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-20220076-IBC1-EN
Issue date	18.08.2022
Valid to	17.08.2027

ASSA ABLOY RD600, Revolving Door
ASSA ABLOY Entrance Systems

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

ASSA ABLOY

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-20220076-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 Petersr
(President of IBU e.V.)

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

ASSA ABLOY RD600, 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 a surrounding frame with an internal diameter of 4.8 m and an internal height of 2.2 m

Scope:
This declaration and its LCA study are relevant to the revolving door ASSA ABLOY RD600. 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 RD600 door sizes vary according to project requirements; a door with an 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.
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 IBU 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 RD600
Product characteristics:
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 aluminium and glass and are available in several designs for a range of requirements in diverse building types.

The ASSA ABLOY RD600 range is the optimal solution for high pedestrian traffic flow whilst maintaining high 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. 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 RD600 has two enclosed triangular display sections, ideal for campaigns, information or advertising.

The door has 4 primary parts:
1) Door leaves
2) Outer walls
3) Canopy
4) Operating system

The ASSA ABLOY RD600 has been designed to meet all operational and safety requirements and is certified by 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) (excl. Switzerland), Switzerland and Turkey the following European directives apply to the ASSA ABLOY RD600:

- *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 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 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 two-wing, high-capacity ASSA ABLOY RD600 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:
- Private buildings
- Public buildings
- Healthcare facilities
- Hospitality facilities
- Transportation
- Sporting venues.

2.3 Technical Data

The table presents the technical properties of the ASSA ABLOY RD600

Technical data

Name	Value	Unit
*U-value - closed position - open position	4.5 5.4	W/(m²K)
Power input "Standby"	60	W
Power input "Operation"	180	W

* Heat transfer Coefficient of the entire door (U-value), in accordance with *EN-ISO 10077-1* :2017 and *EN-ISO 10077-2 :2017* Thermal performance of windows, doors and shutters - Calculation of thermal transmittance

Features

The declared door has a size (W x H) 4800 mm x 2200 mm (internal height)
Outer wall: clear laminated safety glass 4+0.76+4 mm (*/EN12600/ 1B1*) (standard)
Door leaves: standard -clear laminated safety glass 3+0.38+3 mm (*/EN12600/ 2B2*)
Door sections: aluminium profiles Optional: Powder-coated finish (RAL colours), stainless steel cladding
Ceiling: white laminated panels or aluminium panels,
Dust protection roof: white laminated panels.

2.4 Delivery status

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

2.5 Base materials / Ancillary materials

The average composition for ASSA ABLOY RD600 is as follows:

Component	Percentage in mass (%)
Aluminium	39.21
Brass	0.08
Copper	0.04
Glass	35.98
Plastics	3.37
Stainless steel	0.69
Steel	10.14
Electronic	1.77
Electro_mechanics	0.67
Paper	0.00
Wood	7.88
Others	0.17
Total	**100**

This product/article/at least one partial article contains substances listed in the candidate list (date: 05.08.2022) exceeding 0.1 percentage by mass: no.

This product/article/at least one partial article contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no.

2.6 Manufacture

The revolving door is manufactured in two locations, Ostrov Czech Republic and Suzhou, China respectively. The Ostrov location is represented in this declaration. Profiles are provided by tier one supplier and are delivered to the factory. The profiles are bent 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. 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*, 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* (*EWC*) - 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

2.7 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, Greenhouse gases, energy, water, waste, volatile organic compound (VOC), surface treatment and Health & Safety are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and environmental management program effectiveness is evaluated.
• Code of Conduct covers human rights, labor practices and decent work. ASSA ABLOY Entrance Systems AB's 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 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 and 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 trained and qualified installation technicians.

2.9 Packaging

Packaging exists for the purpose of protection during transportation. ASSA ABLOY RD600 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. The wood material is FSC certifiied.

Material	Value (%)
Cardboard/paper	1.66
Wood	97.86
Plastics	0.48
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
EWC 15 01 03 wooden packaging

2.10 Condition of use

The best way to remove dust and dirt from the ASSA ABLOY RD600 and to maintain the quality of the enamel layer is to clean, the surfaces three times/year (once/four months period) with gentle (pH 5-9), non-polishing detergent and water. Use a soft non-abrasive sponge.
To avoid damage to the profiles the brushes must be vacuum-cleaned weekly. Regular inspections performed by a trained and qualified person for a minimum of one visit per year, two are recommended according to the *EN16005*.
• 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 that 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.

2.12 Reference service life

The product has a reference service life of approximately 10.000.000 cycles, or 15 years of average daily use with the recommended maintenance and service program. For this EPD a lifetime of 15 years was considered.

2.13 Extraordinary effects

Fire

Not applicable.

Water

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

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

2.14 Re-use stage

The product is possible to be re-used during the reference service life and be moved from one door to another. All recyclable materials are directed to a recycling unit. The components made of aluminum alloy and 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 (EWC)* - 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

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

2.15 Disposal

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

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

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 ASSA ABLOY RD600 ((W x H) 5400 mm x 2600 mm (Internal height)) as specified in Part B requirements on the *IBU PCR Part B.*

Declared unit

Name	Value	Unit
Mass (without packaging)	2147.22	kg
Mass packaging (paper wood, and plastics)	530.37	kg
Declared unit for sectional door systems (dimensions acc. to this PCR))	1	piece

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

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

According to the most representative scenario, the operating hours of the product are accounted for 9 hours in on mode, 5 hours in stand-by-mode and finally 10 hours in standby mode per day (350 days per year in use); the power consumption throughout the whole life cycle is 12967 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 and brass), a recycling scenario with a 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), 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 modelling of the considered product, 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 2019 (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 paper
- Waste incineration of Plastic
- 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 10 2021b* 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).

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in product	84.580	kg C
Biogenic Carbon Content in accompanying packaging	263.300	kg C

Transport to the building site (A4)

Name	Value	Unit
Truck transport		
Kg of fuel diesel with maximum load (27t payload)	27.505	kg/100km
Transport distance truck (primary target market is EU 28)	835	km
Capacity utilization (incl. empty runs) of truck	61	%
Transport by ship	0	km

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (paper/cardboard packaging)	8.840	kg
Output substances following waste treatment on site (wood packaging)	519	kg
Output substances following waste treatment on site (plastic packaging)	2.530	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, 350 days per year)	12967	kWh
Hours per day in on mode	9	h
Hours per day in stand-by mode	5	h
Hours per day in idle mode	10	h
Power consumption – on mode	180	W
Power consumption – stand-by mode	60	W
Power consumption – idle mode	55	W

For the remaining days (15 days) the power is being switched off.

*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	2147.220	kg
Incineration of plastic parts	72.309	kg
Incineration of paper/wood	169.165	Kg
Recycling aluminium, steel, copper, electronic, electro-mechanics, stainless steel and brass	1129.228	kg
Landfill	776.517	kg

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

Name	Value	Unit
Collected separately waste type (including packaging)	1901.073	kg
Recycling aluminium	44.286	%
Recycling brass	0.087	%
Recycling copper	0.041	%
Recycling stainless steel	0.783	%
Recycling steel	11.451	%
Recycling electronic	1.998	%
Recycling electro mechanics	0.753	%
Incineration of plastic parts	3.937	%
Incineration of paper	0.465	%
Incineration of wood	36.199	%

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 RD600

Core Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	1.11E+04	1.35E+02	9.53E+02	5.25E+03	0.00E+00	1.29E+01	4.92E+02	8.90E+01	-6.51E+03
GWP-fossil	[kg CO_2-Eq.]	1.22E+04	1.34E+02	1.22E+01	5.22E+03	0.00E+00	1.29E+01	1.50E+02	8.97E+01	-6.49E+03
GWP-biogenic	[kg CO_2-Eq.]	-1.15E+03	-2.29E-01	9.41E+02	1.74E+01	0.00E+00	-2.20E-02	3.43E+02	-6.99E-01	-1.24E+01
GWP-luluc	[kg CO_2-Eq.]	8.38E+00	1.09E+00	1.99E-03	7.56E+00	0.00E+00	1.04E-01	6.78E-03	3.02E-02	-2.66E+00
ODP	[kg CFC11-Eq.]	3.00E-08	1.61E-14	1.65E-14	1.15E-10	0.00E+00	1.55E-15	6.32E-14	7.56E-14	1.18E-09
AP	[mol H^+-Eq.]	4.92E+01	1.38E-01	1.10E+00	1.15E+01	0.00E+00	1.32E-02	4.25E-01	7.96E-02	-3.19E+01
EP-freshwater	[kg P-Eq.]	1.50E-02	4.08E-04	3.31E-06	1.39E-02	0.00E+00	3.92E-05	1.01E-05	2.23E-05	-3.28E-03
EP-marine	[kg N-Eq.]	8.89E+00	4.01E-02	2.71E-01	2.56E+00	0.00E+00	3.85E-03	1.05E-01	2.06E-02	-3.86E+00
EP-terrestrial	[mol N-Eq.]	9.75E+01	4.83E-01	3.00E+00	2.69E+01	0.00E+00	4.64E-02	1.19E+00	2.55E-01	-4.20E+01
POCP	[kg NMVOC-Eq.]	2.56E+01	1.11E-01	8.81E-01	7.01E+00	0.00E+00	1.07E-02	3.40E-01	6.09E-02	-1.21E+01
ADPE	[kg Sb-Eq.]	1.61E+05	9.62E-06	2.71E-07	1.51E-03	0.00E+00	9.24E-07	9.17E-07	1.37E-06	-1.17E-01
ADPF	[MJ]	3.30E-01	1.79E+03	2.45E+01	9.18E+04	0.00E+00	1.72E+02	7.65E+01	1.55E+02	-8.39E+04
WDP	[m^3 world-Eq deprived]	9.38E+02	1.20E+00	3.36E+01	1.14E+03	0.00E+00	1.15E-01	2.70E+01	9.59E+00	-1.00E+03
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 RD600

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	[MJ]	3.96E+04	0.00E+00	1.01E+04	0.00E+00	0.00E+00	0.00E+00	3.23E+03	0.00E+00	0.00E+00
PERM	[MJ]	1.33E+04	0.00E+00	-1.01E+04	0.00E+00	0.00E+00	0.00E+00	-3.21E+03	0.00E+00	0.00E+00
PERT	[MJ]	5.29E+04	1.00E+02	4.20E+00	4.07E+04	0.00E+00	9.65E+00	1.84E+01	2.54E+01	-3.52E+04
PENRE	[MJ]	1.57E+05	0.00E+00	7.28E+01	0.00E+00	0.00E+00	0.00E+00	3.76E+03	0.00E+00	0.00E+00
PENRM	[MJ]	3.73E+03	0.00E+00	-4.83E+01	0.00E+00	0.00E+00	0.00E+00	-3.69E+03	0.00E+00	0.00E+00
PENRT	[MJ]	1.61E+05	1.79E+03	2.45E+01	9.18E+04	0.00E+00	1.72E+02	7.65E+01	1.55E+02	-8.40E+04
SM	[kg]	2.43E+02	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]	8.08E+01	1.16E-01	7.76E-01	4.70E+01	0.00E+00	1.12E-02	6.37E-01	2.36E-01	-8.71E+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 RD600

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	[kg]	3.82E-04	8.32E-05	6.44E-08	3.80E-05	0.00E+00	7.99E-06	2.17E-07	1.92E-06	-7.18E-05
NHWD	[kg]	1.60E+03	2.74E-01	5.79E+00	6.51E+01	0.00E+00	2.63E-02	1.60E+01	5.93E+02	-1.57E+03
RWD	[kg]	1.07E+01	2.21E-03	7.55E-04	1.39E+01	0.00E+00	2.13E-04	4.44E-03	2.78E-03	-5.24E+00
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	5.12E+02	0.00E+00	0.00E+00	0.00E+00	1.88E+03	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	2.53E+03	0.00E+00	0.00E+00	0.00E+00	1.25E+03	0.00E+00	7.86E-02
EET	[MJ]	0.00E+00	0.00E+00	3.58E+03	0.00E+00	0.00E+00	0.00E+00	1.88E+03	0.00E+00	1.48E-01
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 RD600										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease Incidence]	4.66E-04	8.20E-07	4.73E-06	9.67E-05	0.00E+00	7.87E-08	2.02E-06	9.88E-07	-3.34E-04
IR	[kBq U235-Eq.]	1.70E+03	3.20E-01	9.14E-02	2.28E+03	0.00E+00	3.07E-02	6.36E-01	2.67E-01	-1.05E+03
ETP-fw	[CTUe]	7.90E+04	1.26E+03	2.64E+01	3.93E+04	0.00E+00	1.21E+02	5.51E+01	8.12E+01	-2.90E+04
HTP-c	[CTUh]	3.66E-05	2.65E-08	6.55E-08	1.08E-06	0.00E+00	2.54E-09	2.65E-08	1.12E-08	-2.19E-05
HTP-nc	[CTUh]	1.43E-04	1.36E-06	5.66E-06	3.99E-05	0.00E+00	1.31E-07	2.33E-06	1.21E-06	-7.74E-05
SQP	[-]	1.44E+05	6.27E+02	4.73E+00	2.92E+04	0.00E+00	6.02E+01	1.94E+01	3.60E+01	-5.12E+03
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 43.64 % and 99.62 % to the overall results for all the environmental impact assessment categories hereby considered.
Within the production stage, the main contribution for all the impact categories is the production of steel, glass and aluminum mainly due to the energy consumption in these processes. These three materials accounts for approx. 85 % 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 20.79 % and 23.71 %, with the exception of ODP (0.4 %) and ADPF (0.46 %). This is a result of 9 hours of operation in on mode, 5 hours in stand-by mode and 10 hours in idle mode per day and per 350 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

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 EN 1627
DIN EN 1627:2021-11, Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Requirements and classification

DIN EN 12600
DIN EN 12600:2003-04, Glass in building - Pendulum tests - Impact test method and classification for flat glass;

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

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

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

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 16005
DIN EN 16005:2013-01, Power operated pedestrian doorsets - Safety in use - Requirements and test method

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

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

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

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

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 GmbH, Echterdingen, 1992-2020.

***GaBi* 10 2021b**
GaBi 10 2021b: Documentation of *GaBi* 8: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Sphera GmbH, Echterdingen, 1992-2020. http://documentation.*GaBi*-software.com/

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 Background Report. Version 1.8 April 2019
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 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

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 RD600

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C1	C2	C3	C4	D
GWP	Global warming potential	[kg CO2-eq.]	1.20E+04	1.32E+02	8.27E+00	0.00E+00	0.00E+00	5 144.32	1.27E+01	1.48E+02	8.91E+01
GWP	Global warming potential. incl. biogenic	[kg CO2-eq.]	1.08E+04	1.32E+02	9.49E+02	5.12E+03	0.00E+00	1.26E+01	4.91E+02	8.83E+01	-6.43E+03
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-eq.]	0.00E+00	1.32E+02	9.49E+02	0.00E+00	0.00E+00	5.12E+03	1.26E+01	4.91E+02	8.83E+01
AP	Acidification potential of land and water	[kg SO2-eq.]	4.19E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP	Eutrophication potential	[kg N- eq.]	1.82E+00	1.20E-01	1.69E+00	0.00E+00	0.00E+00	1.12E+01	1.00E-02	6.60E-01	8.00E-02
Smog	Ground-level smog formation potential	[kg O3-eq.]	5.15E+02	2.00E-02	5.00E-02	0.00E+00	0.00E+00	1.05E+00	0.00E+00	2.00E-02	0.00E+00
Resources	Resources – resources fossil	[MJ surplus energy]	1.11E+04	1.94E+00	1.78E+01	0.00E+00	0.00E+00	1.49E+02	1.90E-01	6.86E+00	1.28E+00

RESULTS OF THE LCA - RESOURCE USE: One piece of RD600

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	3.96E+04	0.00E+00	1.01E+04	0.00E+00	0.00E+00	0.00E+00	3.23E+03	0.00E+00	0.00E+00
PERM	Renewable primary energy resources as material utilization	[MJ]	1.33E+04	0.00E+00	-1.01E+04	0.00E+00	0.00E+00	0.00E+00	-3.21E+03	0.00E+00	0.00E+00
PERT	Total use of renewable primary energy resources	[MJ]	5.29E+04	1.00E+02	4.20E+00	4.07E+04	0.00E+00	9.65E+00	1.84E+01	2.54E+01	-3.52E+04
PENRE	Non-renewable primary energy as energy carrier	[MJ]	1.57E+05	0.00E+00	7.28E+01	0.00E+00	0.00E+00	0.00E+00	3.76E+03	0.00E+00	0.00E+00
PENRM	Non-renewable primary energy as material utilization	[MJ]	3.73E+03	0.00E+00	-4.83E+01	0.00E+00	0.00E+00	0.00E+00	-3.69E+03	0.00E+00	0.00E+00
PENRT	Total use of non-renewable primary energy resources	[MJ]	1.61E+05	1.79E+03	2.45E+01	9.18E+04	0.00E+00	1.72E+02	7.65E+01	1.55E+02	-8.40E+04
SM	Use of secondary material	[kg]	2.43E+02	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]	8.08E+01	1.16E-01	7.76E-01	4.70E+01	0.00E+00	1.12E-02	6.37E-01	2.36E-01	-8.71E+01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of RD600

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	3.82E-04	8.32E-05	6.44E-08	3.80E-05	0.00E+00	7.99E-06	2.17E-07	1.92E-06	-7.18E-05
NHWD	Non-hazardous waste disposed	[kg]	1.60E+03	2.74E-01	5.79E+00	6.51E+01	0.00E+00	2.63E-02	1.60E+01	5.93E+02	-1.57E+03
RWD	Radioactive waste disposed	[kg]	1.07E+01	2.21E-03	7.55E-04	1.39E+01	0.00E+00	2.13E-04	4.44E-03	2.78E-03	-5.24E+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	0.00E+00
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	5.12E+02	0.00E+00	0.00E+00	0.00E+00	1.88E+03	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	2.53E+03	0.00E+00	0.00E+00	0.00E+00	1.25E+03	0.00E+00	7.86E-02
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	3.58E+03	0.00E+00	0.00E+00	0.00E+00	1.88E+03	0.00E+00	1.48E-01

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