ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	ASSA ABLOY Entrance Systems AB
Program holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ASA-20220080-IBC1-EN
Issue date	18.08.2022
Valid to	17.08.2027

ASSA ABLOY SW200 Swing Door Operator

ASSA ABLOY Entrance Systems

www.bau-umwelt.com / https://epd-online.com

1. General Information

ASSA ABLOY Entrance Systems

Program holder
IBU - Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number
EPD-ASA-20220080-IBC1-EN

This Declaration is based on the Product Category Rules:
IBU: PCR Automatic doors, automatic gates and revolving door systems (door systems) Version 1.6 (11. 2017).
(PCR tested and approved by the independent expert committee)

Issue date
18.08.2022

Valid to
17.08.2027

Dipl.-Ing. Hans Peters
(President of IBU e.V.)

Dr. Alexander Röder
(Managing Director of IBU e.V)

ASSA ABLOY SW200 Swing Door Operator

Owner of the Declaration
ASSA ABLOY Entrance Systems AB
Lodjursgatan 10
SE-261 44 Landskrona
Sweden

Declared product / Declared unit
The declaration represents 1 automatic ASSA ABLOY SW200 swing door operator

Scope:
This declaration and its LCA study are relevant to ASSA ABLOY SW200 swing door operator. The final assembly and production stage occurs in Ostrov u Stribra, Czech Republic at D5 Logistic Park 34901 Ostrov u Stribra, Czech Republic. Components are sourced from international tier one suppliers. The ASSA ABLOY SW200 swing door operator cover length varies according to project requirements; an operator with a cover standard length of 716 mm and a push arm system is used in this declaration. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.

Verification

The CEN Standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025
☐ internally ☒ externally

Dr. Wolfram Trinius
(Independent tester appointed by SVA)

2. Product

2.1 Product description

Product name: ASSA ABLOY SW200 swing door operator

Product characteristics: Automatic, robust, electro-mechanical swing door operator

The operator works electro-mechanically. It opens with a motor and closes with a motor and spring. The opening and closing speeds can be varied individually. The motor, control unit, gear box and spring are combined into a compact unit and mounted within the cover. The operator is connected to the door leaf with either a pushing or a pulling arm system.

The ASSA ABLOY SW200 swing door operator can handle heavy doors up to 320 kg and is designed for applications that require highly intelligent functions. The smart control unit offers added-value features like double-door controls and monitored battery backup for convenience. Push-and-Go opens the door automatically when manually pushed from the closed position and Power Assist provides motorized assistance when the door is pulled opened by hand. Automatic swing door operators are generally made of metal and plastic.

The ASSA ABLOY SW200 swing door operator has been designed to meet all operational and safety requirements and is certified by a third party to fulfill the *European Directives* and the standards issued by the *European Standardization Committee (CEN).*

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) and Turkey the following European directives apply to the ASSA ABLOY SW200 swing door operator:

- *2014/30/EU* Electromagnetic Compatibility Directive (EMCD)
- *2006/42/EC* Machinery Directive (MD)

- *2011/65/EU* on the restriction of the use of certain hazardous substances in electrical and electronic equipment with the applicable amendments (RoHS).

These directives provide for CE marking of the product and issue a Declaration of Conformity.

Harmonized European standards, which have been applied:

- *EN 60335-1* Household and similar electrical appliances -Safety -Part 1: General requirements
- *EN 60335-2-103* Household and similar electrical appliances -Safety -Part 2: Particular requirements for drives for gates, doors and windows
- *EN 61000-6-2* Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- *EN 61000-6-3* Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments
- *EN ISO 13849-1* Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
- *EN 16005* Power operated pedestrian door sets - Safety in use -Requirements and test methods.

Other standards or technical specifications, which have been applied:

- *IEC 60335-1* Household and similar electrical appliances -Safety -Part 1: General requirements
- *IEC 60335-2-103* Household and similar electrical appliances Safety Part 2-103: Particular requirements for drives for gates, doors and windows.

Disposal of the product is subject to the Waste from Electrical and Electronic Equipment (WEEE) Directive within Europe, Directive *2012/19/EU* together with the RoHS Directive *2011/65/EU* and its amending Directive *2015/863*.

For the application and use the respective national provisions apply.

2.2 Application

The ASSA ABLOY SW200 swing door operator is suitable for both external and internal swing doors and can be retrofitted with existing doors.

The ASSA ABLOY SW200 swing door operator facilitates entry and exit in buildings, and this widely-used operator can be found on applications ranging from healthcare facilities to the public sector. Packed with the most innovative and advanced technological features, the ASSA ABLOY SW200 swing door operator performs to the highest standards in the industry with unique features such as 180 degree opening and stack pressure management.
The operator can be mounted on either side of the door for pull or push action and is suitable for single or double doors.

2.3 Technical Data

The product has the following technical properties:

Features

Length (standard cover)	716 mm, optional lenghts available
Height	110 mm
Depth	130 mm
Inertia	Max 160 kg/m²
Profile finish	anodized aluminium, RAL colors available on request

Performance

Mains power supply	100-240 V AC+10/-15%, 50/60Hz, mains fuse max 10A (building installation)
Power consumption	Max. 300W
Auxiliary voltage	24 V DC, max. 700 mA
Opening time (0° - 80°)	variable between 2- 12 seconds
Closing time (90° - 10°)	variable between 4 - 12 seconds
HOLD open time	1.5-30 seconds
Ambient temperature	-20°C to +45°C

2.4 Delivery status

The ASSA ABLOY SW200 swing door operator is delivered ready for installation.

2.5 Base materials / Ancillary materials

The average composition of ASSA ABLOY SW200 swing door operator is as follows:

Component	Percentage in mass (%)
Aluminium	22.139
Brass	0.017
Copper	2.347
Plastics	3.323
StainlessSteel	0.642
Steel	58.063
Zinc	8.939
Glass	0.046
Electronic	4.186
Electro_mechanics	0.163
Paper	0.048
others	0.087
Total	**100**

2.6 Manufacture

The primary manufacturing processes are made by tier one suppliers and the final manufacturing processes for operator units occur in the factory in Ostrov, Czech Republic. The profiles are machined and surface treated; either anodized (externally) or powder coated (internally). Other parts such as electronics etc. arrives from tier one suppliers or the factory in China and a final assembly is done in Ostrov. The operators are packed in cardboard boxes and forwarded to on-site installation. The certified quality management system, *EN ISO 9001:2015*, ensures high standards.

Offcuts and scraps during the manufacturing process are directed to a recycling unit. Wastewater is cleared on-site and waste is sent for disposal.

Waste codes according to European Waste Catalogue and Hazardous Waste List (*EWC*) - Valid from 1 January 2002:
EWC 08 02 01 Waste coating powders
EWC 12 01 01 Ferrous metal filings and turnings
EWC 12 01 03 Non-ferrous metal filings and turnings
EWC 17 02 03 Plastic
EWC 17 04 01 Copper, bronze, brass
EWC 17 04 02 Aluminium
EWC 17 04 05 Iron and steel
EWC 17 04 11 Cables with the exception of those outlined in 17 04 10

2.7 Environment and health during manufacturing

ASSA ABLOY Entrance Systems is committed to producing and distributing door opening solutions with minimal environmental impact, where health & safety (H&S) is the primary focus for all employees and associates.

- Environmental operations, greenhouse gas (GHG) emissions, energy, water, waste, volatile organic compounds (VOC), surface treatment and H&S are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and Environment Management program effectiveness is evaluated.
- Code of Conduct covers human rights, labor practices and decent work. The management of ASSA ABLOY Entrance Systems is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
- Preparation and manufacturing conditions (including the process of powder coating) in the factory of Ostrov do not require special health and safety measures. Standard health and safety measures (work gloves, hearing protection, safety shoes, dust mask when sanding and milling, dust extraction, etc.) are observed where appropriate.
- Water and soil contamination does not occur and all production related waste is processed internally in the appropriate manner.

2.8 Product processing/Installation

The ASSA ABLOY SW200 swing door operator is supplied ready for installation. The installation is performed by trained and qualified installation technicians.

2.9 Packaging

The ASSA ABLOY SW200 swing door operator is initially packaged in polystyrene film and corrugated cardboard. The cardboard is recyclable

Material	Value (%)
Cardboard/paper	99.87
Plastics	0.13
Total	**100.0**

All materials incurred during installation are directed to a recycling unit.
Waste codes according to *European Waste Catalogue and Hazardous Waste List* (*EWC*) - Valid from 1 January 2002.
EWC 15 01 01 paper and cardboard packaging
EWC 15 01 02 plastic packaging

2.10 Condition of use

Regular inspections shall be made according to national regulations and product documentation by an ASSA ABLOY Entrance Systems' trained and qualified technician. The number of service occasions should be in accordance with national requirements and product documentation. Service is recommended according to the "Service Log Book".
Regular inspections and cleaning should be performed by the owner of the product, according to the "User's Manual"
The best way to remove dust and dirt from the ASSA ABLOY SW200 swing door operator is to use water and a soft cloth or a sponge. A gentle detergent may be used. To maintain the quality of the enamel layer, the surfaces should be cleaned three times/year (once/four month's period). The cleaning should be documented.

- Do not expose profiles to alkalis. Aluminium is sensitive to alkalis.
- Do not clean with high pressure water. Operator, programme selector and sensor may be damaged and water may enter the profiles.
- Do not use polishing detergent.
- Do not scrub with materials like Scotch-brite, as this will cause mechanical damage.

2.11 Environment and health during use

There is no harmful emissive potential. Minimal risk for personal injury if correctly configured and maintenance recommendations apply.

2.12 Reference service life

The product has a reference service life of approximately 1,000,000 cycles or 10 years of average daily use with the recommended maintenance and service program. For this EPD a lifetime of 10 years was considered.

2.13 Extraordinary effects

Fire
The ASSA ABLOY SW200 swing door operator is tested for usage in fire and smoke protection doors according to *EN1634-1*.

Water
Contains no substances that have any impact on water in case of a flood. Electric operation of the device can be influenced negatively.

Mechanical destruction
No danger to the environment can be anticipated during mechanical destruction.

2.14 Re-use phase

The product is possible to re-use during the reference service life and be moved from one door to another.

All recyclable materials are directed to a recycling unit where they are recycled (brass, electronics, electro-mechanics, stainless steel, steel, and aluminium). The plastic components can be used for energy recovery within a waste incineration process.

Waste codes according to *European Waste Catalogue* and *Hazardous Waste List* (*EWC*) -Valid from 1 January 2002.
EWC 16 02 14 Used devices with the exception of those outlined in 16 02 09 to 16 02 13
EWC 17 02 03 Plastic
EWC 17 04 01 Copper, bronze, brass
EWC 17 04 02 Aluminium

EWC 17 04 05 Iron and steel
EWC 17 04 11 Cables with the exception of those outlined in 17 04 10

2.15 Disposal

The product can be mechanically dissembled to separate the different materials. The majority of components are steel and aluminium which will be recycled. The plastic components are used for energy recovery in an incineration plant.

The disposal of the product is subject to the Waste Electrical and Electronic Equipment (WEEE) Directive within Europe, *Directive 2012/19/EU*

2.16 Further information

For further information and additional contact:
ASSA ABLOY Entrance Systems AB
Lodjursgatan 10
SE-261 44 Landskrona
Sweden
www.assaabloyentrance.com

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of the ASSA ABLOY SW200 swing door operator as specified in *IBU PCR Part B*

Declared unit

Name	Value	Unit
Mass (without packaging)	14.99	kg
Mass packaging	1.58	kg
Declared unit for swing door operator (dimensions acc. to this PCR)	1	piece

3.2 System boundary

Type of the EPD: cradle to gate - with options
The following life cycle phases were considered:

Production stage:

- A1 – Raw material extraction and processing
- A2 – Transport to the manufacturer and
- A3 – Manufacturing

Construction stage:

- A5 – Packaging waste processing

Use stage related to the operation of the building includes:

- B6 – Operational energy use (Energy consumption for operation)

End-of-life stage:

- C1 – De-construction/demolition
- C2 – Transport to waste processing
- C3 – Waste processing for recycling and
- C4 – Disposal (landfill, waste for incineration)

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.

- Benefits and loads beyond the system boundaries: D – Declaration of all benefits and loads

3.3 Estimates and assumptions

Transportation:
Data on mode of transport and distances, as reported by suppliers were used for those materials and parts contributing more than 2 % of the total product mass. In case of unknown transport distances for parts and materials, contributing less than 2 % to the total product mass, transport by road over an average distance of 500 km was assumed.

Use phase:
For the use phase, it is assumed that the sliding door system is used in the European Union, thus an EU electricity grid mix is considered within this stage. According to the most representative scenario, the operating hours of the product are accounted for 1095 hours in on mode, 4015 hours in standby mode and finally 3650 hours in idle mode per year (365 days per year in use); the power consumption throughout the whole life cycle is 1204.5 kWh.

EoL:
In the End-of-Life stage, for all the materials from the product which can be recycled (steel, aluminium, electronic parts, electro-mechanics, copper, stainless steel. zinc and brass) a recycling scenario with 100 % collection rate was assumed. The plastic components are sent for energy recovery within a waste incineration process.
EoL is assumed to happen within EU-28. Furthermore, a transport distance by truck of 100 km has been assumed in the model.

3.4 Cut-off criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, auxiliary materials (e.g. lubricants), thermal energy consumption and electric power consumption - including material and energy flows contributing less than 1 % of mass or energy (if available). In case a specific flow contributing less than 1 % in mass or energy is not available, worst case assumption proxies are selected to represent the respective environmental impacts.
Impacts relating to the production of machines and facilities required during production are out of the scope of this assessment.

3.5 Background data

For life cycle modeling of the considered products, the *GaBi* 10 Software System for Life Cycle Engineering, developed by Sphera, is used *GaBi 10 2021a*
The *GaBi*-database contains consistent and documented datasets which are documented in the online *GaBi*-documentation *GaBi 10 2021b*
To ensure comparability of results in the LCA, the basic data of *GaBi* database were used for energy, transportation and auxiliary materials.

3.6 Data quality

The requirements for data quality and background data correspond to the specifications of the *IBU PCR Part A*.
Sphera performed a variety of tests and checks during the entire project to ensure high quality of the completed project. This obviously includes an extensive review of project-specific LCA models as well as the background data used.
The technological background of the collected data reflects the physical reality of the declared products. The datasets are complete and conform to the system boundaries and the criteria for the exclusion of inputs and outputs.
All relevant background datasets are taken from the *GaBi* 10 software database.

3.7 Period under review

The period under review is 2020 (12-month average).

3.8 Allocation

Regarding incineration, the software model for the waste incineration plant (WIP) is adapted according to the material composition and heating value of the combusted material. In this EPD the following specific life cycle inventories for the WIP are considered:

- Waste incineration of plastic
- Waste incineration of paper

• Waste incineration of electronic scrap

Regarding the recycling material of metals, the metal parts in the EoL are declared as end-of-waste status. Thus, these materials are considered in module D. Specific information on allocation within the background data is given in the *GaBi* dataset documentation.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

4. LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared (MND).

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in product	0.003	kg C
Biogenic Carbon Content in accompanying packaging	0.678	kg C

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel diesel with maximum load (27t payload)	27.505	kg/100km
Transport distance truck (primary target market is EU 28)	1014	km
Capacity utilization (incl. empty runs) of truck	61	%

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (paper/cardboard packaging)	1.577	kg
Output substances following waste treatment on site (plastic packaging)	0.002	kg

Reference service life

Name	Value	Unit
Reference service life	10	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption per RSL (10 years, 365 days per year)	1204.5	kWh
Hours per day in on mode	3	h
Hours per day in stand-by mode	11	h
Hours per day in idle mode	10	h
Power consumption – on mode	40	W
Power consumption – stand-by mode	10	W
Power consumption – idle mode	10	W

*Total energy consumed during the whole product life was calculated using following formula:

*(W_active_mode*h_active_mode+W_idle_mode*h_idle_mode+W_stand_by_mode*h_stand_by_mode)*Life_span*days_year*0.001*

Where:

- W_active_mode - Energy consumption in active mode in W
- h_active_mode - Operation time in active mode in hours
- W_idle_mode - Energy consumption in idle mode in W
- h_idle_mode - Operation time in idle mode in hours
- W_stand_by_mode - Energy consumption in stand-by mode in W
- h_stand_by_mode - Operation time in stand-by mode in hours
- Life_span - Reference service life of product
- days_year - Operation days per year
- 0.001 - Conversion factor from Wh to kWh.

End of life (C1-C4)

Name	Value	Unit
Collected separately	14.987	kg
Incineration of plastic parts	0.498	kg
Incineration of paper	0.007	kg
Recycling aluminium, steel, electronic, electro-mechanics, stainless steel, copper, brass	14.462	kg
Landfill	0.020	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Collected separately waste type (including packaging)	16.546	kg
Recycling aluminium	20.053	%
Recycling brass	0.016	%
Recycling copper	2.125	%
Recycling stainless steel	0.581	%
Recycling steel	52.591	%
Recyling zinc	8.097	%
Recycling electronic	3.792	%
Recyling electro mechanics	0.147	%
Incineration of plastic parts	3.010	%
Incineration of paper	0.044	%
Incineration of packaging (paper, wood and plastic) (from A5)	9.544	%

5. LCA: Results

Results shown are calculated according to *EN 15804+A2*.

Note:
EP-freshwater: This indicator has been calculated as “kg P eq” as required in the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END-OF-LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement[1)]	Refurbishment[1)]	Operational energy use	Operational water use	De-construction 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**
X	X	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of ASSA ABLOY SW200 swing door operator

Core Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	1.20E+02	1.01E+00	2.24E+00	4.87E+02	0.00E+00	9.03E-02	1.38E+00	2.37E-01	-4.65E+01
GWP-fossil	[kg CO_2-Eq.]	1.22E+02	1.01E+00	6.10E-02	4.85E+02	0.00E+00	8.98E-02	1.37E+00	2.37E-01	-4.64E+01
GWP-biogenic	[kg CO_2-Eq.]	-2.28E+00	-1.72E-03	2.18E+00	1.62E+00	0.00E+00	-1.54E-04	1.02E-02	-2.40E-05	-6.75E-02
GWP-luluc	[kg CO_2-Eq.]	8.40E-02	8.16E-03	3.70E-05	7.03E-01	0.00E+00	7.28E-04	1.71E-04	2.42E-05	-1.81E-02
ODP	[kg CFC11-Eq.]	9.04E-10	1.21E-16	4.04E-16	1.07E-11	0.00E+00	1.08E-17	2.29E-15	2.59E-16	6.40E-12
AP	[mol H^+-Eq.]	8.44E-01	1.03E-03	6.27E-04	1.07E+00	0.00E+00	9.23E-05	3.65E-04	1.64E-04	-2.74E-01
EP-freshwater	[kg PO_4-Eq.]	2.85E-04	3.06E-06	7.91E-08	1.30E-03	0.00E+00	2.73E-07	2.96E-07	5.75E-08	-3.92E-05
EP-marine	[kg N-Eq.]	1.30E-01	3.01E-04	2.26E-04	2.38E-01	0.00E+00	2.69E-05	8.97E-05	7.75E-05	-3.43E-02
EP-terrestrial	[mol N-Eq.]	1.42E+00	3.63E-03	2.82E-03	2.50E+00	0.00E+00	3.24E-04	1.22E-03	9.16E-04	-3.73E-01
POCP	[kg NMVOC-Eq.]	3.96E-01	8.37E-04	6.00E-04	6.51E-01	0.00E+00	7.47E-05	2.52E-04	2.00E-04	-1.08E-01
ADPE	[kg Sb-Eq.]	9.50E-03	7.23E-08	6.39E-09	1.40E-04	0.00E+00	6.45E-09	3.08E-08	2.83E-09	-1.43E-02
ADPF	[MJ]	1.56E+03	1.34E+01	7.08E-01	8.52E+03	0.00E+00	1.20E+00	2.03E+00	2.24E-01	-5.56E+02
WDP	[m^3 world-Eq deprived]	1.88E+01	9.01E-03	2.78E-01	1.06E+02	0.00E+00	8.04E-04	1.53E-01	5.06E-02	-8.21E+00
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential									

RESULTS OF THE LCA - RESOURCE USE: One piece of ASSA ABLOY SW200 swing door operator

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	[MJ]	3.82E+02	0.00E+00	2.68E+01	0.00E+00	0.00E+00	0.00E+00	9.04E-01	0.00E+00	0.00E+00
PERM	[MJ]	2.68E+01	0.00E+00	-2.67E+01	0.00E+00	0.00E+00	0.00E+00	-1.23E-01	0.00E+00	0.00E+00
PERT	[MJ]	4.09E+02	7.55E-01	1.29E-01	3.78E+03	0.00E+00	6.73E-02	7.81E-01	5.97E-02	-1.94E+02
PENRE	[MJ]	1.54E+03	0.00E+00	7.88E-01	0.00E+00	0.00E+00	0.00E+00	3.08E+01	0.00E+00	0.00E+00
PENRM	[MJ]	2.89E+01	0.00E+00	-8.00E-02	0.00E+00	0.00E+00	0.00E+00	-2.88E+01	0.00E+00	0.00E+00
PENRT	[MJ]	1.57E+03	1.34E+01	7.08E-01	8.53E+03	0.00E+00	1.20E+00	2.03E+00	2.23E-01	-5.58E+02
SM	[kg]	7.49E+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
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
FW	[m^3]	9.12E-01	8.74E-04	6.54E-03	4.37E+00	0.00E+00	7.80E-05	3.97E-03	1.20E-03	-5.08E-01
Caption	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									

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of ASSA ABLOY SW200 swing door operator

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	[kg]	1.23E-04	6.25E-07	1.05E-09	3.53E-06	0.00E+00	5.58E-08	2.32E-09	1.20E-09	-3.86E-07
NHWD	[kg]	1.53E+01	2.06E-03	7.05E-02	6.05E+00	0.00E+00	1.83E-04	1.25E-01	9.89E-02	-8.61E+00
RWD	[kg]	7.22E-02	1.66E-05	3.72E-05	1.29E+00	0.00E+00	1.48E-06	2.53E-04	8.71E-06	-3.13E-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
MFR	[kg]	0.00E+00	0.00E+00	1.58E+00	0.00E+00	0.00E+00	0.00E+00	1.38E+01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	3.39E+00	0.00E+00	0.00E+00	0.00E+00	2.84E+00	9.59E-03	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	6.16E+00	0.00E+00	0.00E+00	0.00E+00	5.13E+00	1.80E-02	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy									

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: One piece of ASSA ABLOY SW200 swing door operator

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM	[Disease Incidence]	9.56E-06	6.16E-09	3.48E-09	8.98E-06	0.00E+00	5.49E-10	4.00E-09	1.84E-09	-2.74E-06
IR	[kBq U235-Eq.]	1.02E+01	2.40E-03	5.75E-03	2.12E+02	0.00E+00	2.15E-04	4.08E-02	8.00E-04	-5.41E+00
ETP-fw	[CTUe]	8.41E+02	9.49E+00	3.36E-01	3.65E+03	0.00E+00	8.46E-01	1.02E+00	1.03E-01	-2.16E+02
HTP-c	[CTUh]	2.96E-07	1.99E-10	1.78E-11	1.01E-07	0.00E+00	1.77E-11	3.75E-11	1.43E-11	-1.64E-07
HTP-nc	[CTUh]	2.86E-06	1.03E-08	7.76E-10	3.71E-06	0.00E+00	9.15E-10	2.75E-09	9.71E-10	2.89E-06
SQP	[-]	5.33E+02	4.71E+00	1.88E-01	2.71E+03	0.00E+00	4.20E-01	6.13E-01	7.39E-02	-6.30E+01
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index									

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”.
This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”.
The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

This chapter contains an interpretation of the Life Cycle Impact Assessment categories. Stated percentages in the whole interpretation are related to the overall life cycle, excluding credits (module D).

The production stage (modules A1-A3) contributes between 15 % and 45 % to the overall results for all the environmental impact assessment categories hereby considered, except for the abiotic depletion potential (ADPE), for which the contribution from the production stage accounts for approx. 98.83 % - this impact category describes the reduction of the global amount of non-renewable raw materials, therefore, as expected, it is mainly related to the extraction of raw materials (A1). Also, ODP shows a higher contribution of 99.55 %.

Within the production phase, the main contribution to all the impact categories is the production of steel and aluminium mainly due to the energy consumption on this process. Aluminium and steel accounts with approx. 88 % to the overall mass of the product, therefore, the impacts are in line with the mass composition of the product. The environmental impacts for the transport (A2) have a negligible impact within this stage.

To reflect the use stage (module B6), the energy consumption was included, and it has a major contribution to all the impact assessment categories considered - between 55 % and 85 %, with the exception of ODP (1.2°%) and ADPE (1.5 %). This is a result of 3 hours of operation in on mode, 11 hours of standby mode and 10 hours of idle mode per day and per 365 days in a year.

In the end-of-life phase, there are loads and benefits (module D, negative values) considered. The benefits are considered beyond the system boundaries and are declared for the recycling potential of the metals and for the credits from the incineration process (energy substitution).

7. Requisite evidence

Not applicable in this EPD.

8. References

Standards, norms, directives:

CPR
Regulation (EU) No. 305/2011, Construction Product Regulation (CPR)- laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

DIN 4102
DIN 4102-1 B2:1998, Reaction to fire tests - Ignitability of building products subjected to direct impingement of flame.

DIN EN 1634-1
DIN EN 1634-1:2018-04. Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

DIN EN ISO 10140-2
DIN EN ISO 10140-2:2010, Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation (ISO 10140-2:2010); German version EN ISO 10140-2:2010

DIN EN ISO 13849-1
DIN EN ISO 13849-1:2016, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

DIN EN 12424
DIN EN 12424:2000, Industrial, commercial and garage doors and gates - Resistance to wind load - Classification; German version EN 12424:2000

DIN EN 12426
DIN EN 12424:2000, Industrial, commercial and garage doors and gates. Air permeability. Classification; German version EN 12424:2000

DIN EN 12428
DIN EN 12428:2013, Industrial, commercial and garage doors - Thermal transmittance - Requirements for the calculation; German version EN 12428:2013

DIN EN 60335-1
DIN EN 60335-1:2020, Household and similar electrical appliances - Safety - Part 1: General requirements

DIN EN 60335-2
DIN EN 60335-2:2016, Household and similar electrical appliances - Safety - Part 2-103: Particular requirements for drives for gates, doors and windows

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

EN ISO 10140-2
EN ISO 10140-2:2010, Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation (ISO 10140-2:2010); German version EN ISO 10140-2:2010

EN 12425
EN 12425:2000, Industrial, commercial and garage doors and gates - Resistance to water penetration - Classification; German version EN 12425:2000

EN 12453
EN 12453:2017, Industrial, commercial and garage doors and gates – Safety in use of power operated doors – Requirements and test methods

EN 13241-1
EN 13241:2003+A2:2016, Industrial, commercial, garage doors and gates - Product standard, performance characteristics

EN 15804+A2
EN 15804:2014+A2:2019, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 61000-6-2
EN 61000-6-2:2005, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-3
EN 61000-6-3:2007, Electromagnetic compatibility (EMC) - Part 6-3: Generic Standards - Emission standard for residential, commercial and light-industrial environments

EWC
European Waste Catalogue established by Commission Decision 2000/532/EC

IEC 60335-1
IEC 60335-1:2020, Household and similar electrical appliances - Safety - Part 1: General requirements

IEC 60335-2
IEC 60335-2:2016, Household and similar electrical appliances - Safety - Part 2-103: Particular requirements for drives for gates, doors and windows

ISO 9001
ISO 9001:2015, Quality management systems - Requirements with guidance for us

ISO 14001
ISO 14001:2015, Environmental management systems — Requirements with guidance for use

2006/42/EC
European directive on machinery, and amending Directive 95/16/EC (recast)

2011/65/EC
European directive on the restriction of the use of certain hazardous substances in electrical and electronical equipment, and its amendment directives including 2015/863/EC (RoHS directive)

2012/19/EU
European directive on waste electrical and electronic equipment (WEEE)

2014/30/EU
European directive on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

2015/863/EU
European directive amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

Other sources:

GaBi 10 2021a
GaBi 10 2021: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Sphera, Echterdingen, 1992-2018.

GaBi 10 2021b
GaBi 10 2021b: Documentation of GaBi 8: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Sphera, Echterdingen, 1992-2021. https:gabi.sphera.com/internationalsupportgabi

IBU PCR Part A
Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, Version 1.1.1, 2021
www.ibu-epd.de

IBU PCR Part B
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revolving door systems Version 1.6 (11. 2017)
www.ibu-epd.com

IBU 2021
General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021.
www.ibu-epd.com

TRACI Methodology
Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), EPA/600/R-12/554 2012
asdas

9. Annex

Results shown below were calculated using *TRACI Methodology*.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END-OF-LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement[1)]	Refurbishment[1)]	Operational energy use	Operational water use	De-construction 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**
X	X	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of ASSA ABLOY SW200 swing door operator

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C1	C2	C3	C4	D
GWP	Global warming potential, excl. biogenic	[kg CO2-eq.]	1.22E+02	9.90E-01	6.00E-02	4.78E+02	0.00E+00	9.00E-02	1.36E+00	2.30E-01	-4.58E+01
GWP	Global warming potential, incl. biogenic	[kg CO2-eq.]	1.19E+02	9.90E-01	2.24E+00	4.75E+02	0.00E+00	9.00E-02	1.37E+00	2.30E-01	-4.58E+01
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-eq.]	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
AP	Acidification potential of land and water	[kg SO2-eq.]	7.30E-01	0.00E+00	0.00E+00	1.04E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.30E-01
EP	Eutrophication potential	[kg N- eq.]	3.00E-02	0.00E+00	0.00E+00	1.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.00E-02
Smog	Ground-level smog formation potential	[kg O3-eq.]	8.09E+00	1.00E-02	1.00E-02	1.38E+01	0.00E+00	0.00E+00	1.00E-02	0.00E+00	-2.19E+00
Resources	Resources – resources fossil	[MJ surplus energy]	1.17E+02	1.93E+00	7.00E-02	3.61E+02	0.00E+00	1.70E-01	1.00E-01	2.00E-02	-3.95E+01

RESULTS OF THE LCA - RESOURCE USE: One piece of ASSA ABLOY SW200 swing door operator

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	3.82E+02	0.00E+00	2.68E+01	0.00E+00	0.00E+00	0.00E+00	9.04E-01	0.00E+00	0.00E+00
PERM	Renewable primary energy resources as material utilization	[MJ]	2.68E+01	0.00E+00	-2.67E+01	0.00E+00	0.00E+00	0.00E+00	-1.23E-01	0.00E+00	0.00E+00
PERT	Total use of renewable primary energy resources	[MJ]	4.09E+02	7.55E-01	1.29E-01	3.78E+03	0.00E+00	6.73E-02	7.81E-01	5.97E-02	-1.94E+02
PENRE	Non-renewable primary energy as energy carrier	[MJ]	1.54E+03	0.00E+00	7.88E-01	0.00E+00	0.00E+00	0.00E+00	3.08E+01	0.00E+00	0.00E+00
PENRM	Non-renewable primary energy as material utilization	[MJ]	2.89E+01	0.00E+00	-8.00E-02	0.00E+00	0.00E+00	0.00E+00	-2.88E+01	0.00E+00	0.00E+00
PENRT	Total use of non-renewable primary energy resources	[MJ]	1.57E+03	1.34E+01	7.08E-01	8.53E+03	0.00E+00	1.20E+00	2.03E+00	2.23E-01	-5.58E+02
SM	Use of secondary material	[kg]	7.49E+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	Use of renewable secondary fuels	[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
NRSF	Use of non-renewable secondary fuels	[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
FW	Use of net fresh water	[m³]	9.12E-01	8.74E-04	6.54E-03	4.37E+00	0.00E+00	7.80E-05	3.97E-03	1.20E-03	-5.08E-01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of ASSA ABLOY SW200 swing door operator

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	1.23E-04	6.25E-07	1.05E-09	3.53E-06	0.00E+00	5.58E-08	2.32E-09	1.20E-09	-3.86E-07
NHWD	Non-hazardous waste disposed	[kg]	1.53E+01	2.06E-03	7.05E-02	6.05E+00	0.00E+00	1.83E-04	1.25E-01	9.89E-02	-8.61E+00
RWD	Radioactive waste disposed	[kg]	7.22E-02	1.66E-05	3.72E-05	1.29E+00	0.00E+00	1.48E-06	2.53E-04	8.71E-06	-3.13E-02
CRU	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
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	1.58E+00	0.00E+00	0.00E+00	0.00E+00	1.38E+01	0.00E+00	0.00E+00
MER	Materials for energy recovery	[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
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	3.39E+00	0.00E+00	0.00E+00	0.00E+00	2.84E+00	9.59E-03	0.00E+00
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	6.16E+00	0.00E+00	0.00E+00	0.00E+00	5.13E+00	1.80E-02	0.00E+00

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