Environmental Product Declaration

RFID Encoder

Operational Equipment

This highly qualified and sophisticated RFID encoder and updater is embedded into one single device. It is designed with functionality, reliability, and durability in mind.

ASSA ABLOY

ASSA ABLOY is committed to providing products and services that are environmentally sound throughout the entire production process and product lifecycle. Our unconditional aim is to make sustainability a central part of our business philosophy and culture; more importantly, integrating sustainability into our business strategy. The employment of Environmental Product Declarations (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 and end users, utilizing EPDs as one means to document those efforts.

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

EPD Program and Program Operator Name, Address, Logo, and Website	UL Environment 333 Pfingsten Road Northbrook, IL 60611 https://www.ul.com/ https://spot.ul.com
General Program Instructions and Version Number	General Program Instructions v.2.4 July 2018
Manufacturer Name and Address	ASSA ABLOY Global Solutions P.O. Box 70340 (Klarabergviadukten 90) 107 23 Stockholm, Sweden
Declaration Number	4789027809.107.1
Declared Product & Functional Unit or Declared Unit	RFID Encoder Operational Equipment; Functional Unit: 1 unit (piece) per 75 year building lifetime
Reference PCR and Version Number	UL Part B: Builders Hardware EPD Requirements, Version 1.0, November 2019
Description of product application/use	ASSA ABLOY Global Solutions products are primarily used In hospitality settings
Product RSL Description (if appl.)	25 years
Markets of Applicability	Global
Date of Issue	April 1, 2020
Period of Validity	5 Years
EPD Type	Product-specific
Range of Dataset Variability	N/A
EPD Scope	Cradle-to-Grave
Year(s) of reported primary data	2016-2017
LCA Software & Version Number	GaBi 8.7
LCI Database(s) & Version Number	GaBi thinkstep database, Service Pack 35
LCIA Methodology & Version Number	TRACI 2.1; CML 4.1

This PCR review was conducted by:	UL Environment PCR Review Panel epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025: 2006. ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria Thomas P. Gloria, Industrial Ecology Consultants

Limitations

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; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

General Information

Description of Company/Organization

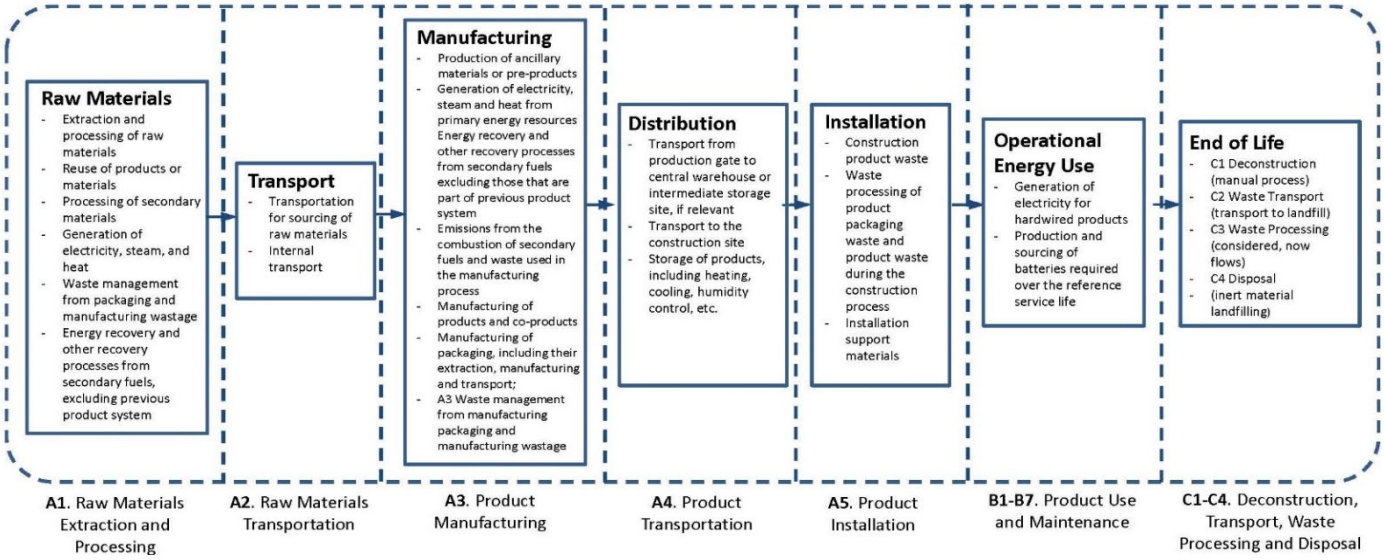
Products are manufactured by ASSA ABLOY Global Solutions. The manufacturing facility is located in Shanghai, China and has an ISO 14001 certified environmental management system in place.

Product Description

Product Name: RFID Encoder
Features
- For encoding, verification and auto update of RFID cards
- Card standards: ISO 14443 A/B and ISO 15693
- Sound signals
- Configurable through web interface
- Horizontal or vertical mounting
- Color display

Product contains screws for installation, as well as paper installation instructions. Otherwise, no other accessory materials are required for installation or use.

Flow Diagram



Application

ASSA ABLOY Global Solutions products are ideal for a wide range of applications including but not limited to hotel, marine, education, hospitals, health care, multi-family, and workforce settings.

Material Composition

Material	Percentage in mass (%)
Metals	56.49%
Plastics	0.83%
Electronics	42.68%
Other	0.00%
Total	**100.00%**

Technical Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data	
Dimensions W/H/D	83.3/152/42.2 mm
Encoder Material	ABS UL 94V-0
Temperature Range	Intended for indoor use only; +5 C to +50 C
Relative Humidity	10-90%; non-condensing

Placing on the Market / Application Rules

The specified product meets or exceeds the following standards:

Properties of Declared Product as Shipped

Products are delivered as a complete unit, inclusive of all installation materials and instructions. Product dimensions are: 83.3x152x42.2 mm.

Delivery Status

Products are delivered in a cardboard box.

Methodological Framework

Functional Unit

The declaration refers to the functional unit of 1 unit (or piece) of RFID Encoder , installed in a North American standard building with an Estimated Service Life of 75 years, and having a Reference Service Life of 25 years.

Name	Value	Unit
Functional unit	1	Piece, over 75 years
Mass	0.618	kg
Conversion factor to 1 kg	1.6	-

System Boundary

This is a cradle to gate with options Environmental Product Declaration. The following life cycle phases were considered:

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 gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND

Description of the System Boundary Stages Corresponding to the PCR

(X = Included; MND = Module Not Declared)

*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.

Product Maintenance

This product requires no maintenance over its reference service life.

Reference Service Life

The reference service life of the product is 25 years and the estimated service life of the building is 75 years. The replacement life cycle stage (B4) considers two replacements of the products required to fulfill the 75 year estimated service life.

Allocation

Unit allocation was used to allocate all manufacturing inputs and outputs to the functional unit. This methodology was chosen over mass allocation because the manufacturing process is largely an assembly process where each product has a similar manufacturing intensity regardless of product mass. Use of recycled/secondary raw materials was accounted for using the cut-off allocation methodology.

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

Data Sources

Primary data were collected for every process in the product system under the control of
ASSA ABLOY Global Solutions. Secondary data from the GaBi thinkstep database were utilized. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the Builder's Hardware product category.

Data Quality

The data sources used are complete and representative of North America in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is the full calendar year of October 2016 - September 2017.

Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all 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. Environmental declarations from different programs may not be comparable. Full conformance with the PCR for North American Builders Hardware products allows EPD comparability only when all stages of a Builders Hardware product's life cycle have been considered. However, variations and deviations are possible.

Estimates and Assumptions

End of Life

The end-of-life disposition is modeled as 85% recycling and 15% landfill disposal for the metal components and 100% landfill disposal for all other materials.

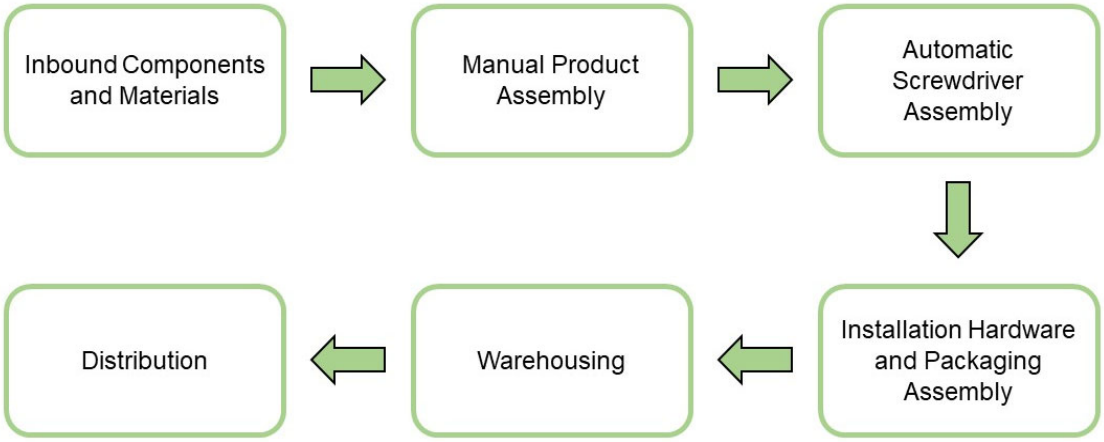
Additional Environmental Information

Background data

For life cycle modeling of the considered products, the GaBi 8 Software System for Life Cycle Engineering, developed by thinkstep, is used. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

Manufacturing

The primary manufacturing processes are made by Tier 1 suppliers and the final manufacturing processes occur in Shanghai, China. The manufacturing process in the Shanghai facility is primarily final product assembly.



Packaging

Products are delivered in a cardboard box.

Material	Quantity (% By Weight)
Cardboard	100%
Other	0%
Total	**100%**

Transformation

Transport to Building Site (A4)		
Name	**Value**	**Unit**
Liters of fuel	38	l/100km
Transport distance	2321	km
Capacity utilization (including empty runs)	90	%
Gross density of products transported	-	kg/m^3
Capacity utilization volume factor	1.00	-

Product Installation

The product is distributed through and installed by trained installation technicians such as locksmiths, carpenters, etc. The installers adhere to local/national standards and requirements.

Installation into the Building (A5)		
Name	**Value**	**Unit**
Auxiliary materials	-	kg
Water consumption	-	m^3
Other resources	-	kg
Electricity consumption	0.03	MJ
Other energy carriers	-	MJ
Waste materials at construction site	0.14	kg
Output substance (recycle)	0.10	kg
Output substance (landfill)	0.03	kg
Output substance (incineration)	0.01	kg
Direct emissions to ambient air*, soil, and water	0.04	kg CO_2

*CO2 emissions to air from disposal of packaging

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	25	years
Estimated building Service Life	75	years
Number of replacements	2	number

Product Use

No cleaning or annual maintenance is required.

Operational Energy Use		
Name	**Value**	**Unit**
Water consumption (from tap, to sewer)	-	m^3
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Equipment output	-	kW
Direct emissions to ambient air, soil, and water	-	kg
AA battery replacements per RSL	0	number

Disposal

The product can be mechanically dissembled to separate the different materials. 100% of the materials used are recyclable. The remainder of components are disposed of according to standard municipal solid waste deposition.

End of life (C1-C4)		
Name	**Value**	**Unit**
Collected separately	0.23	kg
Collected as mixed construction waste	0.39	kg
Reuse	0.00	kg
Recycling	0.23	kg
Energy recovery	0.00	kg
Landfilling	0.39	kg

Re-use Phase

The product can be moved from one location to another during the reference service life, enabling re-use.

LCA Results

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C3	C4
GWP	Global warming potential	kg CO_2-Eq.	1.2E+02	2.8E-01	2.1E-02	2.4E+02	0.0E+00	6.5E-03	2.9E-03	0.0E+00	2.3E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	5.0E-09	1.1E-11	6.6E-14	9.9E-09	0.0E+00	6.6E-14	1.1E-13	0.0E+00	2.2E-13
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	6.2E-01	3.8E-03	1.3E-04	1.2E+00	0.0E+00	5.6E-05	1.7E-05	0.0E+00	1.9E-03
EP	Eutrophication potential	kg N-Eq.	3.4E-02	2.1E-04	1.6E-05	6.9E-02	0.0E+00	7.9E-07	9.5E-07	0.0E+00	7.0E-04
SP	Smog formation potential	kg O_3-Eq.	1.6E+01	1.1E-01	7.9E-04	3.2E+01	0.0E+00	4.4E-04	4.7E-04	0.0E+00	6.1E-03
FFD	Fossil Fuel Depletion	MJ-surplus	2.3E+02	4.9E-01	6.7E-03	4.5E+02	0.0E+00	4.0E-03	5.1E-03	0.0E+00	6.9E-02

**All use phase stages have been considered and only those with non-zero values have been reported*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C3	C4
GWP	Global warming potential	kg CO_2-Eq.	1.2E+02	2.8E-01	2.1E-02	2.4E+02	0.0E+00	6.5E-03	2.9E-03	0.0E+00	2.3E-01
ODP	Depletion potential of the stratospheric ozone layer	kg R-11 Eq.	4.9E-09	1.1E-11	5.5E-14	9.9E-09	0.0E+00	5.5E-14	1.1E-13	0.0E+00	2.2E-13
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.2E-01	3.1E-03	1.1E-04	1.1E+00	0.0E+00	6.1E-05	1.4E-05	0.0E+00	6.9E-04
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	8.5E-02	5.8E-04	2.2E-05	1.7E-01	0.0E+00	2.2E-06	2.5E-06	0.0E+00	7.8E-04
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	7.6E-02	2.8E-04	1.8E-05	1.5E-01	0.0E+00	6.0E-06	1.7E-06	0.0E+00	1.9E-04
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	9.7E-04	1.2E-10	7.7E-10	1.9E-03	0.0E+00	7.2E-11	1.2E-12	0.0E+00	1.2E-08
ADPF	Abiotic depletion potential for fossil resources	MJ	1.6E+03	3.5E+00	1.2E-01	3.3E+03	0.0E+00	9.3E-02	3.6E-02	0.0E+00	5.3E-01

**All use phase stages have been considered and only those with non-zero values have been reported*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C3	C4
RPR_E	Renewable primary energy as energy carrier	MJ	6.5E+00	0.0E+00	2.0E-03	1.3E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E-02
RPR_M	Renewable primary energy resources as material utilization	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	1.7E+03	3.5E+00	1.4E-01	3.3E+03	0.0E+00	1.1E-01	3.7E-02	0.0E+00	5.4E-01
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SM	Use of secondary material	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ	4.0E-07	0.0E+00	0.0E+00	8.0E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ	5.1E-06	0.0E+00	0.0E+00	1.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RE	Energy recovered from disposed waste	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	3.3E-02	0.0E+00	3.3E-05	6.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.5E-05

**All use phase stages have been considered and only those with non-zero values have been reported*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C3	C4
HWD	Hazardous waste disposed	kg	1.1E-06	0.0E+00	7.4E-11	2.1E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E-09
NHWD	Non-hazardous waste disposed	kg	5.9E-01	0.0E+00	2.2E-02	2.4E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.8E-01
HLRW	High-level radioactive waste	kg or m^3	1.3E-03	0.0E+00	3.7E-07	2.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.5E-06
ILLRW	Intermediate- and low-level radioactive waste	kg or m^3	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MR	Materials for recycling	kg	0.0E+00	0.0E+00	1.0E-01	6.7E-01	0.0E+00	0.0E+00	0.0E+00	2.3E-01	0.0E+00
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	6.9E-03	1.4E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EE	Recovered energy exported from system	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

**All use phase stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

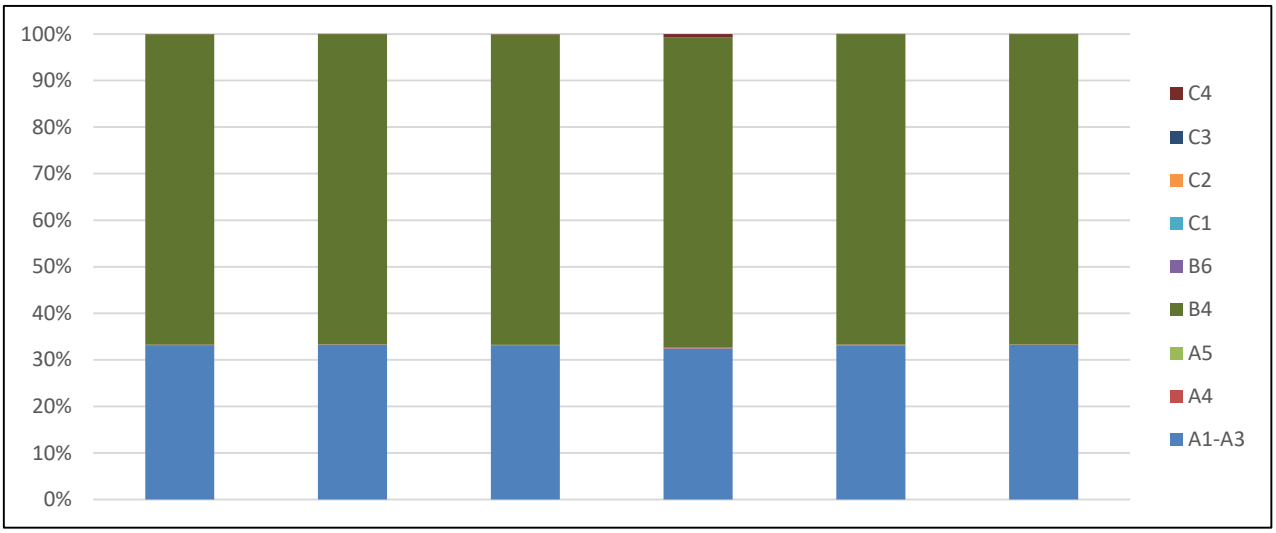
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C3	C4
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	3.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.0E+00	0.0E+00	3.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CCE	Calcination Carbon Emissions	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

**All use phase stages have been considered and only those with non-zero values have been reported*

LCA Interpretation

Aside from the replacement stage (B4), which considers the replacement of the product over the 75 year building lifetime, the production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with electricity use in the manufacturing of the product.



Additional Environmental Information

Environmental and Health During Manufacturing

ASSA ABLOY is committed to producing and distributing door opening solutions with minimal environmental impact, where health and safety are the primary focus for all employees and associates.
• Environmental operations, greenhouse gases (GHG), energy, water, waste, volatile organic content (VOC), surface treatment, and health and safety 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 management is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability, and recognizing outstanding performance.
• Any waste metals produced during machining are separated and recycled.

Environmental and Health During Installation

There is no harmful emissive potential. No damage to health or impairment is expected under normal installation corresponding to the intended installation of the product.

Extraordinary Effects

Fire
No negative environmental impact will result from exposure to fire.

Water
Contains no substances that have any impact on water in case of flood.

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

Delayed Emissions

Global warming potential is calculated using the TRACI 2.1 and CML 4.1 impact assessment methodologies. Delayed emissions are not considered.

Environmental Activities and Certifications

ASSA ABLOY Global Solutions works hard to minimize the environmental impacts of its business activities through various corporate-wide sustainability initiatives. To learn more, please visit:
https://www.assaabloy.com/sv/com/sustainability/sustainability-report/

Further Information

For additional information and contact information, please visit www.assaabloyglobalsolutions.com

References

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