistant hinged door (ROTOR)	Reference standard
Fire resistance	El ₂ 120	El ₂ 120	El ₂ 120	EN 1634-1
CE marking	yes	yes	yes	EN 16034:2014
Wind resistance	n.a.*	Class 4	Class 5	EN 12444 / EN 13241
Thermal transmittance	n.a.*	1.21 W/m ² K	1.29 W/m ² K	EN 12428 / EN 13141
Smoke control	Sa	Sa	Sa	EN 1634-3
Mechanical performance	n.a.*	Pass	Pass	EN 13241
Durability	n.a.*	C3	C3	EN 12604 / EN 12605

*n.a. = not available



Figure 1: Representative product: 1,02 m × 2,16 m hinged fire door



Figure 2: Sliding fire door



Figure 3: Large-Dimension hinged fire doors

Technical purpose of the product: The products are fire-resistant closures intended for use in buildings. They are designed to ensure fire resistance and smoke tightness. By limiting the spread of fire and smoke through building openings, they contribute to the protection of occupants and to maintaining visibility and tenable conditions along escape routes during fire events.

UN CPC code: 42120 Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium.

Product description: The declared products consist of fire-resistant hinged doors, sliding gates and swing gates manufactured by Fael Security. The systems are composed of steel structural elements combined with functional materials such as rock wool, calcium silicate boards, adhesives, seals and other components required to achieve the specified fire resistance and smoke tightness performance.

The production process includes the reception of raw materials and the processing and integration of materials such as steel, rock wool, calcium silicate, adhesives and polymeric components. Steel

elements are processed through cutting, roll-forming and press-braking operations, followed by welding and surface finishing through powder coating. Functional materials, including fire-resistant and insulating components, seals and reinforcements, are subsequently integrated into the product. The manufacturing process is completed by the assembly of hardware and accessories, followed by packaging of the finished products on wooden supports or steel stillages using protective materials suitable for storage and transportation.

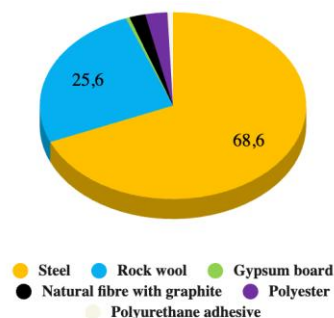
Name and location of production site: FAEL SECURITY S.p.A. production site – object of this study – is located in Puglia, Via Ettore Majorana 4, 72100, Brindisi (BR).

For more information visit: <https://www.faelsecurity.com/>

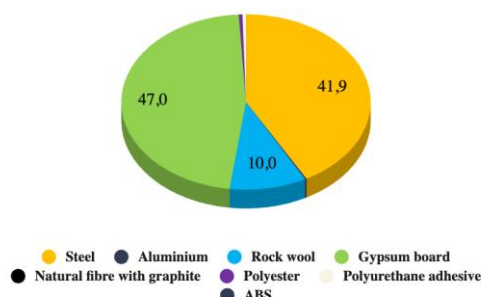
CONTENT DECLARATION

- **The mass (weight) of one unit of a product, as purchased:** The total weight of the three products is as follows:
 - fire-resistant hinged doors (1,02 m x 2,16 m): 74,5 kg
 - fire-resistant sliding gates (3 m x 3 m): 671 kg
 - fire-resistant swing gates (3 m x 3 m): 466 kg
- **Content of the product in the form of a list of materials and substances, and their mass:** The three products under study are typically composed of: steel, gypsum board, rock wool, aluminium and plastic. The products composition is shown in the figure below:

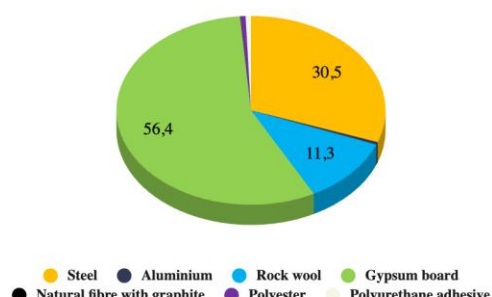
Material composition of hinged door



Material composition of sliding gate



Material composition of swing gate



- The mass and the content of distribution and/or consumer packaging: The fire-resistant doors and gates are generally transported directly from the FAEL SECURITY production site to the building site using lorries. The products are packed using steel stillages, wooden boards, bubble wrap, polystyrene, amber plastic film, cardboard corner protectors, transparent stretch film and plastic strapping. These packaging materials are included in the scope of this EPD.
- Information on the environmental and hazardous/toxic properties of a substances contained in the product: No substances included in the Candidate List of Substances of Very High Concern (SVHC) for authorization under the REACH regulations are present in the products either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

The representative product composition (fire-resistant hinged doors) is as reported below:

Data refer to a fire-resistant hinged doors size 1,02 m * 2,16 m

Product content	Mass, kg	Pre-consumer recycled material, mass-% of product	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product
Steel	51,1	19	33	0	0
Rock wool	19,1	0	0	0	0
Gypsum board	0,3	0,02	0	0	0
Natural fibre with graphite	1,5	0	0	0	0
Polyester	2,0	0	0	0	0
Polyurethane adhesive	0,5	0	0	0	0
TOTAL	74,5	19,02	33	0	0

The recycled content of the raw materials indicated above is based on supplier declarations. The percentage of recycled content reported for each material in the table is calculated as the total amount of recycled material relative to the overall mass of the final product. Recycled materials are allocated in accordance with the rules of EN 15804, distinguishing between virgin and recycled inputs. For further

details on the recycled content of raw materials, please refer to the “Additional Environmental Information”.

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product
Wooden boards	9,00	12,08	4,50
Bubble wrap	0,16	0,22	0,0
Polystyrene	0,17	0,22	0,0
– amber plastic film	0,27	0,37	0,0
– cardboard corner	0,27	0,36	0,13
Polyethylene stretch film	0,10	0,13	0,0
Plastic strapping	0,01	0,02	0,0
TOTAL	9,98	13,39	4,63

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO₂.

LCA INFORMATION

Declared unit: 1 m² of fire-resistant doors

Conversion factor for representative product: 33,85 kg/m²

Time representativeness: The reference period for the LCA calculation is 2025

Database(s) and LCA software used: Ecoinvent 3.12, Allocation, cut-off by classification (Cutoff), OpenLCA 2.6.1

Description of system boundaries: The system boundaries are cradle to gate with options, modules C1–C4, module D and A4, A5 as optional module (A1–A3 + A4 + A5 + C1–C4 + D). Modules B1- B7 are excluded, as they strongly depend on the specific application within the relevant market.

The following stages are included in the study:

Product stage

Module A1: extraction and processing of raw materials, such as steel, rock wool and gypsum board and the production of energy carriers used in the production process;

Module A2: transport of raw materials by the manufacturer to the gate of FAEL SECURITY production plant;

Module A3: The storage of raw materials and energy carriers (including the generation of electricity, fuels, and other energy carriers used in the module); the treatment of waste generated by production processes and the production of packaging for finished products are taken into account.

Construction process stage

Module A4: transport of the finished product to the relevant market;

Module A5: Installation of the finished product and recycling and disposal of the packaging.

End of life stage

Module C1: demolition/deconstruction;

Module C2: transport from collection to waste processing and disposal site;

Module C3: waste processing (recovery);

Module C4: disposal (landfill) of unrecovered material fractions of waste (not sent for recycling/re-use).

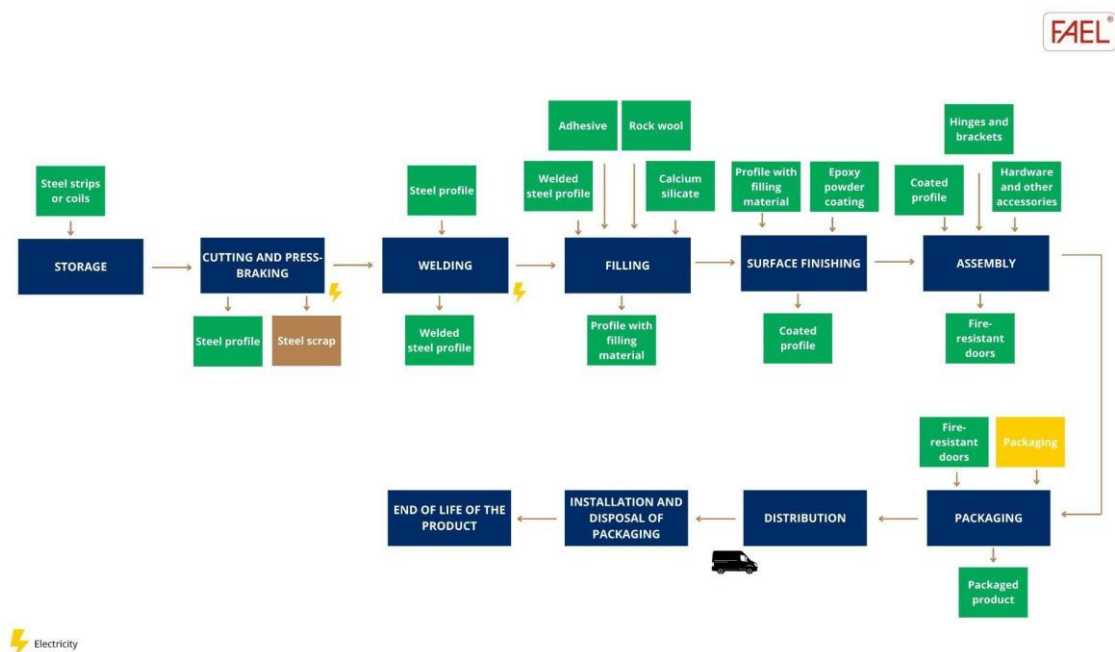
Module D: load and benefit due to the reusability of the products, the recyclability of the materials and the energy carriers (heat and electricity) that leave the product system.

B1-B7 modules are not included in the study since declared as optionals according to PCR.

According to PCR, the following are not considered within the boundaries of the system:

- the production of Fael Security equipment and buildings have been excluded. Infrastructure and capital goods are included for upstream and downstream processes to the extent that they are covered in Ecoinvent database;
- employee mobility;
- business trips;
- research and development activities;
- auxiliary materials and operational inputs, such as welding gases, cooling fluids and lubricating oils, considered not significant for the results of the LCA;
- the installation stage (module A5), as it mainly consists of manual operations, does not require significant energy consumption and involves the use of installation materials in limited quantities, which are not considered significant for the results of the study.

Process flow diagram:



More information:

- In line with EN 15804 and the reference PCR, energy consumption, raw materials, packaging input and waste output were allocated to the production of fire-resistant closures based on the total number of produced pieces during the reference period. Representative product dimensions were used for each product type (3,0 m × 3,0 m for sliding and swing gates and 1,02 m × 216 m for hinged doors) to determine the corresponding surface area. The results were first calculated per produced piece and subsequently converted to the declared unit of 1 m² using the corresponding surface-based conversion factors.
- Specific data used for the manufacturing phase are based on the production year 2025. All background data used in the study are from LCI database and are not older than 3 years.
- Based on the information provided by the company, raw materials were assumed to be transported with lorries, trucks and vans. The real distances were considered for the transport of raw materials to the factory (module A2).
- In modelling the energy mix used in the manufacturing processes, the contribution of energy purchased from the grid and the contribution of self-consumption energy from photovoltaic panels were considered. Specifically, the electricity mix consists of 55% grid electricity, modelled using the AIB Residual Mix 2024, and 45% self-consumed electricity from the photovoltaic installation. The climate impact (GWP-GHG) of the energy source (grid + onsite production) used in the production plant amounts to 0,123 kg CO₂ eq./kWh.

Energy sources	Grid value (%)	Onsite production value (%)	Total consumed mix (%)
Hydro	1,2	0	0,67
Wind	0,4	0	0,22
Solar	7,1	100	48,70
Biomass	0,8	0	0,41
Geothermal	0,0	0	0,00
Coal	46,17	0	25,51
Natural gas	36,95	0	20,41
Oil	2,22	0	1,23
Nuclear	4,73	0	2,61
Lignite	0	0	0

- 1% cut-off is applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.
- The main assumptions used in the study are summarized below.
 - o To produce some raw materials, auxiliary products and packaging, an average European production process was considered, while for others a global production process was used.
 - o Based on the information provided by the company, the following transports were considered for incoming raw materials and packaging materials:
 - transport, freight, lorry, >32 metric ton, diesel, EURO 5 | transport, freight, lorry, >32 metric ton, diesel, EURO 5 | Cutoff, U - RER;

- transport, freight, lorry, 16-32 metric ton, diesel, EURO 5 | transport, freight, lorry, 16-32 metric ton, diesel, EURO 5 | Cutoff, U - RER;
- transport, freight, light commercial vehicle, fleet average | transport, freight, light commercial vehicle, fleet average | Cutoff, U - RER without CH.
- Less than 10% of the GWP-GHG results in modules A1-A3 come from scrap inputs.
- For module A4, the use of a lorry “transport, freight, lorry, >32 metric ton, diesel, EURO 5 | transport, freight, lorry, >32 metric ton, diesel, EURO 5 | Cutoff, U - RER” and the use of a ship “transport, freight, sea, container ship, heavy fuel oil | transport, freight, sea, container ship, heavy fuel oil | Cutoff, U - GLO” for the distribution of the finished product were considered. Transport distances were based on the actual geographical distribution of products sold during the reference year and aggregated using a weighted average according to the number of products delivered, representing the geographical scope of the EPD.

Mode of transport	Module A4 information	Value
Lorry, total weight >32t	Distance	696 km
	Capacity	As Ecoinvent dataset
	Type of fuel	Diesel
Ship	Distance	50 km
	Capacity	As Ecoinvent dataset
	Type of fuel	Heavy fuel oil

- For module A5 the treatment and disposal of the packaging used for the transport of the finished product were included. The end-of-life scenario was defined based on data from the CONAI Integrated Sustainability Report 2025. The percentages of recycling, incineration, and landfill, as well as the quantities of packaging material treated, are reported in the table below.

Material	Amount (kg)	Type of disposal	%
Plastics	0,71	Recycling	51
		Incineration	43
		Landfill	6
Wood	9	Recycling	67
		Incineration	2
		Landfill	31
Cardboard	0,27	Recycling	92
		Incineration	6
		Landfill	2

- End of life scenarios for the components of fire-resistant doors and gates have been setup according to default values, as specified in UNI EN 17213:2020 c-PCR: windows and doors, considered representative of current European end-of-life practices for metals and plastics. For insulating materials, a conservative scenario assuming 100% landfill disposal has been applied. For the definition of the product end-of-life scenario:
 - phase C1: fuel consumption was considered in accordance with the reference PCR (Table 4: Demolition/deconstruction of steel, wood, and other materials);
 - phase C2: a distance of 80 km from the waste treatment and disposal plant was assumed, with a 50% load factor, in line with the reference PCR;

- phase C3 and C4: the considered percentages of the product recycling and landfill in the end of life were the following:
 - for metals: 95% recovery rate and 5% landfill;
 - for plastic materials: 95% incineration and 5% landfill;
 - for insulating materials (rock wool and gypsum board): 100% landfill.

Module D reports the environmental burden of recycled scrap generated at the end of life minus that used at the production stage. Scrap inputs to the production stage are subtracted from the scrap available for recycling at the end of life in order to determine the net scrap output from the product system. For metals the benefit is related to scrap recycling, while for plastics, energy recovery at the end of life is considered.

These benefits are applied to metal and plastic components, while insulated and non-recoverable materials are excluded from Module D.

The parameters used for the end-of-life scenario are reported according to the format defined in EN 15804:2012+A2:2019, as shown in the following table. The assumptions adopted for the scenario are in line with those defined in the UNI EN 17213:2020 c-PCR for windows and doors. The reported quantities refer to the end-of-life scenario of the representative product, consisting of a fire-resistant hinged door with dimensions of 1.02 m × 2.16 m.

Processes	Unit
Collection process specified by type	74,5 kg collected separately
Recovery system specified by type	48,6 kg for recycling
	3,7 kg for energy recovery
Disposal specified by type	22,2 kg
Assumptions for scenario development, e.g. transportation	80 km with 50% load factor

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

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	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 27	EU 27	IT	EU 27	EU 27	ND	ND	ND	ND	ND	ND	ND	EU 27	EU 27	EU 27	EU 27	EU 27
Share of primary data	33%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0% / +44%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X= declared module ND= not declared module

The quality data assessment was conducted in accordance with the requirements of the applicable PCR. The assessment covers at least 80% of the results relating to GWP-GHG.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Steel production for sash and frame	Collected data Database	EPD supplier S-P-11473	2023	Primary data	9%*
Steel production for accessories	Collected data Database	EPD owner Ecoinvent 3.12	2025	Secondary data	0%
Rock wool production	Collected data Database	EPD owner Ecoinvent 3.12	2025	Secondary data	0%
Gypsum board production	Collected data Database	EPD owner Ecoinvent 3.12	2025	Secondary data	0%
Adhesive production	Collected data Database	EPD owner Ecoinvent 3.12	2025	Secondary data	0%
Natural fibre production	Collected data Database	EPD owner Ecoinvent 3.12	2025	Secondary data	0%
Paint and thinner production	Collected data Database	EPD owner Ecoinvent 3.12	2025	Secondary data	0%
Transport of raw materials	Collected data	EPD owner Ecoinvent 3.12	2025	Primary data	6%
Packaging materials for finished product	Database	Ecoinvent 3.12	2025	Secondary data	0%
Packaging materials for incoming raw materials	Database	Ecoinvent 3.12	2025	Secondary data	0%
Electricity consumed during production (grid electricity and on-site PV electricity)	Collected data Database	grid electricity – Italian AIB Residual Mix 2024 Ecoinvent 3.12 PV electricity - Ecoinvent 3.12	2024	Primary data	18%
Total share of primary data, of GWP-GHG results for A1-A3					33%

**Note: The 9% share was calculated by weighting the supplier's GWP-GHG contribution according to the share of primary data declared in the reference EPD.*

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

In accordance with EN 15941, the EPD is based on data collected from Fael Security at the production site located in Via Ettore Majorana 4, 72100, Brindisi (BR), Italy, over one year from January to December 2025. The production process is consistent across all products covered by the EPD.

Background data were obtained from Ecoinvent 3.12 and supplier-provided data for recycled content.

The geographical coverage of the data is as follows: the product is produced in Italy; the construction stage is modelled for EU27; end-of-life stages are modelled for EU27.

The production technologies are consistent with the materials used in the fire-resistant doors and gates. Steel components are processed through cutting, press-braking and welding operations, followed by surface finishing and assembly. Functional materials such as insulating and fire-resistant layers are integrated during the assembly phase, together with glass elements. Relevant inputs include steel and gypsum board with recycled content provided by the suppliers where applicable.

The quality of the relevant data in terms of temporal, geographical, and technological representativeness was assessed using EN 15804:2012+A2:2019, Annex E, Table E.1. Temporal representativeness is very good. Geographical representativeness ranges from very good to good, and technological representativeness is mostly very good, with some limitations for end-of-life processes.

No relevant data were assessed as poor or very poor. No relevant data assessed as fair exceed 30% for any core indicator.

ENVIRONMENTAL PERFORMANCE

LCA results of the product - main environmental performance results

The LCA results presented below refer to the fire-resistant door, chosen as a representative product because it is the best-selling system. The declared unit is 1 m², corresponding to a product mass of 33,85 kg.

Mandatory impact category indicators according to EN 15804

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	6,26E+01	2,84E+00	7,94E+00	1,35E-02	1,03E+00	6,48E+00	7,43E-02	-6,82E+00
GWP-fossil	kg CO ₂ eq.	7,00E+01	2,84E+00	1,42E-01	1,35E-02	1,03E+00	6,26E+00	7,42E-02	-6,81E+00
GWP-biogenic	kg CO ₂ eq.	-7,49E+00	6,40E-04	7,80E+00	1,49E-06	2,14E-04	2,21E-01	2,79E-05	-4,95E-03
GWP-luluc	kg CO ₂ eq.	8,39E-02	9,99E-04	1,84E-05	1,36E-06	3,32E-04	6,41E-04	3,77E-05	-1,21E-03
ODP	kg CFC 11 eq.	1,49E-06	6,43E-08	1,54E-09	2,07E-10	2,33E-08	3,16E-08	1,92E-09	-1,06E-07
AP	mol H ⁺ eq.	4,42E-01	9,45E-03	2,91E-04	1,20E-04	3,23E-03	1,67E-02	4,84E-03	-2,02E-02
EP-freshwater	kg P eq.	1,16E-02	2,17E-05	5,35E-07	4,74E-08	7,69E-06	2,68E-05	6,98E-07	-2,60E-04
EP-marine	kg N eq.	1,05E-01	3,31E-03	1,55E-04	5,63E-05	1,11E-03	7,90E-03	1,88E-04	-4,46E-03
EP-terrestrial	mol N eq.	1,17E+00	3,63E-02	1,26E-03	6,17E-04	1,22E-02	7,92E-02	1,95E-03	-5,18E-02
POCP	kg NMVO C eq.	3,86E-01	1,54E-02	4,75E-04	1,85E-04	5,11E-03	2,37E-02	9,71E-04	-1,85E-02
ADP-minerals&metals*	kg Sb eq.	1,12E-03	8,22E-06	1,95E-07	5,01E-09	3,59E-06	1,07E-05	1,09E-07	-4,51E-06
ADP-fossil*	MJ	9,11E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	2,58E+01	1,59E+00	-8,78E+01
WDP*	m ³	2,06E+01	2,37E-01	2,95E-02	4,38E-04	7,56E-02	4,59E-01	7,02E-02	-1,16E+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 on these results are high or as there is limited experience with the indicator.

The estimated impact results are only relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the production stage (modules A1-A3).

Calculations have been done using the EN15804+A2 method and EF 3.1 characterization factors.

Additional mandatory and voluntary impact category indicators

Indicator	Unit	Results per declared unit							
		A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	7,01E+01	2,84E+00	2,23E-01	1,35E-02	1,03E+00	6,48E+00	7,43E-02	-6,82E+00
PM	disease inc.	4,93E-06	2,85E-07	6,05E-09	3,44E-09	8,19E-08	4,11E-07	1,39E-08	-3,27E-07
IRP**	kBq U-235 eq	8,89E-01	1,68E-02	5,15E-04	3,03E-05	6,23E-03	2,25E-02	4,40E-04	-9,32E-02
ETP-FW*	CTUe	2,63E+02	5,55E+00	4,47E-01	1,77E-02	2,15E+00	1,65E+01	6,16E-01	-1,44E+01
HTP-c	CTUh	3,02E-08	4,49E-10	3,96E-11	1,29E-12	1,68E-10	8,03E-10	1,74E-11	-6,12E-09
HTP-nc*	CTUh	3,45E-07	2,56E-08	1,91E-09	2,31E-11	8,83E-09	2,66E-08	8,53E-10	-1,70E-08
SQP	adimensional	9,44E+02	4,15E+01	1,12E+00	1,21E-02	8,64E+00	2,34E+01	3,11E+00	-1,30E+01
Acronyms	PM = Particulate Matter; IRP = Ionizing radiation Potential; ETP-FW = Ecotoxicity Potential- freshwaters; HTP-C = Human Toxicity potential- Cancer; HTP-NC = Human Toxicity potential- Non-Cancer; SQP = Index of soil quality potential								

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

**Disclaimer: This impact category is primarily concerned with the possible impact of a low dose/amount of ionizing radiation on human health from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or related to disposal of radioactive waste in underground facilities. This indicator also does not consider potential ionizing radiation from soil, radon, or some construction materials.

Resource use indicators

Indicator	Unit	Results per declared unit							
		A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,15E+02	6,40E-01	8,23E+01	1,10E-03	2,39E-01	9,18E-01	1,69E-02	-9,90E+00
PERM	MJ	8,23E+01	0,00E+00	-8,23E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,97E+02	6,40E-01	2,00E-02	1,10E-03	2,39E-01	9,18E-01	1,69E-02	-9,90E+00
PENRE	MJ	8,49E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	8,43E+01	4,67E+00	-8,78E+01
PENRM	MJ	6,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,85E+01	-3,08E+00	0,00E+00

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

PENRT	MJ	9,11E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	2,58E+01	1,59E+00	-8,78E+01
SM	kg	1,77E+01	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
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
FW	m ³	7,07E-01	5,44E-03	-5,50E-03	1,05E-05	1,72E-03	8,04E-03	8,86E-04	-2,80E-02
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							

The balance of renewable and non-renewable primary energy indicators (PERE and PENRE) has been carried out in accordance with PCR 2019:14, Annex 3, Option A.

Waste indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,06E+01	2,33E-01	1,14E-02	5,69E-04	8,88E-02	4,19E-01	5,79E-03	-8,62E-01
Non-hazardous waste disposed	kg	1,48E+02	4,82E+00	7,56E+00	2,83E-03	1,17E+00	5,13E+00	1,06E+01	-1,11E+01
Radioactive waste disposed	kg	6,62E-04	1,07E-05	3,17E-07	1,72E-08	4,02E-06	1,62E-05	2,66E-07	-7,46E-05

Output flow indicators

Results per 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	4,20E-02	0,00E+00	3,02E+00	0,00E+00	0,00E+00	2,21E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	6,91E-01	0,00E+00	2,28E-01	0,00E+00	0,00E+00	1,73E+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	0,00E+00	0,00E+00	1,66E+01
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	1,66E+01

Additional LCA results (other environmental performance results) of the product(s)

As per the PCR, complementary results for the 100% recovery and 100% disposal end-of-life scenarios are provided below.

Mandatory impact category indicators according to EN 15804 (100% recovery end-of-life scenario)

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	6,26E+01	2,84E+00	7,94E+00	1,35E-02	1,03E+00	6,82E+00	0,00E+00	-8,75E+00
GWP-fossil	kg CO ₂ eq.	7,00E+01	2,84E+00	1,42E-01	1,35E-02	1,03E+00	6,59E+00	0,00E+00	-8,75E+00
GWP-biogenic	kg CO ₂ eq.	-7,49E+00	6,40E-04	7,80E+00	1,49E-06	2,14E-04	2,33E-01	0,00E+00	-5,41E-03
GWP-luluc	kg CO ₂ eq.	8,39E-02	9,99E-04	1,84E-05	1,36E-06	3,32E-04	6,75E-04	0,00E+00	-1,63E-03
ODP	kg CFC 11 eq.	1,49E-06	6,43E-08	1,54E-09	2,07E-10	2,33E-08	3,33E-08	0,00E+00	-1,20E-07
AP	mol H ⁺ eq.	4,42E-01	9,45E-03	2,91E-04	1,20E-04	3,23E-03	1,76E-02	0,00E+00	-2,61E-02
EP-freshwater	kg P eq.	1,16E-02	2,17E-05	5,35E-07	4,74E-08	7,69E-06	2,82E-05	0,00E+00	-3,51E-04
EP-marine	kg N eq.	1,05E-01	3,31E-03	1,55E-04	5,63E-05	1,11E-03	8,32E-03	0,00E+00	-5,87E-03
EP-terrestrial	mol N eq.	1,17E+00	3,63E-02	1,26E-03	6,17E-04	1,22E-02	8,34E-02	0,00E+00	-6,85E-02
POCP	kg NMVO C eq.	3,86E-01	1,54E-02	4,75E-04	1,85E-04	5,11E-03	2,49E-02	0,00E+00	-2,43E-02
ADP-minerals&metals*	kg Sb eq.	1,12E-03	8,22E-06	1,95E-07	5,01E-09	3,59E-06	1,13E-05	0,00E+00	-5,63E-06
ADP-fossil*	MJ	9,11E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	2,71E+01	0,00E+00	-1,09E+02
WDP*	m ³	2,06E+01	2,37E-01	2,95E-02	4,38E-04	7,56E-02	4,83E-01	0,00E+00	-1,33E+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 on these results are high or as there is limited experienced with the indicator.

Additional mandatory and voluntary impact category indicators (100% recovery end-of-life scenario)

Indicator	Unit	Results per declared unit							
		A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ²	kg CO ₂ eq.	7,01E+01	2,84E+00	2,23E-01	1,35E-02	1,03E+00	6,82E+00	0,00E+00	-8,75E+00

Resource use indicators (100% recovery end-of-life scenario)

Indicator	Unit	Results per declared unit							
		A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,15E+02	6,40E-01	8,23E+01	1,10E-03	2,39E-01	9,66E-01	0,00E+00	-1,08E+01
PERM	MJ	8,23E+01	0,00E+00	-8,23E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,97E+02	6,40E-01	2,00E-02	1,10E-03	2,39E-01	9,66E-01	0,00E+00	-1,08E+01
PENRE	MJ	8,49E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	8,87E+01	0,00E+00	-1,09E+02
PENRM	MJ	6,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,16E+01	0,00E+00	0,00E+00
PENRT	MJ	9,11E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	2,71E+01	0,00E+00	-1,09E+02
SM	kg	1,77E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	9,48E-04	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
FW	m ³	7,07E-01	5,44E-03	-5,50E-03	1,05E-05	1,72E-03	8,46E-03	0,00E+00	-3,25E-02
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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

² This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste indicators (100% recovery end-of-life scenario)

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,06E+01	2,33E-01	1,14E-02	5,69E-04	8,88E-02	4,41E-01	0,00E+00	-1,20E+00
Non-hazardous waste disposed	kg	1,48E+02	4,82E+00	7,56E+00	2,83E-03	1,17E+00	5,40E+00	0,00E+00	-1,49E+01
Radioactive waste disposed	kg	6,62E-04	1,07E-05	3,17E-07	1,72E-08	4,02E-06	1,71E-05	0,00E+00	-8,27E-05

Output flow indicators (100% recovery end-of-life scenario)

Results per 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	4,20E-02	0,00E+00	3,02E+00	0,00E+00	0,00E+00	2,33E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	6,91E-01	0,00E+00	2,28E-01	0,00E+00	0,00E+00	1,82E+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	0,00E+00	0,00E+00	1,75E+01
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	1,75E+01

Mandatory impact category indicators according to EN 15804 (100% landfill end-of-life scenario)

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	6,26E+01	2,84E+00	7,94E+00	1,35E-02	1,03E+00	0,00E+00	3,71E-01	0,00E+00
GWP-fossil	kg CO ₂ eq.	7,00E+01	2,84E+00	1,42E-01	1,35E-02	1,03E+00	0,00E+00	3,71E-01	0,00E+00
GWP-biogenic	kg CO ₂ eq.	-7,49E+00	6,40E-04	7,80E+00	1,49E-06	2,14E-04	0,00E+00	1,29E-04	0,00E+00
GWP-luluc	kg CO ₂ eq.	8,39E-02	9,99E-04	1,84E-05	1,36E-06	3,32E-04	0,00E+00	1,27E-04	0,00E+00
ODP	kg CFC 11 eq.	1,49E-06	6,43E-08	1,54E-09	2,07E-10	2,33E-08	0,00E+00	6,46E-09	0,00E+00
AP	mol H ⁺ eq.	4,42E-01	9,45E-03	2,91E-04	1,20E-04	3,23E-03	0,00E+00	5,93E-03	0,00E+00

EP-freshwater	kg P eq.	1,16E-02	2,17E-05	5,35E-07	4,74E-08	7,69E-06	0,00E+00	2,29E-06	0,00E+00
EP-marine	kg N eq.	1,05E-01	3,31E-03	1,55E-04	5,63E-05	1,11E-03	0,00E+00	6,73E-04	0,00E+00
EP-terrestrial	mol N eq.	1,17E+00	3,63E-02	1,26E-03	6,17E-04	1,22E-02	0,00E+00	6,61E-03	0,00E+00
POCP	kg NMVO C eq.	3,86E-01	1,54E-02	4,75E-04	1,85E-04	5,11E-03	0,00E+00	2,68E-03	0,00E+00
ADP-minerals&metals*	kg Sb eq.	1,12E-03	8,22E-06	1,95E-07	5,01E-09	3,59E-06	0,00E+00	3,56E-07	0,00E+00
ADP-fossil*	MJ	9,11E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	0,00E+00	5,38E+00	0,00E+00
WDP*	m ³	2,06E+01	2,37E-01	2,95E-02	4,38E-04	7,56E-02	0,00E+00	2,37E-01	0,00E+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 on these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators (100% landfill end-of-life scenario)

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ³	kg CO ₂ eq.	7,01E+01	2,84E+00	2,23E-01	1,35E-02	1,03E+00	0,00E+00	3,71E-01	0,00E+00

Resource use indicators (100% landfill end-of-life scenario)

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,15E+02	6,40E-01	8,23E+01	1,10E-03	2,39E-01	0,00E+00	5,40E-02	0,00E+00
PERM	MJ	8,23E+01	0,00E+00	-8,23E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,97E+02	6,40E-01	2,00E-02	1,10E-03	2,39E-01	0,00E+00	5,40E-02	0,00E+00
PENRE	MJ	8,49E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	0,00E+00	6,70E+01	0,00E+00
PENRM	MJ	6,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,16E+01	0,00E+00
PENRT	MJ	9,11E+02	4,12E+01	9,79E-01	1,75E-01	1,45E+01	0,00E+00	5,38E+00	0,00E+00

³ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

SM	kg	1,77E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	9,48E-04	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
FW	m ³	7,07E-01	5,44E-03	-5,50E-03	1,05E-05	1,72E-03	0,00E+00	-2,02E-03	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							

Waste indicators (100% landfill end-of-life scenario)

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,06E+01	2,33E-01	1,14E-02	5,69E-04	8,88E-02	0,00E+00	1,89E-02	0,00E+00
Non-hazardous waste disposed	kg	1,48E+02	4,82E+00	7,56E+00	2,83E-03	1,17E+00	0,00E+00	3,73E+01	0,00E+00
Radioactive waste disposed	kg	6,62E-04	1,07E-05	3,17E-07	1,72E-08	4,02E-06	0,00E+00	8,06E-07	0,00E+00

Output flow indicators (100% landfill end-of-life scenario)

Results per 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	4,20E-02	0,00E+00	3,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	6,91E-01	0,00E+00	2,28E-01	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	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	0,00E+00

Variation in LCA results among products

The following table presents the variation in environmental performance results for the declared unit of the analyzed products.

The fire-resistant door has been selected as the representative product as it is the best-selling system. The Min and Max columns indicate the lowest and highest impact values obtained among the three product variants considered in the study (fire-resistant hinged fire doors, sliding fire doors and Large-Dimension hinged fire doors). The percentage variation (%) expresses the difference between these values relative to the representative product. All results are calculated as the sum of modules A1–C4.

LCA result of one declared unit product (A-C)	Unit	Min	Representative	Max	Variation (%)
GWP-total	kg CO ₂ eq.	8,09E+01	8,09E+01	1,15E+02	0 / +42
GWP-fossil	kg CO ₂ eq.	8,03E+01	8,03E+01	1,15E+02	0 / +43
GWP-biogenic	kg CO ₂ eq.	5,25E-01	5,25E-01	9,36E-01	0 / +78
GWP-luluc	kg CO ₂ eq.	8,59E-02	8,59E-02	1,37E-01	0 / +60
ODP	kg CFC 11 eq.	1,62E-06	1,62E-06	2,41E-06	0 / +49
AP	mol H ⁺ eq.	4,77E-01	4,77E-01	1,73E+00	0 / +264
EP-freshwater	kg P eq.	9,90E-03	1,17E-02	1,65E-02	-15 / +41
EP- marine	kg N eq.	1,08E-01	1,17E-01	1,45E-01	-8 / +24
EP-terrestrial	mol N eq.	1,17E+00	1,31E+00	1,62E+00	-11 / +24
POCP	kg NMVOC eq.	4,31E-01	4,31E-01	6,03E-01	0 / +40
ADP-minerals&metals*	kg Sb eq.	1,15E-03	1,15E-03	2,73E-03	0 / +138
ADP-fossil*	MJ	9,95E+02	9,95E+02	1,45E+03	0 / +46
WDP*	m ³	2,14E+01	2,14E+01	3,19E+01	0 / +49

The variations in the environmental impacts relative to the representative product are mainly due to differences in product mass and material composition. The sliding and large dimension hinged fire-resistant doors require larger quantities of raw materials, particularly steel, calcium silicate and rock wool, which leads to higher environmental impacts compared with the representative hinged door. The production processes are substantially equivalent, therefore, the differences are primarily attributable to the amount of materials used.

ADDITIONAL ENVIRONMENTAL INFORMATION

Fael Security is able to supply products that comply with the Minimum Environmental Criteria for Construction (DM 24/11/2025 – G.U. n. 281/2025), with specific reference to criterion 2.4.4 “Steel products”.

The average recycled content, which includes pre- and post-consumer recycled scrap in the representative product (fire-resistant door), is not below 50%. This value is based on environmental product declarations provided by the suppliers regarding the actual recycled content of unalloyed structural steel produced via Electric Arc Furnace (EAF) (83,9%, of which 30% pre-consumer and 53,9% post-consumer) and gypsum board (5,7%, of which 5,4% pre-consumer and 0,3% post-consumer).

The composition of the input raw materials for the fire-resistant closures produced by Fael Security is based on information declared by the respective suppliers (verified by accredited bodies), as reported below.

Raw material	Primary material (%)	Pre-consumer recycled content (%)	Post-consumer recycled content (%)	Source of the data
Galvanized non-alloy structural steel produced via Electric Arc Furnace (EAF)	16,1	30	53,9	S-P-11473 (2023)
Rock wool	100	0	0	EPD ROCKWOOL® Stone Wool Thermal Insulation for buildings* (2025) NEPD-4099-3121-EN* (2022)
Gypsum board	94,3	5,4	0,3	Certification System 3 – ISO/IEC 17067 No. P238 (2023)

** Disclaimer: The EPDs “ROCKWOOL® Stone Wool Thermal Insulation for Buildings” and NEPD-4099-3121-EN have been considered as representing 100% virgin material input, as they were verified by individual verifiers not accredited under the IAF/ILAC system. A conservative assumption has therefore been applied in the modelling.*

For further details on the recycled content of raw materials in relation to the total product mass, please refer to the “Content Declaration” section.

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CPC	Central product classification
SVHC	Substances of Very High Concern
PM	Particulate Matter
IRP	Ionizing radiation Potential
ETP-FW	Ecotoxicity Potential- freshwaters
HTP-C	Human Toxicity potential- Cancer
HTP-NC	Human Toxicity potential- Non-Cancer
SQP	Index of soil quality potential
ND	Not Declared

REFERENCES

- 1) General Programme Instructions of the International EPD® System. Version 5.0.1
- 2) Forethinking Srl Società Benefit, 2026. Technical report: STUDIO LCA PER PORTE E PORTONI TAGLIAFUOCO PRODOTTI DA FAEL SECURITY
- 3) EN 15804:2012+A2:2019/AC:2021 “Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products”
- 4) International EPD® System PCR 2019:14 Construction products, version 2.0.1
- 5) UNI EN 17213:2020 c-PCR: windows and doors, c-PCR-007 (to pcr 2019:14), version 1.0.0
- 6) International Organisation for Standardization (ISO), 2006a Environmental management - Life Cycle assessment Principles and framework. ISO 14040:2006/Amd 1:2020, Geneva
- 7) International Organisation for Standardization (ISO), 2006b Environmental management - Life Cycle assessment Requirements and guidelines. ISO 14044:2006/Amd 2:2020, Geneva
- 8) International Organisation for Standardization (ISO), 2006c Environmental labels and declarations - Type III environmental declarations - Principles and procedures. ISO 14025:2006, Geneva
- 9) Ecoinvent Database. <http://www.ecoinvent.org/database/>
- 10) ENVIRONMENTAL PRODUCT DECLARATION FOR NON-ALLOYED STRUCTURAL STEELS GALVANIZED COILS, STRIPS AND SHEETS FROM ACCIAIERIA ARVEDI SPA- S-P-11473
- 11) Certificato di prodotto P237A- UNI PdR 88
- 12) ENVIRONMENTAL PRODUCT DECLARATION FOR ROCKWOOL STONE WOOL THERMAL INSULATION FOR BUILDINGS FROM ROCKWOOL A.S.
- 13) ENVIRONMENTAL PRODUCT DECLARATION FOR PAROC STONE WOOL THERMAL INSULATION (HVAC SLABS & MATS & OEM SLABS) FROM PAROC GROUP OY
- 14) ENVIRONMENTAL PRODUCT DECLARATION FOR GYPROC WALLBOARD FROM SAINT-GOBAIN ITALIA SPA
- 15) C. Chicaiza-Ortiz, Waste-to-Energy technologies for municipal solid waste management: Bibliometric review, life cycle assessment, and energy potential case study, Journal of Cleaner Production, 2024
- 16) Rapporto integrato di sostenibilità 2025 – CONAI
- 17) <https://www.searates.com/distance-time/>

VERSION HISTORY

Original Version of the EPD, 2026-09-09

VERIFICATION STATEMENT CERTIFICATE CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD17001

CERTINALIA, S.L.U., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:

CERTINALIA, S.L.U., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:

Fael Security S.r.l.
Via Ettore Majorana 4
72100, Brindisi (BR) - ITALY

for the following product:

para el siguiente producto:

Fire-resistant doors: Hinged fire doors, sliding fire doors, large-dimension hinged fire doors
Puertas cortafuegos: Puertas cortafuegos batientes, puertas cortafuegos correderas, puertas cortafuegos batientes de grandes dimensiones

with registration number **EPD-IES-0032514** in the International EPD® System (www.environdec.com)
*con número de registro **EPD-IES-0032514** en el Sistema Internacional EPD® (www.environdec.com)*

it's in conformity with:

es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v5.**
- **PCR 2019:14 Construction products (EN 15804+A2) 2.0.**
- **c-PCR-007 Windows and doors (EN 17213:2020) v1.0.**
- **UN CPC 42120 Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium.**

Issued date / Fecha de emisión:

08/09/2026

Update date / Fecha de actualización:

08/09/2026

Serial Nº / Nº Serie:

EPD1700100-E



Carlos Nazabal Alsua
Manager

The validity of this certificate is subject to the validity of its related EPD.
La validez de este certificado está sujeta a la vigencia de su correspondiente EPD.

This certificate is subject to modifications, temporary suspensions and withdrawals by CERTINALIA.
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