

ASSA ABLOY UNITURN REVOLVING DOOR

ASSA ABLOY ENTRANCE SYSTEMS



The ASSA ABLOY UniTurn Revolving Door a revolutionary two-wing design that creates a welcoming and spacious entrance with maximum energy efficiency.

ASSA ABLOY

ASSA ABLOY is committed to providing products and services that are environmentally sound throughout the entire production process and the product lifecycle. Our unconditional aim is to make sustainability a central part of our business philosophy and culture, but even more important is the job of integrating sustainability into our business strategy. The employment of EPDs will help architects, designers and LEED-APs select environmentally preferable door openings. ASSA ABLOY will continue our efforts to protect the environment and health of our customers/end users and will utilize the EPD as one means to document those efforts.



ENVIRONMENTAL PRODUCT DECLARATION



ASSA ABLOY Entrance Systems
ASSA ABLOY UniTurn Revolving Door

According to EN 15804 and ISO 14025
Dual Recognition by UL Environment and Institut Bauen und Umwelt e.V.


This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. **Exclusions:** EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. **Accuracy of Results:** EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. **Comparability:** EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	ASSA ABLOY Entrance Systems AB
ULE DECLARATION NUMBER	4786980837.106.1
IBU DECLARATION NUMBER	EPD-ASA-20150119-IBA1-EN
DECLARED PRODUCT	ASSA ABLOY UniTurn Revolving Door
REFERENCE PCR	PCR Automatic doors, automatic gates, and revolving door systems (door systems)

DATE OF ISSUE	May 18, 2015
PERIOD OF VALIDITY	5 years

SCOPE	This EPD is Manufacturer Declaration (1a) – Declaration of a specific product from a manufacturer’s plant. The owner of the declaration shall be liable for the underlying information and evidence.
CONTENTS OF THE DECLARATION	Product definition Information about basic material and the material’s origin Description of the product’s manufacture Indication of product processing Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	Dr. Wolfram Trinius (Independent verifier appointed by SVA)
	PCR was approved by the Independent Expert Committee (SRV)
The CEN Norm EN 15804 serves as the core PCR. This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	 Wade Stout, UL Environment
	IBU - Institut Bauen und Umwelt e.V.
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	

This EPD conforms with ISO 21930:2007



1. General Information

ASSA ABLOY Entrance Systems AB

Programme holder

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

Declaration number

EPD-ASA-20150119-IBA1-EN

This Declaration is based on the Product Category Rules:

IBU: PCR Automatic doors, automatic gates, and revolving door systems (door systems)
(PCR tested and approved by the independent expert committee (SVA))

Issue date

18.05.2015

Valid to

17.05.2020

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr.-Ing. Burkhard Lehmann
(Managing Director IBU)

ASSA ABLOY UniTurn, Revolving Door

Owner of the Declaration

ASSA ABLOY Entrance Systems AB
Lodjursgatan 10
SE-261 44 Landskrona
Sweden

Declared product / Declared unit

This declaration represents 1 revolving door consisting of 2 door leaves and surrounding frame with internal diameter of 4.8 m and internal height of 2.2 m.

Scope:

This declaration and its LCA study is relevant to the revolving door ASSA ABLOY UniTurn Revolving Door. 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 UniTurn Revolving Door sizes vary according to project requirements; a door with internal diameter of 4.8 m 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

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 verifier appointed by SVA)

2. Product

2.1 Product description

Product name: ASSA ABLOY UniTurn Revolving Door

Product characteristic:

Two-wing high capacity revolving door
Pedestrian automatic revolving doors are installations that serve to automatically regulate the flow of people in residential and non-residential buildings while providing high thermal performance.
- Automatic 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.
The ASSA ABLOY UniTurn Revolving Door range is the optimal solution for high pedestrian traffic flow whilst maintaining highest standard of safety for the user. The two-wing automatic revolving door has the largest compartments in relation to the diameter of the

revolving door within our portfolio and the door is designed so that operation is not affected or interrupted by winds or by users pushing the door wings. A unique design option is additional automatic sliding door in the centre of the unit, providing even more flexibility from the revolving door. The rotating section of the ASSA ABLOY UniTurn Revolving Door has two enclosed triangular display sections, ideal for campaigns, information or advertising.

The door has 4 primary parts:

- 1) Door leafs
- 2) Frame
- 3) Floor track
- 4) Operating system

The ASSA ABLOY UniTurn Revolving Door has been designed to meet all operational and safety requirements in the European Directives and the standards issued by the European Standardization Committee (CEN).

2.2 Application

The two-wing, high-capacity ASSA ABLOY UniTurn Revolving Door is an automatic revolving door

developed to provide draught free access to buildings. The door is designed to offer continuous use, a high degree of safety and maximum lifetime. 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. The door can be used indoors or outdoors.

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

Typical applications are found in:

- Commercial buildings
- Healthcare facilities
- Hospitality facilities
- Transportation
- Sporting venues

2.3 Technical Data

The table presents the technical properties of the ASSA ABLOY UniTurn Revolving Door:

Technical data

Name	Value	Unit
Heat transfer coefficient of the entire door or gate system	2.7	W/(m ² K)
Power input "Standby"	30	W
Power input "Operation"	200	W

Features

The declared door has a size (W x H) 5400 mm x 2600 mm (Internal height)

Outer wall: clear laminated safety glass 4+0.76+4mm (/EN12600/ 1B1) (standard)

Other types of glass available

Door leaves: standard -clear laminated safety glass 3+0.38+3mm (/EN12600/ 2B2)

Door sections: aluminum profiles Optional: Powder-coated finish (RAL colours), Stainless steel cladding

Ceiling: white laminated panels, dust protection

Calculated heat transfer Coefficient of the entire door (U-value), in accordance with /EN ISO 10077-1 /-2/.

2.4 Placing on the market / Application rules

For the placing on the market in the EEA, Switzerland and Turkey the following European directives apply to the ASSA ABLOY UniTurn Revolving Door:

2004/108/EC Electromagnetic Compatibility Directive (EMCD)

2006/42/EC Machinery Directive (MD)

These directives provides for CE marking of the product and issuing 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 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 doorsets - Safety in use -Requirements and test methods.

Other standards or technical specifications, which have been applied:

DIN 18650-1 Powered pedestrian doors - Part 1:

Product requirements and test methods

DIN 18650-2 Powered pedestrian doors - Part 2:

Safety at powered pedestrian doors

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

IEC 600335-1 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 WEEE

Directive within Europe, Directive 2012/19/EU

For the application and use the respective national provisions.

2.5 Delivery status

Revolving door unit with internal diameter of 4.8 m, internal height of 2.2 m and external height 2.54 m, is delivered ready for installation.

2.6 Base materials / Ancillary materials

The average composition for ASSA ABLOY UniTurn Revolving Door, is as following:

Component	Percentage in mass (%)
Glass	41.25
Aluminium	21.61
Particle Board	14.65
Steel	13.86
Plastics	5.76
Stainless steel	0.80
Electronic	0.10
Electromechanic	0.86
Others	1.11
Total	100

2.7 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, /EN ISO 9001:2008/, ensures high standards.

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

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

/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

/EWC/ 12 01 05 plastics.

2.8 Environment and health during manufacturing

ASSA ABLOY Entrance Systems AB is 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 environment management program effectiveness is evaluated.
- Code of Conduct covers human rights, labor practices and decent work. ASSA ABLOY Entrance Systems AB management is aware of their roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
- Preparation 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.

2.9 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.

2.10 Packaging

Packaging exists for the purpose of protection during transportation. ASSA ABLOY UniTurn Revolving Door components are 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 while the cardboard is recyclable. The pallets are available for immediate reuse upon delivery.

Material	Value (%)
Cardboard/paper	0.98
Plastics	0.59
Wood	98.43
Total	100.0

All materials incurred during installation are directed to a recycling unit.

Waste codes according to European Waste Catalogue (/EWC/ 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

2.11 Condition of use

The best way to remove dust and dirt from the ASSA ABLOY UniTurn Revolving Door 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. The number of service

occasions should be in accordance with national requirements and product documentation. This is especially important when the installation concerns a fire-approved door or a door with an emergency opening function.

- Do not expose doors or profiles to alkalis. Both aluminum 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.

2.12 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. Monitored pressure sensitive safety sensors on both entrance post and door leafs. 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.

2.13 Reference service life

The product has reference service life of 10.000.000 cycles, which complies for 15 years of standard daily use (with the recommended service check). For this EPD the lifetime of 15 years was considered.

2.14 Extraordinary effects

Fire

Not applicable

Water

Contain 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.

2.15 Re-use phase

The product is possible to re-use during the reference service life and be moved from one door to another. All materials are directed to a recycling unit. The components made of aluminum alloy, steel can be recycled. 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 - Valid from 1 January 2002:

- /EWC/ 16 02 13* discarded equipment containing hazardous components 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
- /EWC/ 17 09 02* construction and demolition wastes containing PCB

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

2.16 Disposal

The requirements on waste disposal and recycling listed in the European Waste Catalogue (EWC) should be followed. 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.

In this EPD product parts made of glass were treated as a waste for landfill:
EWC 17 02 02 glass.

2.17 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 UniTurn Revolving Door 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
Declared unit for automatic doors and gates*	20.73	m ²
Mass (Total System)	2287.88	kg
Conversion factor to 1 kg	0.0004	-
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 leaves

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:

- 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 (Energy consumption for ASSA ABLOY UniTurn- Revolving Door operation)

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 or recycling potential from EOL and A5.

3.3 Estimates and assumptions

Use phase:

For the use phase, it is assumed that the revolving door is used in the European Union, thus an European electricity grid mix is considered within this stage.

EoL:

In the End-of-Life phase, 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), 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 6 Software System for Life Cycle Engineering, developed by PE INTERNATIONAL 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/.

PE INTERNATIONAL 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. The last revision of the used background data has taken place not longer than 10 years ago.

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 electronic scraps (PWBs)
- 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.

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)	4.2	kg
Output substances following waste treatment on site (Plastics packaging)	2.53	kg
Output substances following waste treatment on site (Wood packaging)	421	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)	8744	kWh

End of life (C1-C4)

Name	Value	Unit
Collected separately Aluminium, stainless steel, steel, zinc, electronic, particle board, plastic parts	1086.64	kg
Collected as mixed construction waste – glass, other construction waste for landfilling	787.22	kg
Reuse plastic parts, particle board	382.49	kg
Recycling Aluminium, stainless steel, steel, zinc, copper, electronic	699.21	kg
Landfilling – glass, other construction waste for landfilling	792.16	kg

Recycling Electronic (PWBs, copper)	0.78	%
Reuse Plastic parts	4.69	%
Reuse packaging (plastics, paper, wood) (from A5)	18.58	%
Loss Glass, constructions waste for landfilling (no recycling potential)	34.42	%

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

Name	Value	Unit
Collected separately waste type ASSA ABLOY UniTurn Revolving Door (including packaging)	2287.88	kg
Recycling Aluminium	17.60	%
Recycling Steel	11.29	%
Reuse Particle board	11.93	%
Recycling Stainless steel	0.65	%
Recycling Brass	0.06	%

5. LCA: Results

Results shown below were calculated using CML 2001 – 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 UniTurn Revolving Door

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
GWP	[kg CO ₂ -eq.]	6.40E+03	1.15E+02	6.77E+02	4.15E+03	5.47E+01	1.97E-01	7.87E+02	-4.56E+03
ODP	[kg CFC111-eq.]	7.89E-07	5.50E-10	2.69E-09	2.84E-06	2.62E-10	1.35E-10	3.26E-09	1.65E-06
AP	[kg SO ₂ -eq.]	4.37E+01	5.26E-01	9.64E-02	1.96E+01	2.50E-01	9.29E-04	2.59E-01	-2.40E+01
EP	[kg PO ₄ ³⁻ -eq.]	2.94E+00	1.20E-01	1.48E-02	1.10E+00	5.72E-02	5.24E-05	2.97E-02	-1.16E+00
POCP	[kg ethene-eq.]	2.82E+00	-1.70E-01	7.77E-03	1.16E+00	-8.08E-02	5.52E-05	2.06E-02	-1.39E+00
ADPE	[kg Sb-eq.]	2.90E-01	4.33E-06	9.39E-06	5.75E-04	2.06E-06	2.73E-08	3.72E-05	-5.21E-02
ADPF	[MJ]	8.63E+04	1.59E+03	1.51E+02	4.72E+04	7.55E+02	2.24E+00	6.30E+02	-4.66E+04
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources								

RESULTS OF THE LCA - RESOURCE USE: One piece of ASSA ABLOY UniTurn Revolving Door

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
PERE	[MJ]	3.44E+04	-	-	-	-	-	-	-
PERM	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	[MJ]	3.44E+04	6.25E+01	1.49E+01	1.35E+04	2.98E+01	6.41E-01	3.88E+01	-1.71E+04
PENRE	[MJ]	9.97E+04	-	-	-	-	-	-	-
PENRM	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	[MJ]	9.97E+04	1.59E+03	1.79E+02	7.39E+04	7.58E+02	3.51E+00	6.76E+02	-5.83E+04
SM	[kg]	4.74E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	5.27E+01	4.41E-02	1.75E+00	3.33E+01	2.10E-02	1.58E-03	6.54E-01	-4.53E+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 UniTurn Revolving Door

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
HWD	[kg]	8.20E+00	3.62E-03	1.25E-02	1.02E+01	1.73E-03	4.86E-04	2.92E-02	-1.02E+00
NHWD	[kg]	7.70E+02	2.00E-01	1.03E+01	2.39E+01	9.53E-02	1.13E-03	6.16E+02	-6.48E+02
RWD	[kg]	5.31E+00	2.08E-03	1.10E-02	1.06E+01	9.92E-04	5.05E-04	1.84E-02	-4.62E+00
CRU	[kg]	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	9.14E+00	0.00E+00	0.00E+00	2.15E+03	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	-
EEE	[MJ]	0.00E+00	0.00E+00	7.96E+02	0.00E+00	0.00E+00	0.00E+00	1.07E+03	-
EET	[MJ]	0.00E+00	0.00E+00	2.23E+03	0.00E+00	0.00E+00	0.00E+00	2.96E+03	-
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; EET = Exported thermal energy								

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 phase (modules A1-A3) contributes between 52% 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 phase accounts for app. 21%. Glass, aluminium and steel accounts in total with app. 75% 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 phase (module B6), the energy consumption was included and it has a major contribution for all the impact assessment categories considered - between 0.2% and 34%, with the exception of ODP (78%). 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 phase of the product (B6). This is a result of long operation hours in on mode almost every day 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

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

IBU PCR Part A

Institut Bauen und Umwelt e.V., Berlin (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. April 2013
www.bau-umwelt.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 Electronic Access Control Systems. www.bau-umwelt.com

2004/108/EC Electromagnetic Compatibility Directive (EMCD)

Relating to electromagnetic compatibility and repealing Directive 89/336/EEC

2006/42/EC Machinery Directive (MD)

Directive 2006/42/EC on machinery

DIN 18650-1

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

DIN 18650-2

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

ISO 14025

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

EN 15804

EN 15804:2012+A1:2014: Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products

EN 16005

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

EN 60335-1

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

EN 60335-2

EN 60335-2-103:2003: 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 (EN 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 12600

Glass in building - Pendulum tests - Impact test method and classification for flat glass

EN ISO 10077-1

EN ISO 10077-1:2006: Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 1: General.

EN ISO 10077-2

EN ISO 10077-2:2012: Thermal performance of windows doors and shutters – Calculation of thermal transmittance – Part 2: Numerical method for frame.

EN ISO 9001

EN ISO 9001:2008: Quality management systems - Requirements (ISO 9001:2008)

GaBi 6 2013

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

GaBi 6 2013D

GaBi 6 2013D: Documentation of GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, PE INTERNATIONAL AG, Leinfelden-Echterdingen, 1992-2013.

<http://documentation.gabi-software.com/>

WEEE

Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)

EWC

European Waste Catalog

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 UniTurn Revolving Door

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
GWP	[kg CO ₂ -eq.]	6.40E+03	1.15E+02	6.77E+02	4.15E+03	5.47E+01	1.97E-01	7.87E+02	-4.56E+03
ODP	[kg CFC11-eq.]	8.55E-07	5.85E-10	2.86E-09	3.02E-06	2.79E-10	1.44E-10	3.46E-09	1.75E-06
AP	[kg SO ₂ -eq.]	4.34E+01	6.87E-01	1.11E-01	1.85E+01	3.27E-01	8.80E-04	2.89E-01	-2.25E+01
EP	[kg N-eq.]	2.75E+00	4.86E-02	6.05E-03	7.89E-01	2.31E-02	3.75E-05	2.45E-02	-5.84E-01
Smog	[kg O ₃ -eq.]	4.91E+02	1.41E+01	2.10E+00	1.68E+02	6.74E+00	7.97E-03	4.53E+00	-2.05E+02
Resources	[MJ]	7.68E+03	2.28E+02	1.75E+01	3.36E+03	1.09E+02	1.59E-01	7.67E+01	-4.27E+03
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential; EP = Eutrophication potential; Smog = Smog, air; Resources = Resources, fossil fuels								

RESULTS OF THE LCA - RESOURCE USE: One piece of ASSA ABLOY UniTurn Revolving Door

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
PERE	[MJ]	3.44E+04	-	-	-	-	-	-	-
PERM	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	[MJ]	3.44E+04	6.25E+01	1.49E+01	1.35E+04	2.98E+01	6.41E-01	3.88E+01	-1.71E+04
PENRE	[MJ]	9.97E+04	-	-	-	-	-	-	-
PENRM	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	[MJ]	9.97E+04	1.59E+03	1.79E+02	7.39E+04	7.58E+02	3.51E+00	6.76E+02	-5.83E+04
SM	[kg]	4.74E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	5.27E+01	4.41E-02	1.75E+00	3.33E+01	2.10E-02	1.58E-03	6.54E-01	-4.53E+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 UniTurn Revolving Door

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
HWD	[kg]	8.20E+00	3.62E-03	1.25E-02	1.02E+01	1.73E-03	4.86E-04	2.92E-02	-
NHWD	[kg]	7.70E+02	2.00E-01	1.03E+01	2.39E+01	9.53E-02	1.13E-03	6.16E+02	6.48E+02
RWD	[kg]	5.31E+00	2.08E-03	1.10E-02	1.06E+01	9.92E-04	5.05E-04	1.84E-02	-
CRU	[kg]	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	9.14E+00	0.00E+00	0.00E+00	2.15E+03	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	-

EEE	[MJ]	0.00E+00	0.00E+00	7.96E+02	0.00E+00	0.00E+00	0.00E+00	1.07E+03	-
EET	[MJ]	0.00E+00	0.00E+00	2.23E+03	0.00E+00	0.00E+00	0.00E+00	2.96E+03	-
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; EET = Exported thermal energy								

**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@bau-umwelt.com
Web www.bau-umwelt.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@bau-umwelt.com
Web www.bau-umwelt.com

**Author of the Life Cycle Assessment**

PE INTERNATIONAL 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

**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-automatic.na.entrance@assaabloy.com
Web www.assaabloyentrance.com