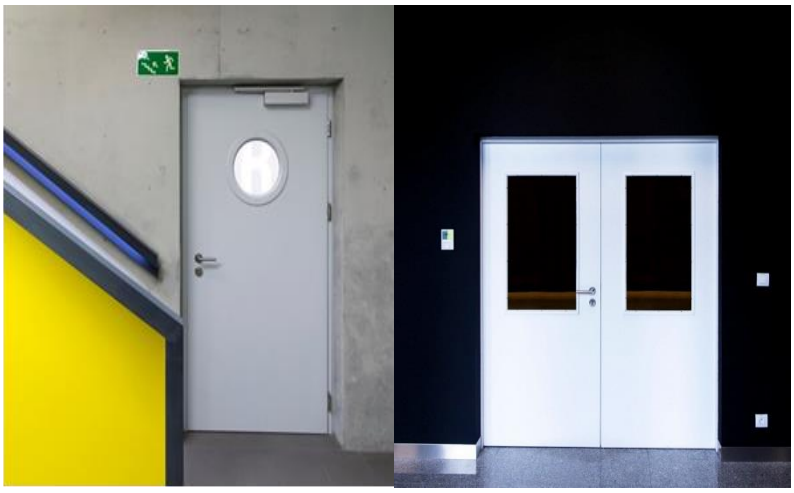
Type III Environmental Product Declaration No. 376/2022

Issuance date: 18.11.2022
Validity date: 18.11.2027

Steel doors: ALPE BO, ALPE EI30, ALPE EI60



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Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804
(Cradle-to-Gate with options)

The year of preparing the EPD: 2022

Tech. assessment doc.: ITB-KOT-2017/0326, 2nd ed. (reference document may be a subject to change)

Service Life: 20 years

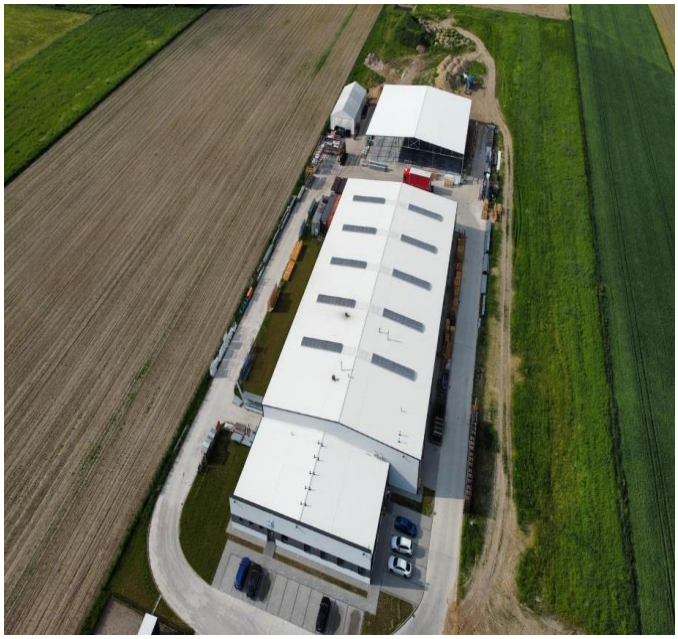
PCR: ITB-PCR A

Declared unit: 1 unit

Reasons for performing LCA: B2B

Representativeness: Poland, European, 2021

MANUFACTURER



ASSA ABLOY Mercor Doors is part of ASSA ABLOY, a global leader in comprehensive building security systems committed to meeting safety and user comfort needs. The company is a leading producer of steel and wooden fire doors, profile doors and walls, fire gates and curtains as well as partitions without fire resistance. All products meet the stringent safety requirements, which has been confirmed by numerous tests and obtained Technical Approvals, National Technical Assessments and certificates of relevant research institutes in Poland, as well as in other European countries. The offer of ASSA ABLOY Mercor Doors sp. z o.o. includes: steel doors (covered by this EPD), wooden fire doors, fire gates (roller gates), steel profile doors and walls, aluminum profile doors and walls, RAPTOR apartment doors. ASSA ABLOY Mercor Doors plants are: the plant in Dobrzeń Wielki (Poland), where steel doors, fire gates and RAPTOR apartment doors are manufactured and the plant in Bielsk (Poland, a picture) engaged in the production of steel profile doors and walls as well as aluminum profile doors and walls. The seamless steel door (covered by this EPD) is the main product of company. Along with the increase in the technical requirements of steel doors, there has been a development of the structure in terms of fire, smoke-tight, strength, corrosion, thermal and acoustic parameters. As a standard, the leaf structure is made of galvanized sheet metal, which is bent and riveted, which guarantees high resistance to corrosion and a perfect leaf plane. The technology of welding the door frames ensures their stability as well as the appropriate shape and size, which facilitates assembly and subsequent adjustment of the door. Production Process is controlled and certified and meets the requirements of the Environmental Management System ISO14001. Code of Conduct covers human rights, labor practices and decent work. Management of ASSA ABLOY is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.

PRODUCT DESCRIPTION

ALPE doors are designed for indoor and exterior applications. It is a door solution, designed to provide specific performance parameters including: fire resistance, burglary resistance, acoustic and thermal insulation performance. ALPE doors are steel doors with a shell structure (glazed or not). The filling is mineral wool. ALPE steel doors are used in the construction industry to close openings in vertical partitions with declared fire resistance class EI30 and smoke tightness in the case of ALPE EI30 doors and dampers, with the declared fire resistance class EI60 and smoke-tightness in the case of ALPE EI60 doors and dampers, general use - without declared fire resistance and smoke tightness in the case of ALPE BO doors. More information is available in the manufacturer's web site or on request. The specific products covered by this EPD document are described in Table 1.

Table 1. Technical data for three types of ALPE door covered by this EPD

Technical parameters	Product type		
	ALPE BO	**ALPE EI30**	**ALPE EI60**
Fire resistance acc. to PN-EN 1634	None fire rated (NFR)	EI30	EI60
Smokeproof class acc. to PN-EN 13501	-	S_a , S_{200}	S_a , S_{200}
Max. acoustic insulation class PN-EN ISO 10140	Rw=37dB (max. acoustic rate Rw=41dB)	Rw=37 dB (max. acoustic rate Rw=41 dB)	Rw=32 dB (max. acoustic rate Rw=34 dB)
U value acc. to PN-EN 14351	U=1,3 W/m^{2}K		
Mechanical strength class acc. to PN-EN 1192	class 3 (the door leaf made of plate thickness ≥0.75 mm and <1.25 mm) class 4 (3 (the door leaf made of plate thickness 1.25 mm)		
Mechanical durability class acc. to PN-EN 16034	class C5 (200 000 cycles)		
Anti-burglary acc. to PN-EN 1627 (for standard welded hinges)	RC2	RC2	RC2 RC3 (for one leaf door)
Possibility of performance in corrosivity class acc. to PN-EN 12944 and PN-EN 14713	C3 or C4 or C5		
Dimension [mm] W: width h: height t: thickness *the maximum range of dimensions of ALPE steel doors is given in the wall opening, not taking into account the intended use (the ranges may vary depending on the intended use).*	1-leaf W: 368-1378 H: 584-2834 T: 54 2-leafs W: 656-2758 H: 584-2834 T: 54	1-leaf W: 368-1378 H: 584-2834 T: 54 2-leafs W: 656-2758 H: 584-2834 T: 54	1-leaf W: 382-1362 H: 591-2841 T: 63 2-leafs W: 668-2727 H: 591-2841 T: 63

ALPE steel jacket doors are flagship product, created as a result of the merger of the ASSA ABLOY and Mercor Doors brands. Company approach each project individually, adjusting it to the needs of client. For years, manufacturer have been improving the construction of doors, and developing it in accordance with market demand and available modern technology. Thanks to full customization, both in terms of dimensions and colors, the customer receives a door adapted to the project. The technical solutions used in welding ensure the stability of the product and facilitate its assembly and subsequent adjustment. Doors from the ALPE series (ALPE BO, ALPE EI30, ALPE EI60) are especially dedicated to rooms that require additional fire and burglary protection. Their standard purpose is staircases, horizontal partitions and connectors. Thanks to ALPE doors, commercial buildings, offices or warehouses remain safe places, protected against fire and theft. Installers and distributors value these products for durability and ease of installation, fire resistance and smoke tightness, as well as resistance to the use of tools such as crowbars. An additional advantage of the doora are their sound insulation properties, which is especially useful in offices and where silence is required for work. The products are compatible with a wide range of ASSA ABLOY products, such as locks, handles and door closers. Regarding fire protection, the product is tested according to EN1634-1 by ITB Poland. Steel doors are powder coated in any color from the RAL palette, as standard they are made of sheet coated in RAL 7035, the leaf is foil-coated to protect it during transport and assembly. The door can be painted with structural paint. For the application and use the respective national provisions apply. ALPE doors meet the requirements of: EN 1634-1 standard for fire resistance, ISO 717 & EN 20140-3-1 for sound insulation, ISO 10077-1 & ISO 10077-2 for thermal insulation, EN 12400:2004 for mechanical durability. Doors are delivered with final painting (used of pre-coated steel sheet or powder painting in the manufacture plant). Gasketing are used to control the flow of air, smoke, heat or cold and sound through the door opening. Repairs or replacement are not usually necessary. No cleaning efforts need to be taken into consideration.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declaration refers to the functional unit of 1 piece of Mercor ALPE door. The declared unit is 1 steel door product including 1-leaf door and for 2-leaf doors: ALPE BO, ALPE EI30, and ALPE EI60.

System boundary

Type of the EPD is: cradle to gate - with options. The following life cycle stages were considered. Production stage including: A1 – Raw material extraction and processing, A2 – Transport to the manufacturer and A3 – Manufacturing. End-of-life stage: C1- Deconstruction, C2 – Transport to waste processing, C3 – Waste processing, C4 – Disposal (landfill). This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues. EPD includes D module- declaration of all benefits and loads beyond product system. Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB's document PCR A (EN 15804+A2). The total average product mass recipe per unit was used for the calculations based on input materials mass divided by the number of specific door products. The input substances ranges are average values and the composition of specific products complying with the EPD can deviate from these concentration levels in individual cases. In the case of a specific specification of the effects of a particular product, it is necessary to contact the manufacturer.

System limits

All raw materials submitted for the formulations and production data were taken into consideration. In the assessment, all available data from production have been considered, i.e. all raw materials/elements used as per formulation process, utilized thermal energy for heating, and electric power consumption. Thus, material and energy flows contributing less than 1 % of mass or energy have been considered. It can be assumed that the total sum of neglected processes does not exceed 1 % of energy usage and mass per modules. Machines and facilities required during production are neglected. The production of etiquettes was not considered.

Modules A1 and A2: *Raw materials supply and transport*

The modules A1 and A2 represent the extraction and processing of raw materials and components and transport to the production sites (including steel, steel elements, glass, mineral wool and plastics). For A2 module (transport) European averages for fuel data are applied. All distances and types of vehicles for all input products were declared by manufacturer and considered. Data on mode of transport and distances, as reported by suppliers were used for those materials and parts contributing more than 0.5 % of total product mass.

Module A3: *Production*

The manufacturing process occurs in two factories ASSA ABLOY Mercor Doors in Dobrzeń Wielki and Bielsk in Poland. The door production process is composed of: input material delivery, cutting profiles and sheets, drilling, welding, grinding, bonding, washing, powder painting, galzing, fitting

accessories. The product specific manufacturing process line is presented in Figure 1. Electricity is consumed in the mixture process and gas for plant space heating purposes. Production Process meets the requirements of the Environmental Management System ISO14001. Finished ALPE doors are placed horizontally on wooden pallets and banded to pallet for shipment. Max 10 doors per pallet.

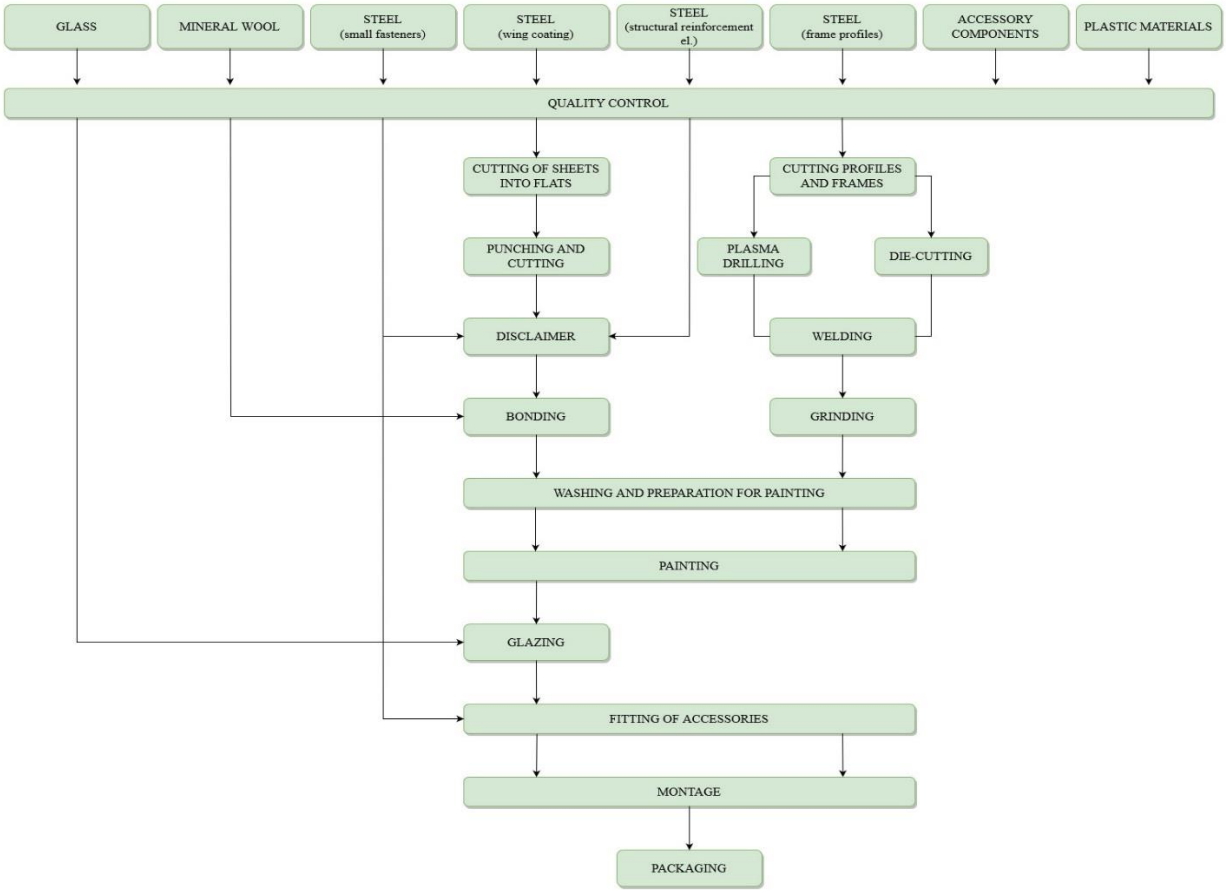


Fig. 1. A basic scheme of steel doors manufacturing process

Modules *C and D: End-of-life (EOL)*

The product (at the end of life in building) is to be removed form a building using electrical tools. The End of Life scenario is based on a material split and respective recycling rates (Table 2). In the applied scenario, the steel parts (98%) are assumed mainly to be recycled, plastics are incinerated (95%), and stone wool landfilled (97%). The all other remaining parts (other than steel) are in 70% landfilled. The energy required for treatment of recycled materials is included. In the adapted end-of-life scenario, the de-constructed products are transported to recycling plant 200 km on > 16t lorry EURO 5. The recycling potentials of materials is presented in table 2. Module D presents credits resulting from the recycling (packaging), energy recovered (plastic incineration) and steel scrap use in a new steel production process. Regarding incineration, model for the waste incineration is adapted according to the material composition and heating value of the plastic material. The reuse, recovery and recycling stage is considered beyond the system boundaries (D). Net scrap is an amount of steel recycled at end-of-life minus scrap input from previous product life cycles. Each scenario assumes that rate % of the material is sent to that scenario (table 2).

Table 2. End-of-life scenario for the product components.

Material	Recycling %	Landfilling %	Energy recovery %
Steel (and steel elements)	98	2	10
Plastics	0	5	95
Glass	80%	20	0
Wool	3%	97%	0
Other	70	20	10

Regarding the recycling material of metals, the metal parts in the EoL are declared as end-of-waste status. Electricity at end-of-life (module C) has been modelled. Electricity at end-of-life (module D) has been modelled using an average EU-27 electricity mix as the location where the product reaches end-of-life is unknown.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2021 – 31.12.2021 (1 year). The life cycle assessments were prepared for Italy and Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires (2 manufacturing plants) completed by producer and verified via data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.8 (energy carriers, plastics, steels, mineral wool, waste treatment, incineration, and packaging) and specific EPDs (steel accessories, fire glass). The background data for energy is national based on KOBiZE/GUS reports (Polish electricity mix and combustion factors for fuels). Specific (LCI) data quality analysis was a part of the input data verification. Where no background data was available, data gaps were complemented by literature research.

Assumptions and estimates

The impacts of the representative door products were aggregated using mass averaged approach per unit. Glazed and unglazed doors were averaged.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100-year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method

Additional information

Polish electricity mix used (production) is 0.698 kg CO_2/kWh (KOBiZE 2021). European electricity mix used is 0.430kg CO_2/kWh for the end of life (Ecoinvent v3.8, RER).

As a general rule, no particular environmental or health protection measures other than those specified by law are necessary. There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product. The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.
On the basis of data obtained from suppliers, it is declared that use of recycled content in door elements ia as presented in table 3. The average weight of the B0 and EI 30 doors is 74 kg, and the EI 60 door is 87 kg. The content of recycled material in the door is minimum of 40%.

Table 3. Recycled content in door production materials

Material	Post-consumer Recycled content	Pre-consumer recycled content
Mineral wool	Min. 20%	-
Leaf shell sheet (steel)	63.5%	37.4%
Steel frames	2.6%	
Other steel	20.0%	
Glass	8.7%	

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 unit (steel doors). The following life cycle modules (table 4) were included in the analysis. The following tables 5-16 present the environmental impacts of the life cycle of selected door types (B0, EI30 and EI60). In the case of double-leaf doors, the results from the table should be multiplied by the conversion factor 1.8.

Table 4. System boundaries for the environmental characteristic included in LCA

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)															
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MD	MND	MD	MD	MD	MD	MD

Table 5. Life cycle assessment (LCA) results of the steel door type B0 - environmental impacts (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.58E+02	9.75E+00	3.04E+01	1.98E+02	2.12E-02	1.04E+00	7.04E+00	9.12E-02	-8.29E+01
Greenhouse potential - fossil	eq. kg CO_2	1.67E+02	9.71E+00	2.95E+01	2.06E+02	2.05E-02	1.04E+00	7.04E+00	9.02E-02	-8.31E+01
Greenhouse potential - biogenic	eq. kg CO_2	-9.34E+00	3.83E-02	8.69E-01	-8.43E+00	6.00E-04	3.55E-03	1.43E-06	9.10E-04	2.59E-01
Global warming potential - land use and land use change	eq. kg CO_2	1.05E-01	4.43E-03	1.03E-02	1.20E-01	7.20E-06	4.08E-04	1.83E-06	9.14E-05	-8.16E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	7.10E-06	2.19E-06	9.62E-07	1.03E-05	4.20E-10	2.40E-07	7.28E-09	2.74E-08	-2.84E-06
Soil and water acidification potential	eq. mol H+	1.07E+00	3.88E-02	3.28E-01	1.43E+00	2.28E-04	4.22E-03	1.57E-01	7.61E-04	-3.36E-01
Eutrophication potential - freshwater	eq. kg P	1.28E-01	7.43E-04	5.56E-02	1.84E-01	3.90E-05	6.98E-05	1.71E-06	2.62E-05	-3.70E-02
Eutrophication potential - seawater	eq. kg N	1.58E-01	1.14E-02	4.85E-02	2.18E-01	3.30E-05	1.27E-03	7.89E-02	2.63E-04	-7.37E-02
Eutrophication potential - terrestrial	eq. mol N	1.69E+00	1.24E-01	4.01E-01	2.21E+00	2.79E-04	1.39E-02	8.65E-01	2.86E-03	-8.03E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	8.66E-01	3.81E-02	1.13E-01	1.02E+00	7.80E-05	4.25E-03	2.14E-01	8.26E-04	-4.23E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	8.83E-03	4.31E-05	1.43E-04	9.02E-03	1.00E-07	3.68E-06	2.70E-08	3.05E-07	-1.55E-03
Abiotic depletion potential - fossil fuels	MJ	1.14E+03	1.43E+02	5.18E+02	1.80E+03	3.48E-01	1.54E+01	1.32E-01	2.08E+00	-6.85E+02
Water deprivation potential	eq. m^3	6.08E+01	7.30E-01	1.05E+01	7.21E+01	7.20E-03	7.13E-02	1.27E-01	1.21E-02	-1.36E+01

Table 6. Life cycle assessment (LCA) results of the steel door type B0– additional impacts indicators (DU: 1 unit)

Indicator	Unit	A1-A3	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Table 7. Life cycle assessment (LCA) results of the steel door type B0- the resource use (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Consumption of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total consumption of renewable primary energy resources	MJ	3.19E+02	2.38E+00	3.68E+01	3.58E+02	2.58E-02	2.21E-01	2.05E-03	3.66E-02	-5.96E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Consumption of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total consumption of non-renewable primary energy resources	MJ	2.07E+03	1.43E+02	5.21E+02	2.73E+03	3.49E-01	1.54E+01	1.32E-01	2.25E+00	-6.55E+02
Consumption of secondary materials	kg	4.30E+01	5.66E-02	4.65E-02	4.31E+01	3.18E-05	5.17E-03	1.75E-05	4.31E-08	1.11E+01
Consumption of renew. secondary fuels	MJ	2.29E+00	6.49E-04	2.55E-04	2.29E+00	1.77E-07	5.70E-05	4.59E-07	1.13E-09	-1.40E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	4.01E-01	4.01E-01	2.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	9.00E-01	1.97E-02	1.95E-01	1.11E+00	9.45E-05	1.94E-03	1.08E-03	3.25E-04	-6.03E-01

Table 8. Life cycle assessment (LCA) results of the steel door type B0– waste categories (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste	kg	7.93E-03	1.81E-01	1.02E-02	1.99E-01	3.60E-06	1.73E-02	2.70E-03	3.50E-06	-2.28E-02
Non-hazardous waste	kg	1.31E-01	3.26E+00	3.34E-01	3.73E+00	1.87E-04	3.07E-01	7.28E-03	8.59E+00	-1.06E+00
Radioactive waste	kg	3.88E-05	7.95E-04	5.24E-04	1.36E-03	2.61E-07	1.15E-06	5.40E-09	1.27E-05	-1.20E-03
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	0.00E+00
Materials for recycling	kg	1.68E-01	4.83E-04	6.82E-02	2.37E-01	3.60E-07	4.77E-05	6.10E+01	4.10E-10	-8.30E-05
Materials for energy recovery	kg	6.07E-04	3.85E-06	4.53E-06	6.16E-04	3.15E-09	3.86E-07	2.64E-08	4.86E-12	-1.46E-06
Exported Energy	MJ	3.92E+00	1.42E-01	1.49E+00	5.55E+00	1.04E-03	0.00E+00	4.32E-05	0.00E+00	-2.16E-02

Table 9. Life cycle assessment (LCA) results of the steel door type EI30- environmental impacts (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.63E+02	9.74E+00	3.04E+01	2.03E+02	2.12E-02	1.04E+00	7.04E+00	9.12E-02	-8.29E+01
Greenhouse potential - fossil	eq. kg CO_2	1.72E+02	9.70E+00	2.95E+01	2.11E+02	2.05E-02	1.04E+00	7.04E+00	9.02E-02	-8.31E+01
Greenhouse potential - biogenic	eq. kg CO_2	-9.30E+00	3.82E-02	8.69E-01	-8.39E+00	6.00E-04	3.55E-03	1.43E-06	9.10E-04	2.59E-01
Global warming potential - land use and land use change	eq. kg CO_2	1.06E-01	4.42E-03	1.03E-02	1.21E-01	7.20E-06	4.08E-04	1.83E-06	9.14E-05	-8.16E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	8.80E-06	2.19E-06	9.62E-07	1.19E-05	4.20E-10	2.40E-07	7.28E-09	2.74E-08	-2.84E-06
Soil and water acidification potential	eq. mol H+	1.07E+00	3.87E-02	3.28E-01	1.43E+00	2.28E-04	4.22E-03	1.57E-01	7.61E-04	-3.36E-01
Eutrophication potential - freshwater	eq. kg P	1.28E-01	7.42E-04	5.56E-02	1.84E-01	3.90E-05	6.98E-05	1.71E-06	2.62E-05	-3.70E-02
Eutrophication potential - seawater	eq. kg N	1.63E-01	1.14E-02	4.85E-02	2.23E-01	3.30E-05	1.27E-03	7.89E-02	2.63E-04	-7.37E-02
Eutrophication potential - terrestrial	eq. mol N	1.74E+00	1.24E-01	4.01E-01	2.27E+00	2.79E-04	1.39E-02	8.65E-01	2.86E-03	-8.03E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	9.51E-01	3.80E-02	1.13E-01	1.10E+00	7.80E-05	4.25E-03	2.14E-01	8.26E-04	-4.23E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	8.82E-03	4.31E-05	1.43E-04	9.01E-03	1.00E-07	3.68E-06	2.70E-08	3.05E-07	-1.55E-03
Abiotic depletion potential - fossil fuels	MJ	1.18E+03	1.42E+02	5.18E+02	1.84E+03	3.48E-01	1.54E+01	1.32E-01	2.08E+00	-6.85E+02
Water deprivation potential	eq. m^3	6.14E+01	7.29E-01	1.05E+01	7.26E+01	7.20E-03	7.13E-02	1.27E-01	1.21E-02	-1.36E+01

Table 10. Life cycle assessment (LCA) results of the steel door type EI30– additional impacts indicators (DU: 1 unit)

Indicator	Unit	A1-A3	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Table 11. Life cycle assessment (LCA) results of the steel door type EI30 the resource use (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Consumption of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total consumption of renewable primary energy resources	MJ	3.23E+02	2.37E+00	3.68E+01	3.62E+02	2.58E-02	2.21E-01	2.05E-03	3.66E-02	-5.96E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Consumption of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total consumption of non-renewable primary energy resources	MJ	2.12E+03	1.42E+02	5.21E+02	2.78E+03	3.49E-01	1.54E+01	1.32E-01	2.25E+00	-6.55E+02
Consumption of secondary materials	kg	4.30E+01	5.65E-02	4.65E-02	4.31E+01	3.18E-05	5.17E-03	1.75E-05	4.31E-08	1.11E+01
Consumption of renew. secondary fuels	MJ	2.29E+00	6.48E-04	2.55E-04	2.29E+00	1.77E-07	5.70E-05	4.59E-07	1.13E-09	-1.40E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	4.01E-01	4.01E-01	2.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	9.12E-01	1.96E-02	1.95E-01	1.13E+00	9.45E-05	1.94E-03	1.08E-03	3.25E-04	-6.03E-01

Table 12. Life cycle assessment (LCA) results of the steel door type EI30– waste categories (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste	kg	2.18E-02	1.81E-01	1.02E-02	2.13E-01	3.60E-06	1.73E-02	2.70E-03	3.50E-06	-2.28E-02
Non-hazardous waste	kg	1.29E-01	3.26E+00	3.34E-01	3.72E+00	1.87E-04	3.07E-01	7.28E-03	8.59E+00	-1.06E+01
Radioactive waste	kg	7.70E-05	7.95E-04	5.24E-04	1.33E-03	2.61E-07	1.15E-06	5.40E-09	1.27E-05	-1.20E-03
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	0.00E+00
Materials for recycling	kg	2.02E-01	4.82E-04	6.82E-02	2.71E-01	3.60E-07	4.77E-05	5.72+01	4.10E-10	-8.30E-05
Materials for energy recovery	kg	6.11E-04	3.84E-06	4.53E-06	6.19E-04	3.15E-09	3.86E-07	2.64E-08	4.86E-12	-1.46E-06
Exported Energy	MJ	3.98E+00	1.42E-01	1.49E+00	5.61E+00	1.04E-03	0.00E+00	4.32E-05	0.00E+00	-2.16E-02

Table 13.Life cycle assessment (LCA) results of the steel door type EI60 - environmental impacts (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.74E+02	2.43E+01	3.56E+01	2.34E+02	2.12E-02	1.22E+00	8.23E+00	1.07E-01	-9.69E+01
Greenhouse potential - fossil	eq. kg CO_2	1.83E+02	2.41E+01	3.45E+01	2.42E+02	2.05E-02	1.21E+00	8.23E+00	1.05E-01	-9.72E+01
Greenhouse potential - biogenic	eq. kg CO_2	-8.90E+00	1.19E-01	1.02E+00	-7.76E+00	6.00E-04	4.15E-03	1.67E-06	1.06E-03	3.03E-01
Global warming potential - land use and land use change	eq. kg CO_2	1.14E-01	1.40E-02	1.21E-02	1.40E-01	7.20E-06	4.77E-04	2.14E-06	1.07E-04	-9.54E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	1.11E-05	5.29E-06	1.12E-06	1.75E-05	4.20E-10	2.81E-07	8.52E-09	3.21E-08	-3.32E-06
Soil and water acidification potential	eq. mol H+	1.22E+00	9.43E-02	3.83E-01	1.70E+00	2.28E-04	4.93E-03	1.83E-01	8.90E-04	-3.92E-01
Eutrophication potential - freshwater	eq. kg P	1.33E-01	2.29E-03	6.50E-02	2.00E-01	3.90E-05	8.16E-05	2.00E-06	3.06E-05	-4.33E-02
Eutrophication potential - seawater	eq. kg N	1.77E-01	2.61E-02	5.67E-02	2.60E-01	3.30E-05	1.49E-03	9.23E-02	3.07E-04	-8.62E-02
Eutrophication potential - terrestrial	eq. mol N	1.97E+00	5.12E-02	4.69E-01	2.49E+00	2.79E-04	1.62E-02	1.01E+00	3.34E-03	-9.38E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.00E+00	8.87E-02	1.32E-01	1.22E+00	7.80E-05	4.97E-03	2.50E-01	9.66E-04	-4.95E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	9.16E-03	1.47E-04	1.68E-04	9.48E-03	1.00E-07	4.31E-06	3.15E-08	3.57E-07	-1.81E-03
Abiotic depletion potential - fossil fuels	MJ	1.51E+03	3.53E+02	6.05E+02	2.47E+03	3.48E-01	1.80E+01	1.55E-01	2.44E+00	-8.01E+02
Water deprivation potential	eq. m^3	6.96E+01	2.14E+00	1.23E+01	8.41E+01	7.20E-03	8.34E-02	1.48E-01	1.42E-02	-1.59E+01

Table 14. Life cycle assessment (LCA) results of the steel door type EI60– additional impacts indicators (DU: 1 unit)

Indicator	Unit	A1-A3	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Table 15. Life cycle assessment (LCA) results of the steel door type EI60- the resource use (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Consumption of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total consumption of renewable primary energy resources	MJ	3.44E+02	7.40E+00	4.31E+01	3.94E+02	2.58E-02	2.59E-01	2.40E-03	4.28E-02	-6.97E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Consumption of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total consumption of non-renewable primary energy resources	MJ	2.32E+03	3.53E+02	6.09E+02	3.28E+03	3.49E-01	1.80E+01	1.55E-01	2.63E+00	-7.66E+02
Consumption of secondary materials	kg	3.86E+01	1.80E-01	5.44E-02	3.88E+01	3.18E-05	6.04E-03	2.05E-05	4.03E-08	1.30E+01
Consumption of renew. secondary fuels	MJ	2.31E+00	2.14E-03	2.98E-04	2.31E+00	1.77E-07	6.66E-05	5.36E-07	1.05E-09	-1.64E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	4.69E-01	4.69E-01	2.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	1.19E+00	5.70E-02	2.28E-01	1.47E+00	9.45E-05	2.27E-03	1.26E-03	3.80E-04	-7.05E-01

Table 16. Life cycle assessment (LCA) results of the steel door type EI60– waste categories (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste	kg	2.70E-02	5.46E-01	1.19E-02	5.85E-01	3.60E-06	2.02E-02	3.15E-03	4.04E-06	-2.67E-02
Non-hazardous waste	kg	1.78E-01	1.00E+01	3.90E-01	1.06E+01	1.87E-04	3.59E-01	8.52E-03	1.00E+01	-1.24E+00
Radioactive waste	kg	9.45E-06	3.77E-05	6.13E-04	6.60E-04	2.61E-07	1.35E-06	6.31E-09	1.48E-05	-1.40E-04
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	0.00E+00
Materials for recycling	kg	2.15E-01	1.39E-03	7.97E-02	2.96E-01	3.60E-07	5.58E-05	6.69E+01	3.84E-10	-9.70E-05
Materials for energy recovery	kg	6.11E-04	1.08E-05	5.30E-06	6.27E-04	3.15E-09	4.51E-07	3.09E-08	4.55E-12	-1.71E-06
Exported Energy	MJ	5.02E+00	0.00E+00	1.74E+00	6.77E+00	1.04E-03	0.00E+00	5.05E-05	0.00E+00	-2.53E-02

Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (sub clause 8.1.3.) ☒ external ☐ internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., Eng.

Note: The declaration owner has the sole ownership, liability, and responsibility for the declaration. Declarations 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.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- EN 1634-1 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Fire resistance test for door and shutter assemblies and openable windows.
- EN 13241-1:2003+A1:2011 Industrial, commercial and garage doors and gates - Product standard Part 1: Products without fire resistance or smoke control characteristics/
- EN 14351-1+A1:2010 Windows and doors. Product standard, performance characteristics. Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics.
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business

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CERTIFICATE № 376/2022
of TYPE III ENVIRONMENTAL DECLARATION

Product:

Steel doors: ALPE BO, ALPE EI30, ALPE EI60

Manufacturer:

ASSA ABLOY Mercor Doors

ul. Arkońska 6 bud. A2, 80-387 Gdańsk, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued for the first time on 31st October 2022 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, October 2022