ENVIRONMENTAL PRODUCT DECLARATION

CORBIN RUSSWIN

ML20900 ECL ELECTROMECHANICAL MORTISE LOCK

The Corbin Russwin ML20900 ECL Electromechanical Lock, is an ANSI/BHMA A156.13 Series 1000 Grade 1 mechanical mortise lock. It has a reversible latch with stainless steel insert and an independent non-handed stainless steel deadlatch.

Corbin Russwin

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. The Corbin Russwin ML20900 ECL Electromechanical Mortise Lock EPD provides detailed requirements with which to evaluate the environmental and human health impacts related to producing our 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.

Institut Bauen und Umwelt e.V.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

Corbin Russwin
ASSA ABLOY

Corbin Russwin
ML20900 Mortise Lock

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.

CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Corbin Russwin, an ASSA ABLOY Group company
ULE DECLARATION NUMBER	4786545067.141.1
IBU DECLRATION NUMBER	EPD-ASA-20150144-IBA1-EN
DECLARED PRODUCT	ML20900 ECL Electromechanical EcoFlex Mortise Lock
REFERENCE PCR	IBU: PCR Locks and fittings (mechanical & electromechanical locks & fittings), 07-2014

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

CONTENTS OF THE DECLARATION	General information Product / Product description LCA calculation rules LCA scenarios and further technical information LCA results References

The PCR review was conducted by:	IBU – Institut Bauen und Umwelt e.V. PCR was approved by the Independent Expert Committee (SVA)
The CEN Norm EN 15804 serves as the core PCR. This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Wade Stout
This life cycle assessment was independently verified in accordance with EN 15804 and the reference PCR by:	IBU – Institut Bauen und Umwelt e.V.

Environment

1. General Information

Corbin Russwin

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
D-10178 Berlin

Declaration number
EPD-ASA-20150144-IBA1-EN

This Declaration is based on the Product Category Rules:
Locks and fittings , 07-2014
(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. Burkhart Lehmann
(Managing Director IBU)

ML20900 ECL Electromechanical Lock

Owner of the Declaration
Corbin Russwin
225 Episcopal Rd
Berlin, CT 06037 USA

Declared product / Declared unit
The declaration represents 1 mortise lock of the following types:
- ML20900 ECL Electromechanical lock

inclusive of lock body, latches, levers, roses, strikes and all mounting hardware.

Scope:
This EPD is based on the full lifecycle of 1 Corbin Russwin ML20900 ECL Electromechanical Lock. Data was collected from the lock case manufacturer in Berlin, Connecticut (US). 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 Norm 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

The Corbin Russwin ML20900 ECL Electromechanical Lock, is an ANSI/BHMA A156.13 Series 1000 Grade 1 mechanical mortise lock. It has a reversible latch with stainless steel insert and an independent non-handed stainless steel deadlatch.

The ML20900 ECL is available with 10 different electromechanical locking functions, optional deadbolt and multiple lever options

- ANSI/BHMA A156.13 Series 1000 Grade 1 Certified
- Meets A117.1 Accessibility Code

Corbin Russwin's products meet building codes that require hurricane, windstorm and FEMA certifications, including some of the most stringent building codes as specified in the Florida Building Code, Miami Dade Code and the International Building Code. Refer to the Corbin Russwin Website (www.corbinrusswin.com) for specific code compliance listings for both the lock hardware and other door components.

2.2 Application

The locks are designed for single or double leaf doors with mullions. The locks are typically installed in commercial buildings, such as
- Commercial campuses
- Colleges
- Detention centers
- Dormitories
- Hospitals
- Warehouses
- Psychiatric wards
- Any high abuse applications

2.3 Technical Data

The table presents the technical properties of Corbin Russwin ML20900 ECL:

Item	Value
Backset	2-3⁄4" (70mm)
Door Thickness	1-3⁄4" (44mm) thick standard
Bevel	Front adjustable at any angle from flat to bevelled 1⁄8" (3mm) in 2" (51mm)
Door prep	ANSI/BHMA A156.115 or A156.115W modified per template
Handing	field reversible
Keying	Can be masterkeyed or grand masterkeyed.
Power Consupmtion (Stand-by)	0.0 Watts
PowerConsumption (idle)	0.0 Watts
Power Consumption (peak)	0.204 Watts

2.4 Placing on the market / Application rules

The products are subject to UL marking. Relevant norms are: ANSI/BHMA A156.13 American Standard for Mortise locks

2.5 Delivery status

Delivered as a complete unit, inclusive of lockbody, trim, strike and fasteners or as separate lock case. Delivered in a box size 9" x 5.5" x 4.375" (229 x 140 x 111 mm).

2.6 Base materials / Ancillary materials

The average composition of the Corbin Russwin Mortise lock is as following:

Component	Percentage in mass (%)
Aluminum	0.15
Brass	46.58
Copper	0.82
Plastic parts	0.47
Stainless Steel	10.64
Steel	38.28
Zinc	1.44
Electro mechanics	0.96
Others	0.66
Total	**100.0**

2.7 Manufacture

Products are manufactured and assembled in the United States and are supported by tier-1 supplier in Mexico. The components come from processes such as stamped steel, zinc and steel casting.

2.8 Environment and health during manufacturing

ASSA ABLOY is committed to integrating our sustainability efforts across the organization. Our priorities are to: reduce resource and energy consumption; reduce carbon emissions; improve water and waste management; improve health and safety performance in operations; improve sustainability performance within our supply chain and enhance the sustainability performance in ASSA ABLOY's supply of door opening solutions. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and environment management systems are evaluated.

Our Code of Conduct covers business ethics, workers' rights, human rights, environment and health & safety, consumer interests and community outreach. It provides the framework for ASSA ABLOY's daily operations.

• The Berlin facility complies the requirements of the Code of Federal Requirements (CFR) 29 part 1910 General Industry and are under the oversight of the United States Department of Labor and the Occupational Safety and Health Administration.
• The Berlin facility is currently certified to ISO 9001-2008. Upgrading to 9001-2014 in 2015. Lab Certification audit to ISO 17025 in Dec 2014. Working towards ISO 14000 with current goal of 1st qtr 2015.
• Any waste metals (chips) during machining are separated and recycled.
• Waste cleaners and rinses are processed internally in our Waste Water Treatment facility.
• Waste solids are packaged and shipped offsite for treatment by a CT DEEP approved waste handler.

2.9 Product processing / Installation

Corbin Russwin locks are distributed through, and installed by trained technicians, such as locksmiths or security technicians. Preparation of doors and frames are conducted at the door manufacturer's production site.

2.10 Packaging

All packaging is fully recyclable. The packaging material is composed by cardboard (app. 70%) and plastic foil (app. 30%).

Material	Value (%)
Cardboard/paper	93.22
Plastics	6.78
Total	**100.0**

2.11 Condition of use

Locks require no maintenance.

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.

2.13 Reference service life

The reference service life of 30 years is based on a typical installation of a Corbin Russwin lock as a security lock operated when the facilities are to be closed or opened. If operations per day exceeds that typical wear the locks are exposed to the life time is limited to 1,000,000 cycles in accordance with ANSI/BHMA A156.13
Influences on ageing when applied in accordance with the rules of technology.

2.14 Extraordinary effects

Fire

Suitable for use in fire and smoke doors (listed by Underwriters Laboratories).

Water

Contain 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.

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. The lock can either be sent back to Corbin Russwin for recycling or to a professional recycling service provider. The majority, by weight, of components are aluminum, brass, steel, stainless steel and zinc, which can be recycled. The plastic components can be used for energy recovery in an incineration process.

2.16 Disposal
The product can be mechanically dissembled to separate the different materials. 99.42% of the materials used are recyclable. The rest is disposed as a construction waste for landfill.

2.17 Further information
Corbin Russwin
225 Episcopal Rd
Berlin, CT 06037 USA
Tel 800-543-3568
www.corbinrusswin.com

3. LCA: Calculation rules

3.1 Declared Unit
The declaration refers to the functional unit of 1 piece of Corbin Russwin ML20900 ECL Electromechanical Lock as specified in Part B requirements on the EPD for Doors, windows, shutters, and related products/IBU PCR Part B/.

Declared unit

Name	Value	Unit
Declared unit	1	piece of motor lock
Conversion factor to 1 kg	0.371	-
Mass of product (without packaging)	2.693	kg

3.2 System boundary
Type of the EPD: cradle to gate - with options.
The following life cycle phases were considered for Motor Lock:

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

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

The use stage:
- B2 - Maintenance (cleaning of the locks)

Use stage related to the operation of the building includes:
- B6 – Operational energy use (energy consumption for lock operation)

End-of-life stage:
- C2 – Transport to waste processing,
- C3 – Waste processing for recycling and
- C4 – Disposal (landfill).

These information modules include provision and transport of all materials, products, as well as energy and water provisions, 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 lock is used in the America, thus an US 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 WIP is adapted according to the material composition and heating value of the combusted material. Following specific life cycle inventories for the WIP are considered:

- Waste incineration of plastic
- Waste incineration of paper
- Waste incineration of electronic scrap

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

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Paper packaging)	0.31	kg
Output substances following waste treatment on site (Paper packaging)	0.023	kg

Maintenance (B2)

Name	Value	Unit
Water for cleaning	1.0	kg/a
Other resources detergents	0.1	kg/a

Reference service life

Name	Value	Unit
Reference service life	30	a

Operational energy use (B6) and Operational water use (B7)

Name	Value	Unit
Electricity consumption (during lifetime)	0.093	kWh

End of life (C1-C4)

Name	Value	Unit
Collected separately Aluminum, Brass, Copper, Plastic parts, Stainless Steel, Steel, Zinc, Electro mechanics	2.676	kg
Collected as mixed construction waste Construction waste for landfilling	0.018	kg
Recycling Aluminum, Brass, Copper, Stainless Steel, Steel, Zinc, Electro mechanics	2.663	kg
Reuse Plastic parts	0.013	kg
Landfilling Construction waste for landfilling	0.018	kg

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

Name	Value	Unit
Collected separately waste ASSA Motor lock 810 (including packaging)	3.026	kg
Recycling Aluminium	0.13	%
Recycling Brass	41.46	%
Recycling Copper	0.73	%
Reuse Plastic parts	0.42	%
Recycling StainlessSteel	9.47	%
Recycling Steel	34.07	%
Recycling Zinc	1.28	%
Recycling/Reuse Electronic (PWB)	0.86	%
Reuse Paper packaging (from A5)	10.25	%
Reuse Plastic packaging (from A5)	0.75	%
Loss Construction waste for landfilling (no recycling potential)	0.58	%

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 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	X	MND	MND	MND	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of Corbin Russwin ML20900 ECL Electromechanical Lock

Parameter	Parameter	Unit	A1 - A3	A4	A5	B2	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	1.94E+01	8.61E-02	5.15E-01	-2.06E+00	6.25E-02	7.18E-02	4.18E-03	3.77E-02	1.03E+00
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.95E-09	4.12E-13	2.24E-12	6.81E-11	2.16E-11	3.44E-13	2.86E-12	1.15E-13	1.17E-10
AP	Acidification potential of land and water	[kg SO_2-Eq.]	8.63E-02	3.94E-04	1.20E-04	4.83E-02	2.11E-04	3.28E-04	1.97E-05	1.18E-05	1.07E-03
EP	Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	6.28E-03	9.00E-05	1.89E-05	2.88E-02	1.13E-05	7.50E-05	1.11E-06	1.24E-06	2.81E-04
POCP	Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	5.87E-03	-1.27E-04	8.05E-06	9.53E-04	1.29E-05	-1.06E-04	1.17E-06	6.81E-07	2.29E-04
ADPE	Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	3.05E-03	3.25E-09	1.30E-08	1.00E-06	8.26E-09	2.70E-09	5.78E-10	3.38E-09	2.93E-03
ADPF	Abiotic depletion potential for fossil resources	[MJ]	2.48E+02	1.19E+00	1.55E-01	5.91E+01	7.21E-01	9.90E-01	4.75E-02	2.01E-02	1.41E+01

RESULTS OF THE LCA - RESOURCE USE: One piece of Corbin Russwin ML20900 ECL Electromechanical Lock

Parameter	Parameter	Unit	A1 - A3	A4	A5	B2	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	3.36E+01	-	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	3.36E+01	4.68E-02	1.38E-02	1.18E+02	7.06E-02	3.90E-02	1.36E-02	1.68E-03	3.12E+00
PENRE	Non renewable primary energy as energy carrier	[MJ]	2.85E+02	-	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	2.85E+02	1.19E+00	1.80E-01	6.26E+01	9.13E-01	9.93E-01	7.44E-02	2.24E-02	1.66E+01
SM	Use of secondary material	[kg]	4.32E+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
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	[m^3]	1.31E-01	3.30E-05	1.46E-03	6.30E-02	3.21E-04	2.75E-05	3.36E-05	9.13E-05	1.97E-02

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of Corbin Russwin ML20900 ECL Electromechanical Lock

Parameter	Parameter	Unit	A1 - A3	A4	A5	B2	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	1.20E-02	2.72E-06	1.24E-05	3.67E-03	7.11E-07	2.26E-06	1.03E-05	1.82E-06	2.66E-03
NHWD	Non hazardous waste disposed	[kg]	1.49E+00	1.50E-04	1.81E-02	4.37E-01	2.91E-04	1.25E-04	2.40E-05	2.09E-02	-7.15E-01
RWD	Radioactive waste disposed	[kg]	1.44E-02	1.56E-06	9.86E-06	1.40E-03	7.52E-05	1.30E-06	1.07E-05	9.05E-07	9.95E-04
CRU	Components for re-use	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	3.10E-01	0.00E+00	0.00E+00	0.00E+00	2.63E+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	-
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	7.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.54E-02	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	1.97E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-01	-

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 63% and 99% to the overall results for all the environmental impact assessment categories hereby considered, except for the eutrophication potential (EP), for which the contribution from the production phase accounts for app. 18%.

Within the production phase, the main contribution for all the impact categories is the production of steel, with app. 61%, mainly due to the energy consumption on this process. Steel and brass account in total with app. 84% 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.

Relatively high impact on EP (81%) during the maintenance phase (module B2) is a result of generated waste water during maintenance of the product. Eutrophication is the enrichment of nutrients in a certain place and it can be aquatic or terrestrial. Waste water contributes to eutrophication therefore, as expected, it is mainly related with the maintenance of the product (B2).

In the end-of-life phase, there are loads and benefits (module D, negative values) considered. For the components containing brass, the value of scrap input in the production process is higher than the value of scrap output from the recycling process. Therefore, there is an environmental burden instead of credit in the End-of-Life. The benefits and loads 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
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 Locks and fittings.
www.bau-umwelt.com

ANSI/A117.1
ANSI/A117.1: Accessible and Usable Buildings and Facilities

ANSI/BHMA A156.13
ANSI/BHMA A156.13: Mortise Locks

ASTM F1577-95b
ASTM F1577-95b: Detention Locks for Swinging Doors

ISO 14001
ISO 14001: Environmental management systems - Requirements with guidance for use
(ISO 14001:2004 + Cor. 1:2009)

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

EMC directive (2004/108/EC)
EMC directive (2004/108/EC): Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

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

Florida Building Code Approved (FL#14307)
Florida Building Code: 2010 Florida Building Code, Building contains substantial copyrighted material from the 2009 International Building Code which is a copyrighted work owned by the International Code Council, Inc
http://www2.iccsafe.org/states/florida_codes/

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

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

ICC IBC(2009)
ICC IBC (2009): International Building Code. A member of the international code family®. www.iccsafe.org

Miami Dade Code
© 2014 Miami-Dade County government.
http://www.miamidade.gov

UL and ULc Standards
ULC Standards develops and publishes standards and specifications for products having a bearing on fire, life safety and security, crime prevention, energy efficiency, environmental safety, security of assets and facilities, live working and workplace safety and other areas. ULC Standards is accredited by the Standards Council of Canada as a consensus based Standards Development Organization under the National Standards System of Canada.

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	X	MND	MND	MND	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of Corbin Russwin ML20900 ECL Electromechanical Lock

Parameter	Parameter	Unit	A1-3	A4	A5	B2	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	1.94E+01	8.61E-02	5.15E-01	-2.06E+00	6.25E-02	7.18E-02	4.18E-03	3.77E-02	1.03E+00
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	4.22E-09	4.38E-13	2.38E-12	7.23E-11	2.30E-11	3.65E-13	3.04E-12	1.23E-13	1.05E-10
AP	Acidification potential of land and water	[kg SO_2-Eq.]	8.44E-02	5.15E-04	1.44E-04	5.67E-02	1.97E-04	4.29E-04	1.87E-05	1.39E-05	9.74E-04
EP	Eutrophication potential	[kg N-eq.]	5.03E-03	3.64E-05	7.68E-06	4.48E-02	9.70E-06	3.03E-05	7.94E-07	6.20E-07	1.71E-04
Smog	Ground-level smog formation potential	[kg O_3-eq.]	9.92E-01	1.06E-02	3.01E-03	2.40E-01	1.68E-03	8.83E-03	1.69E-04	1.78E-04	-1.46E-03
Resources		[MJ]	2.32E+01	1.71E-01	1.78E-02	7.67E+00	4.25E-02	1.42E-01	3.38E-03	2.13E-03	1.99E+00

RESULTS OF THE LCA - RESOURCE USE: One piece of Corbin Russwin ML20900 ECL Electromechanical Lock

Parameter	Parameter	Unit	A1-3	A4	A5	B2	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	3.36E+01	-	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	3.36E+01	4.68E-02	1.38E-02	1.18E+02	7.06E-02	3.90E-02	1.36E-02	1.68E-03	3.12E+00
PENRE	Non renewable primary energy as energy carrier	[MJ]	2.85E+02	-	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	2.85E+02	1.19E+00	1.80E-01	6.26E+01	9.13E-01	9.93E-01	7.44E-02	2.24E-02	1.66E+01
SM	Use of secondary material	[kg]	4.32E+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
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	[m^3]	1.31E-01	3.30E-05	1.46E-03	6.30E-02	3.21E-04	2.75E-05	3.36E-05	9.13E-05	1.97E-02

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of Corbin Russwin ML20900 ECL Electromechanical Lock

Parameter	Parameter	Unit	A1-3	A4	A5	B2	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	1.20E-02	2.72E-06	1.24E-05	3.67E-03	7.11E-07	2.26E-06	1.03E-05	1.82E-06	2.66E-03
NHWD	Non hazardous waste disposed	[kg]	1.49E+00	1.50E-04	1.81E-02	4.37E-01	2.91E-04	1.25E-04	2.40E-05	2.09E-02	-7.15E-01
RWD	Radioactive waste disposed	[kg]	1.44E-02	1.56E-06	9.86E-06	1.40E-03	7.52E-05	1.30E-06	1.07E-05	9.05E-07	9.95E-04
CRU	Components for re-use	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	3.10E-01	0.00E+00	0.00E+00	0.00E+00	2.63E+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	-
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	7.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.54E-02	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	1.97E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-01	-

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
70771 Leinfelden-Echterdingen
Germany

Tel +49 711 34 18 17 22
Fax +49 711 34 18 17 25
Mail consulting@pe-international.com
Web **www.pe-international.com**

Owner of the Declaration
Corbin Russwin
225 Episcopal Rd
Berlin, CT 06037 USA

Tel 800-543-3568
Web www.corbinrusswin.com
www.assaabloydss.com