

Environmental Product Declaration

Zigbee Router

Network Product



The Zigbee router is part of the network capabilities ASSA ABLOY Global Solutions offer. It serves as a link between locks and server.

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.



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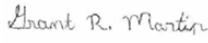

Door Hardware

ASSA ABLOY



According to
ISO 14025, EN 15804,
and ISO 21930:2017

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	4789027809.118.1	
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Zigbee Router Network Product; 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. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	 Grant R. Martin, UL Environment
	 Thomas P. Gloria, Industrial Ecology Consultants
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	

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.



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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

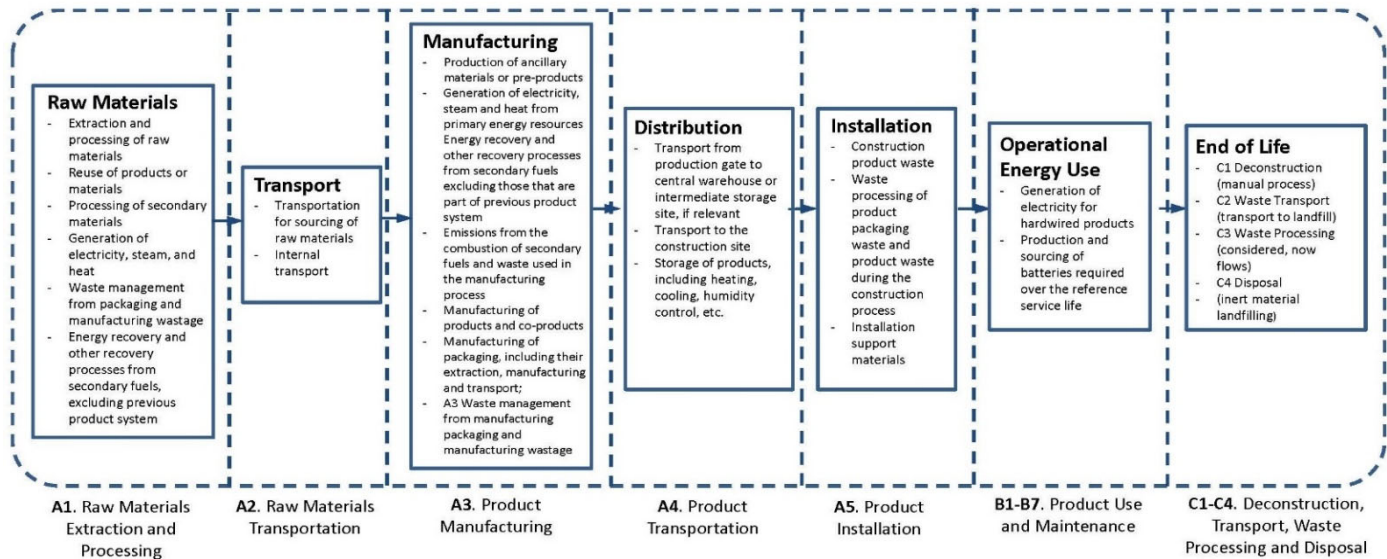
Product Name: Zigbee Router

Additional features include:

- Flexible and easy installation
- No need to wire door locks
- Online communication with server, locks, safes and EMS
- Audit trails, alarms and events over network
- Support for room moves and extended stays without visiting front desk
- Remote cancellation of cards
- Mobile Access

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

Flow Diagram



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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	6.00%
Plastics	5.38%
Electronics	88.62%
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	40mm/105mm/20mm
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: 40x105x20 mm.

Delivery Status

Products are delivered in a cardboard box.



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Methodological Framework

Functional Unit

The declaration refers to the functional unit of 1 unit (or piece) of Zigbee Router, 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	0.180	kg
Conversion factor to 1 kg	5.6	-

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	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.



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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.



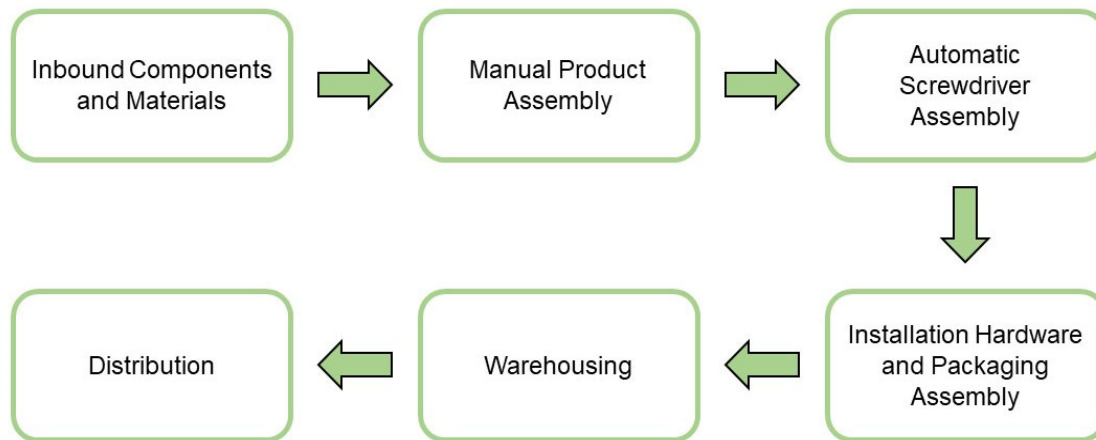
Additional Environmental Information

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	-

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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 disassembled 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	0.00	kg
Collected as mixed construction waste	0.18	kg
Reuse	0.00	kg
Recycling	0.00	kg
Energy recovery	0.00	kg
Landfilling	0.18	kg



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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.	3.2E+00	8.1E-02	2.1E-02	6.7E+00	0.0E+00	6.5E-03	8.4E-04	0.0E+00	6.6E-02
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.2E-10	3.1E-12	6.6E-14	4.5E-10	0.0E+00	6.6E-14	3.2E-14	0.0E+00	6.3E-14
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	1.9E-02	1.1E-03	1.3E-04	4.2E-02	0.0E+00	5.6E-05	5.0E-06	0.0E+00	5.4E-04
EP	Eutrophication potential	kg N-Eq.	1.2E-03	6.1E-05	1.6E-05	2.9E-03	0.0E+00	7.9E-07	2.8E-07	0.0E+00	2.1E-04
SP	Smog formation potential	kg O ₃ -Eq.	3.6E-01	3.2E-02	7.9E-04	7.8E-01	0.0E+00	4.4E-04	1.4E-04	0.0E+00	1.7E-03
FFD	Fossil Fuel Depletion	MJ-surplus	3.9E+00	1.4E-01	6.7E-03	8.2E+00	0.0E+00	4.0E-03	1.5E-03	0.0E+00	1.9E-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.	3.2E+00	8.1E-02	2.1E-02	6.7E+00	0.0E+00	6.5E-03	8.4E-04	0.0E+00	6.6E-02
ODP	Depletion potential of the stratospheric ozone layer	kg R-11 Eq.	2.2E-10	3.1E-12	5.5E-14	4.5E-10	0.0E+00	5.5E-14	3.2E-14	0.0E+00	6.3E-14
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	1.8E-02	9.0E-04	1.1E-04	3.8E-02	0.0E+00	6.1E-05	4.1E-06	0.0E+00	2.0E-04
EP	Eutrophication potential	kg(PO ₄) ³ -Eq.	2.2E-03	1.7E-04	2.2E-05	5.1E-03	0.0E+00	2.2E-06	7.3E-07	0.0E+00	2.3E-04
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.6E-03	8.0E-05	1.8E-05	3.5E-03	0.0E+00	6.0E-06	4.8E-07	0.0E+00	5.6E-05
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	7.4E-05	3.4E-11	7.7E-10	1.5E-04	0.0E+00	7.2E-11	3.5E-13	0.0E+00	3.3E-09
ADPF	Abiotic depletion potential for fossil resources	MJ	3.7E+01	1.0E+00	1.2E-01	7.8E+01	0.0E+00	9.3E-02	1.1E-02	0.0E+00	1.5E-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	4.6E+00	0.0E+00	2.0E-03	9.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.8E-03
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	4.1E+01	1.0E+00	1.4E-01	8.5E+01	0.0E+00	1.1E-01	1.1E-02	0.0E+00	1.5E-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	1.8E-02	0.0E+00	3.3E-05	3.6E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.4E-05

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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	9.6E-07	0.0E+00	7.4E-11	1.9E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.5E-10
NHWD	Non-hazardous waste disposed	kg	1.2E-01	0.0E+00	2.2E-02	6.1E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E-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	1.2E-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	2.1E-01	0.0E+00	0.0E+00	0.0E+00	2.1E-03	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

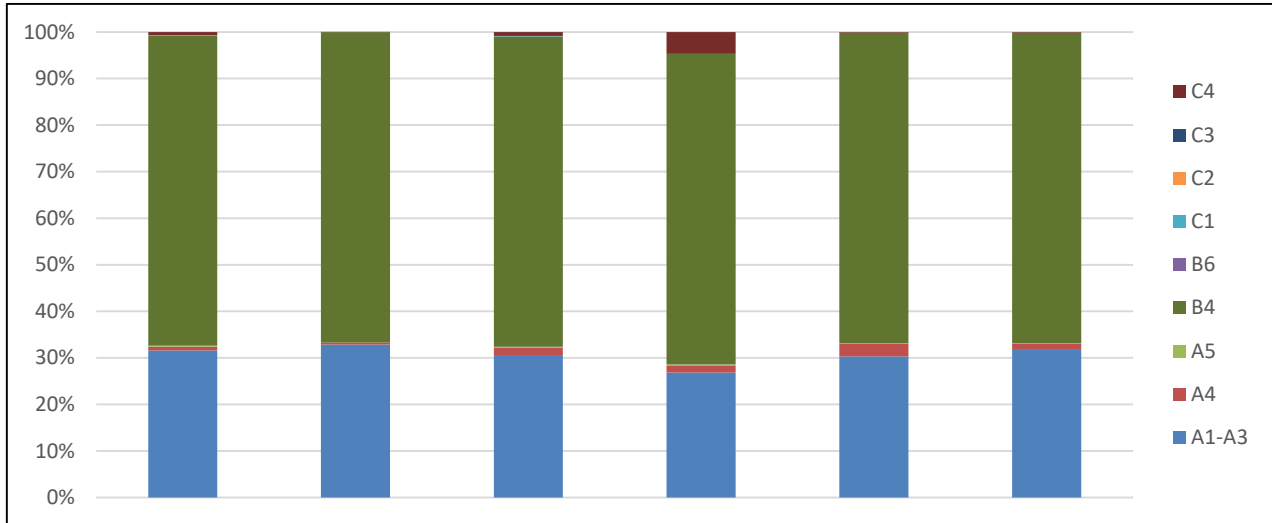
**All use phase stages have been considered and only those with non-zero values have been reported*





LCA Interpretation

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.



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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

- PCR Part A UL Environment: Product Category Rules for Building-Related Products and Services in North America, Part A: Life Cycle Assessment Calculation Rules and Report Requirements, v.3.2, December 2018.
- PCR Part B UL Environment: Product Category Rules Part B: Requirements on the Environmental Product Declaration for Builders Hardware, v.1.0, November 2019.
- GaBi 8 thinkstep.one. GaBi Life Cycle Assessment version 8.7 (software).
- ISO 14025 ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
- ISO 14040 ISO 14040:2009-11, Environmental management — Life cycle assessment — Principles and framework.
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