

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	ASSA ABLOY Entrance Systems AB
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ASAB-20171176-IBA1-EN
Issue date	13.11.2017
Valid to	12.11.2022




ASSA ABLOY RD100-4, Revolving door ASSA ABLOY Entrance Systems AB



www.ibu-epd.com / <https://epd-online.com>



1. General Information

ASSA ABLOY Entrance Systems AB	ASSA ABLOY RD100-4, Revolving door
<p>Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p>	<p>Owner of the Declaration ASSA ABLOY Entrance Systems AB Lodjursgatan 10 SE-261 44 Landskrona Sweden</p>
<p>Declaration number EPD-ASAB-20171176-IBA1-EN</p>	<p>Declared product / Declared unit This declaration represents 1 revolving door consisting of 4 door leaves and surrounding frame with internal diameter of 2.4 m and internal height of 2.2 m</p>
<p>This Declaration is based on the Product Category Rules: IBU: PCR Automatic doors, automatic gates, and revolving door systems (door systems), 07.2014 (PCR tested and approved by the independent expert committee)</p>	<p>Scope: This declaration and its LCA study is relevant to the revolving door ASSA ABLOY RD100-4. The final assembly and production stage occurs in Ostrov u Stribra, Czech Republic at ASSA ABLOY ES Production s.r.o at: D5 Logistic Park 34901 Ostrov u Stribra, Czech Republic. Components are sourced from international tier one suppliers. ASSA ABLOY RD100-4 door sizes vary according to project requirements; a standard door with internal diameter of 2.4 m and 4 leaves 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.</p>
<p>Issue date 13.11.2017</p>	<p>Verification The CEN Standard EN 15804 serves as the core PCR Independent verification of the declaration and data according to ISO 14025 <input type="checkbox"/> internally <input checked="" type="checkbox"/> externally</p>
<p>Valid to 12.11.2022</p>	
<p> Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)</p>	<p> Dr. Wolfram Trinius (Independent verifier appointed by SVR)</p>
<p> Dr.-Ing. Burkhard Lehmann (Managing Director IBU)</p>	

2. Product

2.1 Product description

Product name: ASSA ABLOY RD100-4

Product characteristic:

Four-wing compact revolving door with digital speed control, power assist and park assist. Compact pedestrian revolving doors are installations that serve to regulate the flow of people in residential and non-residential buildings while providing high thermal performance

- Revolving doors are made up of various assemblies mainly consisting of a support structure, glazing, drive unit, controller and safety equipment.

- Revolving doors also feature elements that are designed to simplify their installation, operation and maintenance.

- Revolving doors are typically made of metal, plastic and glass and are available in several designs for a range of requirements in diverse building types.

Equipped with "Park Assist" as standard the ASSA ABLOY RD4-100 will safely return the door leaves to the optimum park position to minimize air permeability

and maximize thermal efficiency. Revolving doors help to maintain a comfortable indoor climate while saving energy.

The door has 4 primary parts:

- 1) Door leaves
- 2) Frame
- 3) Drive system
- 4) Operating system

The harmonizing provisions that apply for ASSA ABLOY RD100-4 revolving doors are:

- /2014/35/EC Low Voltage Directive (LVD)/
- /2014/30/EC Electro Magnetic Compatibility Directive (EMCD)/
- /2006/42/EC Machinery Directive (MD)/

The product needs the CE-marking. The CE-marking takes into account the proof of conformity with the following harmonised standards based on the a.m. harmonisation provisions.

Harmonized European standards, which apply:

/EN 60335-1/ Household and similar electrical appliances -Safety -Part 1: General requirements
 /IEC 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 window
 /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 apply:

DIN 18650-1/-2 Building hardware - Powered pedestrian doors - Part 1: Product requirements and test methods/ Building hardware - Powered pedestrian doors - Part 2: Safety at powered pedestrian doors

Note: Disposal of the motor is subject to the /WEEE Directive within Europe, Directive 2012/19/EU/

2.2 Application

The ASSA ABLOY RD100-4 is a digitally controlled manually operated revolving door, developed to provide an attractive and draught free access to buildings that adapts naturally to the volume and flow of traffic. The system is self-adjusting to the effects caused by normal variations in the weather conditions and to minor friction changes caused by e.g. dust and dirt. It will try to achieve set speed in all weather conditions within system limits for a user safe door.

Compact revolving doors are utilized to provide entrance and exit capabilities for many different building types.

Typical applications of compact revolving doors include:

- Commercial buildings
- Private sector and office facilities
- Hospitality facilities
- Residential buildings

2.3 Technical Data

The table presents the technical properties of the ASSA ABLOY RD100-4 revolving door:

Technical data

Name	Value	Unit
Power input "Standby"	10	W
Power input "Idle"	10	W
Power input "Operation" (during park assist)	80	W

Features

Size: (W x H) 2400 x 2400 mm (external height) X 2200 (internal height)
 Glass wall: 4 + 4 mm clear laminated
 Glass door leaves: 3+3 mm clear laminated

Door sections: aluminium profiles Optional: Powder-coated finish (RAL colours), Stainless steel cladding
 Burglar protection: Class 3

2.4 Delivery status

Revolving door unit with internal diameter of 2.4 m, internal height of 2.2 m and external height 2.4 m, is delivered ready for installation.

2.5 Base materials / Ancillary materials

The average composition for ASSA ABLOY RD100-4 is as following:

Component	Percentage in mass (%)
Glass	49.45
Steel	11.21
Stainless steel	0.31
Aluminium	12.99
Wood	21.87
Plastics	2.33
Electronics	0.63
Electro-mechanics	0.49
Others	0.72
Total	100

2.6 Manufacture

Profiles are provided by tier one supplier SAPA and are delivered to the factory in Ostrov, Czech Republic. The profiles are bended and machined. The products are surface treated; either anodized (externally) or powder coated (internally). Other parts as electronics, glass, etc. arrives from tier one suppliers or the factory in China and a basic assembly is done in Ostrov. The parts are encased in pine crates and forwarded on a standard wooden pallet to on-site installation. The certified Quality Management system, DIN EN ISO 9001:2008, ensures high standards.

Waste codes according to European Waste Catalogue and Hazardous Waste List - Valid from 1 January 2002.

Offcuts and scraps during the manufacturing process are directed to a recycling unit. Waste is sent for destruction.

EWC 12 01 01 Ferrous metal filings and turnings
 EWC 12 01 03 Non-ferrous metal filings and turnings
 EWC 08 02 01 Waste coating powders.

2.7 Environment and health during manufacturing

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

- Environmental operations, GHG, energy, water, waste, 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 to evaluate the effectiveness of the environmental management program.
- Code of Conduct covers human rights, labor practices and decent work. ASSA ABLOY Entrance Systems ABs' management is aware of their environmental roles and responsibilities, providing appropriate training and supporting accountability.
- Preparation conditions 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 revolving door components are supplied ready for installation. The frame as well as the door leaves and central column are assembled and installed on-site. The components are assembled using simple tools including drills and hand tools. The installation is performed by certified installation technicians.

2.9 Packaging

ASSA ABLOY RD100-4 revolving door is initially packaged in plastic tarpaulin, polystyrene and corrugated cardboard. Finally, a revolving door is placed on a standard wooden pallet and encased in a pine crate. All of these packaging components are standard industry types and the cardboard is recyclable.

80% of cardboard is made from recycled material

100% of paper documents are made from recycled material.

Material	Value (%)
Cardboard/ Paper	3.49
Plastics	10.66
Wood	85.85
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 - Valid from 1 January 2002:

EWC 15 01 01 paper and cardboard packaging

EWC 15 01 02 plastic packaging

EWC 15 01 03 wooden packaging

2.10 Condition of use

The best way to remove dust and dirt from the ASSA ABLOY RD100-4 and to maintain the quality of the enamel layer is to clean the surfaces three times/year with gentle (pH 5-9), non-polishing detergent and water. Use a soft non-abrasive sponge. The cleaning should be documented.

To avoid damages to the profiles, the brushes must be vacuum-cleaned weekly. Regular inspections by a trained and qualified person is recommended a minimum of two visits per year.

- Do not expose doors or profiles to alkalis. Both aluminium and glass are 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 detergents or abrasive additives.
- 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. No damage to health or impairment is expected under normal use corresponding to the intended use of the product. For user safe operation there are monitored pressure sensitive safety sensors on both entrance post and door leafs and monitored touchless sensor on vertical entrance post and top of door leaf. If an obstacle

prohibits the rotation of the door (the resistance is higher than the pre-set value) the rotation will cease. Compressible vertical safety switches placed on the drum edges. To prevent injury, the drum edges are equipped with soft safety edges.

2.12 Reference service life

The product has reference service life of 10 000.000 cycles based on internal reference installations, which complies for 15 years of standard daily use (with the recommended service check). For this EPD the lifetime of 15 years was considered.

A calculation according ISO 15686 /ISO 15686/ is not applied.

2.13 Extraordinary effects

Fire

The product is not fireproof. No test has been done according to EN13501-1. The product wall surfaces however consists of a large amount of aluminium and glass, which does not add to the spread of fire.

Water

Contains no substances that have any impact on water in case of flood. Electric operation of the device will be influenced negative.

Mechanical destruction

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

2.14 Re-use stage

The product is possible to re-use during the reference service life and be moved from one entrance to another. The majority, by weight, of components is aluminium alloy, steel and glass which can be recycled. The plastic components are used for energy recovery within a waste incineration process.

2.15 Disposal

The requirements on waste disposal and recycling listed in the European Waste Catalogue (EWC) should be followed. As the product contains no substances harmful to the environment or human health, the entire system can be safely placed in a landfill site in cases where no waste recycling technologies are available.

Waste codes according to European Waste Catalogue and Hazardous Waste List - Valid from 1 January 2002:

EWC 16 02 13* discarded equipment containing hazardous components (2) other than those mentioned in 16 02 09 to 16 02 12

EWC 17 02 01 wood

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

Note: Disposal of the motor is subject to the WEEE Directive within Europe, Directive 2012/19/EU

Further information

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 revolving door ASSA ABLOY RD100-4 as specified in Part B requirements on the EPD for PCR Automatic doors, automatic gates, and revolving door systems (door systems).

Declared unit

Name	Value	Unit
Mass (without packaging)	371.85	kg
Mass packaging (wood, paper and plastics)	111.82	kg
Conversion factor to 1 kg	0.0027	-
Declared unit for revolving door systems (dimensions acc. to this PCR)	1	piece

*The areas for the Revolving doors are represented by the lateral area i.e. the outer wall cylinder area surrounding the revolving door leafs

3.2 System boundary

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

Production stage:

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

Construction stage:

- A4 - Transport from the gate to the site
- A5 – Packaging waste processing

Use stage related to the operation of the building includes:

- B6 – Operational energy use

C1-C4 End-of-life stage:

- 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.

Module 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 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 stage:

For the use stage, it is assumed that the revolving door is used in the European Union, thus a European electricity grid mix is considered within this stage. According to the most representative scenario, the

operating hours of the product are accounted for 1000 hours in on mode, 2500 hours in stand-by mode and 2500 hours in idle mode per year as the product is only operational for 250 days per year; the power consumption throughout the whole life-cycle is 1950 kWh.

EoL:

In the End-of-Life stage, for all the materials which can be recycled, a recycling scenario with 100% collection rate was assumed

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), and electric power consumption - including material and energy flows contributing less than 1% of mass or energy. 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 6 Software System for Life Cycle Engineering, developed by thinkstep AG, is used /GaBi 6 2013/. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation /GaBi 6 2013D/. 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/.

thinkstep 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 6 software database.

3.7 Period under review

The period under review is 2013/14 (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 for:

- Waste incineration of plastic

- Waste incineration of paper
- Waste incineration of wood

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. GaBi 6 serves as background database for the calculation.

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).

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Paper packaging)	3.9	kg
Output substances following waste treatment on site (Plastics packaging)	11.92	kg
Output substances following waste treatment on site (Wood packaging)	96	kg

Reference service life

Name	Value	Unit
Reference service life	15	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption per RSL (15 years, 250 days per year)	1950	kWh
Hours per day in on mode	4	h
Hours per day in stand-by mode	10	h
Hours per day in idle mode	10	h
Power consumption – on mode	80	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 Aluminium, stainless steel, steel, electronic, electro mechanics, wood and plastic parts	371.85	kg
Collected as mixed construction waste – glass, other construction waste for landfilling	186.55	kg
Incineration of plastic parts and wood	197.9	kg
Recycling Aluminium, stainless steel, steel, electronic, electro-mechanics, plastic parts	103.97	kg
Landfilling – glass, other construction waste for landfilling	186.55	kg

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

Name	Value	Unit
Collected separately waste type ASSA ABLOY RD100-4 (including packaging)	297.11	kg
Recycling Aluminium	9.9	%
Recycling Stainless steel	0.2	%
Recycling Steel	8.6	%
Recycling Electronic	0.4	%
Recycling Electro mechanics	0.3	%
Reuse Plastic parts	2.1	%
Incineration of packaging (paper) (from A5)	0.8	%
Incineration of packaging (plastics) (from A5)	4.2	%
Incineration of packaging (wood) (from A5)	35.5	%
Loss Glass, constructions waste for landfilling (no recycling potential)	38	%

5. LCA: Results

Results shown below were calculated using CML 2000 – Apr. 2013 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	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of ASSA ABLOY RD100-4, Revolving door

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO ₂ -Eq.]	2.35E+03	2.80E+01	1.91E+02	5.70E+02	1.41E+01	1.32E+02	7.47E+01	-1.47E+03
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.41E-07	1.34E-10	7.33E-10	3.90E-07	6.76E-11	5.83E-10	2.41E-10	5.37E-07
AP	Acidification potential of land and water	[kg SO ₂ -Eq.]	1.52E+01	1.28E-01	3.06E-02	2.69E+00	6.46E-02	1.88E-02	2.86E-02	-7.57E+00
EP	Eutrophication potential	[kg (PO ₄) ³⁻ -Eq.]	1.03E+00	2.93E-02	4.15E-03	1.51E-01	1.48E-02	2.86E-03	2.80E-03	-3.72E-01
POCP	Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	9.32E-01	-4.13E-02	2.23E-03	1.60E-01	-2.08E-02	1.53E-03	1.84E-03	-4.60E-01
ADPE	Abiotic depletion potential for non-fossil resources	[kg Sb Eq.]	6.20E-02	1.06E-06	4.14E-06	7.89E-05	5.32E-07	1.77E-06	5.51E-06	-3.90E-03
ADPF	Abiotic depletion potential for fossil resources	[MJ]	2.95E+04	3.87E+02	4.85E+01	6.47E+03	1.95E+02	3.01E+01	5.15E+01	-1.48E+04

RESULTS OF THE LCA - RESOURCE USE: One piece of ASSA ABLOY RD100-4, Revolving door

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.02E+04	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.02E+04	1.52E+01	4.46E+00	1.85E+03	7.68E+00	3.16E+00	4.06E+00	-5.42E+03
PENRE	Non-renewable primary energy as energy carrier	[MJ]	3.46E+04	-	-	-	-	-	-	-
PENRM	Non-renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non-renewable primary energy resources	[MJ]	3.46E+04	3.88E+02	5.65E+01	1.01E+04	1.95E+02	3.60E+01	5.60E+01	-1.84E+04
SM	Use of secondary material	[kg]	4.97E+01	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
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
FW	Use of net fresh water	[m ³]	1.80E+01	1.07E-02	4.92E-01	4.58E+00	5.42E-03	3.42E-01	9.83E-02	-1.44E+01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of ASSA ABLOY RD100-4, Revolving door

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	2.05E+00	8.83E-04	3.96E-03	1.41E+00	4.45E-04	2.63E-03	3.41E-03	-2.60E-01
NHWD	Non-hazardous waste disposed	[kg]	2.44E+02	4.88E-02	5.13E+00	3.27E+00	2.46E-02	1.88E+00	1.22E+02	-7.88E+01
RWD	Radioactive waste disposed	[kg]	2.01E+00	5.08E-04	3.19E-03	1.46E+00	2.56E-04	2.37E-03	1.76E-03	-1.43E+00
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
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	9.99E+01	0.00E+00	0.00E+00	4.20E+02	0.00E+00	1.24E+02
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
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	2.46E+02	0.00E+00	0.00E+00	1.54E+02	1.39E+02	0.00E+00
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	6.87E+02	0.00E+00	0.00E+00	4.32E+02	3.82E+02	0.00E+00

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 73% and 99% to the overall results for all the environmental impact assessment categories hereby considered, except for the depletion potential of the stratospheric ozone layer (ODP), for which the contribution from the production stage accounts for approx. 38%. Glass, aluminium and steel account in total with approx. 74% 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 for all the impact assessment categories considered - between 0.1% and 17%, with the exception of ODP (62%). In calculating the ozone depletion potential, the anthropogenically released halogenated hydrocarbons, which can destroy many ozone molecules, are recorded first, therefore, as expected, the impact is higher during the use stage of the product (B6). This is a result of operation in 4 hours on and 10 hours on idle and stand-by modes for 250 days in a year.

In the end-of-life stage, 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

Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin (pub.):
Generation of Environmental Product Declarations
(EPDs);

General principles

for the EPD range of Institut Bauen und Umwelt e.V.
(IBU), 2013-04
www.bau-umwelt.de

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 Background Report. Version 1.6,
2017
www.ibu-epd.de

IBU PCR Part B

IBU PCR Part B: PCR Guidance-Texts for Building-
Related Products and Services. From the range of
Environmental Product Declarations of Institute
Construction and Environment e.V. (IBU). Part B:
Requirements on the EPD for
Automatic doors, automatic gates, and
revolving door systems. www.ibu-epd.com

EN 15804

EN 15804:2012-04: Sustainability of construction
works — Environmental Product Declarations — Core
rules for the product category of construction products

GaBi 6 2013

GaBi 6 2013: Software-System and Database for Life
Cycle Engineering. Copyright, TM. Stuttgart, thinkstep
AG, Echterdingen, 1992-2013.

GaBi 6 2013D

GaBi 6 2013D: Documentation of GaBi 6: Software-
System and Database for Life Cycle Engineering.
Copyright, TM. Stuttgart, thinkstep AG, Echterdingen,
1992-2013. <http://documentation.gabi-software.com/>

ISO 14025

DIN EN ISO 14025:2011-10: Environmental labels and
declarations — Type III environmental declarations —
Principles and procedures

2014/30/EC

Electro Magnetic Compatibility Directive

2014/35/EC

Low Voltage Directive

2006/42/EC

Machinery Directive (MD)

ISO 15686:

ISO 15686:2011-05, Buildings and constructed assets
- Service life planning

EN 60335-1

EN 60335-1:2012: Household and similar electrical
appliances -Safety - Part 1: General requirements

EN 60335--2-103

EN 61000-6-2-103:2003: Household and similar
electrical appliances - Safety - Part 2-103: Particular
requirements for drives for gates, doors and windows

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 61000-6-3:2001: Quality management systems -
Requirements (ISO 9001:2008)

EN ISO 13849-1

EN ISO 13849-1:2008: Safety of machinery — Safety-
related parts of control systems — Part 1: General
principles for design

EN 16005

EN 16005:2012: Power operated pedestrian door sets
- Safety in use - Requirements and test methods

DIN 18650-1

DIN 18650-1:2005: Building hardware - Powered
pedestrian doors - Part 1: Product requirements and
test methods

DIN 18650-2

DIN 18650-2:2005: Building hardware - Powered
pedestrian doors - Part 2: Safety at powered
pedestrian doors

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: Particular requirements for
drives, for gates, doors and windows

2012/19/EU

Waste Electrical and Electronic Equipment Directive
(WEEE Directive)

EWC

Waste codes according to European Waste Catalogue
and Hazardous Waste List - Valid from 1 January 2002

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 BOUNDARYS
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	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of ASSA ABLOY RD100-4, Revolving door

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO ₂ -Eq.]	2.35E+03	2.80E+01	1.91E+02	5.70E+02	1.41E+01	1.32E+02	7.47E+01	-1.47E+03
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.57E-07	1.43E-10	7.80E-10	4.15E-07	7.19E-11	6.20E-10	2.56E-10	5.72E-07
AP	Acidification potential of land and water	[kg SO ₂ -Eq.]	1.51E+01	1.68E-01	3.54E-02	2.54E+00	8.44E-02	2.16E-02	3.28E-02	-7.11E+00
EP	Eutrophication potential	[kg N-eq.]	7.16E-01	1.18E-02	1.73E-03	1.08E-01	5.96E-03	1.18E-03	1.63E-03	-1.91E-01
Smog	Ground-level smog formation potential	[kg O ₃ -eq.]	1.73E+02	3.45E+00	5.81E-01	2.30E+01	1.74E+00	4.06E-01	3.94E-01	-6.57E+01
Resources	Resources – resources fossil	[MJ]	2.50E+03	5.56E+01	5.45E+00	4.61E+02	2.80E+01	3.44E+00	5.79E+00	-1.29E+03

RESULTS OF THE LCA - RESOURCE USE: One piece of ASSA ABLOY RD100-4, Revolving door

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.02E+04	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.02E+04	1.52E+01	4.46E+00	1.85E+03	7.68E+00	3.16E+00	4.06E+00	-5.42E+03
PENRE	Non-renewable primary energy as energy carrier	[MJ]	3.46E+04	-	-	-	-	-	-	-
PENRM	Non-renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non-renewable primary energy resources	[MJ]	3.46E+04	3.88E+02	5.65E+01	1.01E+04	1.95E+02	3.60E+01	6E+01	-1.84E+04
SM	Use of secondary material	[kg]	4.97E+01	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
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
FW	Use of net fresh water	[m ³]	1.80E+01	1.07E-02	4.92E-01	4.58E+00	5.42E-03	3.42E-01	9.83E-02	-1.44E+01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of ASSA ABLOY RD100-4, Revolving door

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	2.05E+00	8.83E-04	3.96E-03	1.41E+00	4.45E-04	2.63E-03	3.41E-03	-2.60E-01
NHWD	Non-hazardous waste disposed	[kg]	2.44E+02	4.88E-02	5.13E+00	3.27E+00	2.46E-02	1.88E+00	1.22E+02	7.88E+01
RWD	Radioactive waste disposed	[kg]	2.01E+00	5.08E-04	3.19E-03	1.46E+00	2.56E-04	2.37E-03	1.76E-03	1.43E+00
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	-
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	9.99E+01	0.00E+00	0.00E+00	4.20E+02	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	-
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	2.46E+02	0.00E+00	0.00E+00	1.54E+02	1.39E+02	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	6.87E+02	0.00E+00	0.00E+00	4.32E+02	3.82E+02	-

**Publisher**

Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748-0
Fax +49 (0)30 3087748-29
Mail info@ibu-epd.com
Web www.ibu-epd.com

**Programme holder**

Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748-0
Fax +49 (0)30 3087748-29
Mail info@ibu-epd.com
Web www.ibu-epd.com



thinkstep

Author of the Life Cycle Assessment

thinkstep AG
Hauptstraße 111-113
70771 Leinfelden-Echterdingen
Germany

Tel +49 (0)711 341817-0
Fax +49 (0)711 341817-25
Mail info@pe-international.com
Web www.pe-international.com

ASSA ABLOY

Owner of the Declaration

ASSA ABLOY Entrance Systems AB
Lodjursgatan 10
26144 Landskrona
Sweden

Tel +46 10 47 47 000
Fax +46 418 284 12
Mail info.aaes@assaabloy.com
Web www.assaabloyentrance.com