# **ENVIRONMENTAL PRODUCT DECLARATION**

as per ISO 14025 and EN 15804

Owner of the Declaration ASSA ABLOY AB

Programme holder Institut Bauen und Umwelt e.V. (IBU

Publisher Institut Bauen und Umwelt e.V. (IBU

Declaration number EPD-ASA-20160106-IBA1-EI

Issue date 24.05.2016 Valid to 23.05.2021

# Access Control Systems – CLIQ Local Programming Device ASSA ABLOY AB



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# 1. General Information

#### **ASSA ABLOY AB**

#### Programme holder

IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1

10178 Berlin

Germany

#### **Declaration number**

EPD-ASA-20160106-IBA1-EN

# This Declaration is based on the Product Category Rules (PCR):

Electronic Access Control Systems, 11-2013 (PCR tested and approved by the independent expert committee (SVR))

Issue date

24.05.2016

Valid to

23.05.2021

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

Dr.-ixtg Burkmart Lehman (Managing Director IBU)

#### **CLIQ Local PD**

#### Owner of the Declaration

ASSA ABLOY AB

Förmansvägen 11

117 43 Stockholm

Sweden

#### **Declared product / Declared unit**

This Declaration represents one ASSA ABLOY CLIQ Local Programming Device (PD), including all custom configurations.

#### Scope:

The Life Cycle Assessment is based on data collected from the Flextronic production facility in Linköping, Sweden.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

#### Verification

The CEN Standard EN 15804 serves as the core PCR Independent verification of the declaration and data

Independent verification of the declaration and data according to ISO 14025

internall

x externally



Dr. Wolfram Trinius
(Independent tester appointed by SVR)

# 2. Product

#### 2.1 Product description

The CLIQ Local PD, also known as the CLIQ Desktop PD, produced by ASSA ABLOY, is a programming device communicating via USB to a computer or mobile device. The CLIQ system allows administrators the ability to manage CLIQ keys and cylinders. CLIQ keys can be updated and/or reauthorized with timely expirations for enhanced security, while retrieving audit data simultaneously locally with this Local PD. The CLIQ Local PD is also used when logging in to the CLIQ administration program.

The programming device can be configured to support several different CLIQ key types.

#### 2.2 Application

The CLIQ Local PD is suitable for indoor use only standing on a table. Common applications include: Commercial buildings, Industrial buildings, Government buildings, Education establishments, Healthcare buildings.

#### 2.3 Technical Data

The table presents the technical properties of CLIQ Local PD:

#### **Technical data**

Tooliiiioai aata		
Name	Value	Unit
Mounting	Indoor table mounting	-
Power supply	USB 5V standard method of supplying	VDC
Operating Temperature	-40 – 80	°C
Operating Humidity	10 – 95	% (non- condensing)
Power consumption	0.15	W

### 2.4 Placing on the market / Application rules

The following directives apply:

- EMC Directive 2004/108/EC
- LVD Directive 2006/95EC
- ROHS Directive 2011/65/EU

Conformity is established through tests performed against a set of standards at a certified body testing laboratory:

- EN 61000-6-2:2005 Information technology equipment - EMC
- EN 61000-6-3:2007/A1:2011 Information technology equipment - EMC



- IEC 60950-1:2005+A1 Information technology equipment - Safety
- EN60950-1: 2006 + A11 + A1 + A12 Information technology equipment – Safety.

# RoHS Conformity:

EN50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

#### 2.5 Delivery status

Each programming device is delivered with the USB-cable individually packaged. Package dimensions: 13.5cm x 12.4cm x 7.3cm.

#### 2.6 Base materials / Ancillary materials

The average composition of CLIQ Local PD is as following:

Component	Percentage in mass (%)
Plastics	22.84
Stainless steel	15.10
Electronics	4.42
Brass	17.68
Steel	2.03
Electro-mechanics	37.93
Total	100.0

#### 2.7 Manufacture

The CLIQ Local PD is assembled at the production facility at Flextronics International Sweden AB, Linköping, Sweden. The injection moulded parts are purchased from Plastep Oy, Finland. The electronic components, including PCB, are purchased externally and assembled at Flextronics. The assembled programming device is then packaged with the USB-cable for shipment.

# 2.8 Environment and health during manufacturing

The Management System of Flextronics International has assessed and certified as meeting the requirements of /ISO 14001:2004/.

### 2.9 Product processing / Installation

CLIQ programming devices can be installed by fastening it with screws on a table/desk.

#### 2.10 Packaging

The programming device is packed in a cardboard box to avoid damage. Packaging materials shall be collected separately for recycling.

Material	Value (%)
Cardboard/ Paper	100.0
Total	100.0

Packaging components incurred during installation are directed to energy recovery circuits.

EWC/ 15 01 01 Paper and cardboard packaging.

#### 2.11 Condition of use

No auxiliary or consumable materials are incurred for maintenance and usage of the programming device. Cleaning is not required.

#### 2.12 Environment and health during use

There are no interactions between products, the environment and health.

#### 2.13 Reference service life

The service life of the CLIQ Local PD is estimated to be 10 years. This number is based on the most conservative Mean Time Between Failure (MTBF) data available for the programming device components at elevated operation temperatures.

# 2.14 Extraordinary effects Fire

The external housing of the CLIQ Local PD, is constructed from polycarbonate resin thermoplastic. The housing material, and thus the programming device as a whole unit, has been classified as having a UL94 V0 Flame Rating. A UL94 Flame Rating of V0 specifies; burning stops within 10 seconds on a vertical specimen; drips of particles allowed as long as they are not inflamed.

#### Water

No substances are used which have a negative impact on ecological water quality on contact by the device with water.

#### **Mechanical destruction**

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

#### 2.15 Re-use stage

The following possibilities arise with reference to the material composition of the programming device.

#### Re-use

During the reference service life, the programming device can be disconnected and dismounted, then remounted and attached elsewhere.

### Material Recycling

EU Recycling:

ASSA ABLOY distributors act as the importer of the equipment into their member state. Thus, the distributor has the legal responsibility to:

- Register as the WEEE producer in their member state.
- Finance arrangements for collection and recycling of WEEE arising from ASSA ABLOY products that the distributor sells in their member state.

For specific recycling information, your local distributor should be contacted.

For all other regions, ASSA ABLOY distributors act as the importer of the equipment and provides arrangements for the collection, treatment, recycling and recovery of the programming device.

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

EWC/ 16 02 13\* discarded equipment containing hazardous components other than those mentioned in 16 02 09 to 16 02 12



- EWC/ 16 02 14 Discarded equipment other than those mentioned in 16 02 09 to 16 02 13.
- EWC/ 16 02 16 Components removed from discarded equipment other than those mentioned in 16 02 15
- EWC/ 17 02 03 plastic
- EWC/ 17 04 05 iron and steel
- EWC/ 17 04 11 Cables with the exception of those outlined in 17 04 10
- Disposal of the product is subject to the WEEE Directive within Europe, Directive 2012/19/EU.

#### 2.16 Disposal

No disposal is foreseen for the product nor for the corresponding packaging.

#### 2.17 Further information

More information on ASSA ABLOY CLIQ Local PD is available at:

ASSA ABLOY AB Förmansvägen 11 SE-117 43 Stockholm Sweden

Tel: +46-8-506 485 00 Internet: www.assaabloy.com

## 3. LCA: Calculation rules

#### 3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of CLIQ Local Programming Device as specified in Part B requirements on the EPD for Electronic Access Control Systems /IBU PCR Part B/.

#### **Declared unit**

Name	Value	Unit
Declared unit	1	piece of CLIQ Local PD
Mass (without packaging)	0.272	kg
Conversion factor to 1 kg	3.68	-

#### 3.2 System boundary

Type of the EPD: cradle to gate - with options The following life cycle stages were considered for programming device:

A1-A3 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 device includes:

 B6 – Operational energy use (Energy consumption for device 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

EoL:

In the End-of-Life stage, 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 modelling of the considered products, the GaBi ts Software System for Life Cycle Engineering, developed by thinkstep AG, is used /GaBi ts 2016/. 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/.

thinkstep AG 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 ts 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 2015 (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. Following specific life cycle inventories for the WIP are considered:

- Waste incineration of plastic
- Waste incineration of paper
- Waste incineration of electronic scraps (PWB).

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

electronic, electro mechanics

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

# 4. LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared (MND).

Transport to the building site (A4)

Name	Value	Unit								
Truck transport										
Litres of fuel diesel with maximum load (27 t payload)	39.40	l/100 km								
Transport distance truck	500	km								
Capacity utilization (incl. empty runs) of truck	85	%								
Air transpo	rt									
Payload	113	t								
Transport distance ship	1500	km								
Capacity utilization	66	%								

#### Installation into the building (A5)

For the life cycle module A5 only packaging waste processing was considered:

Name	Value	Unit
Output substances following waste treatment on site Packaging (paper)	0.05	kg

#### Reference service life

Name	Value	Unit
Reference service life	10	а

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	2.4	kWh
Days per year in use	200	d
Hours per day in on modes	8	h
Power consumption in on mode in W	0.15	W

End of life (C2-C4)

Name	Value	Unit
Collected separately steel, brass, zinc, electronic, electro mechanics, plastic parts	0.27	kg
Collected as mixed construction waste construction waste for landfilling	0.00	kg
Reuse plastic	0.06	kg
Recycling steel, brass, zinc,	0.21	kg

# Landfilling construction waste for landfill 0.00 kg

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

Name	Value	Unit
Collected separately waste type (incl. packaging)	0.32	kg
Recycling Steel	1.70	%
Recycling Stainless Steel	12.67	%
Recycling Brass	14.84	%
Recycling Electronic	3.71	%
Recycling Electro-mechanics	31.84	%
Reuse Plastic parts	19.17	%
Reuse packaging (paper) (from Module A5)	16.07	%



# 5. LCA: Results

Results shown below were calculated using CML 2000 – Apr. 2013 Methodology.

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PERI PERI PENE PENE PENE SM RSF NRS FW RESU Parame	E MM	Renewa resources Total use envon-renew Mon-renew ma Total us primary Use of Use of non	ole prima anergy ca able prim as mate of renew ergy resc able prim anergy ca able prim anergy ca able prin	ry energarrier lary ene erial utilizable pri ources mary ene erial utilizable pri ources mary ene erial utilizable pri ources mary ene erization -renewa resource resource econdar ble secondar ble secondar sh wate	gy as rgy zation imary ergy as ergy as able es rial ry fuels ondary r	Unit  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]  [Kg]  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0	A 000 000 1.050 001 000 000 000 000 000 0.000 0000 0.000 0000 0.000 000 0.0000 000 0.000 000 0.000 000 0.000 000 0.000 000 0.000 000 0.000 000 0.000 000 0.000	E-02 :: =+00 :: =+00 :: =+00 :: =+00 :: =-05 :: =-05 ::	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 2.14E-04 ATEG A5	3.71E	6 4 E+01 1. E+00 0. E+00 0. E+00 2. E-03 2.		- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-08 of CLI	2 7.70 0 0.00 0 0.00 0 0.00 0 3.98	E-02 E+00 E+00 E+00 E-04	-3.12E-01 -3.797E+00 0.00E+00 0.00E+00 -3.98E-03
PERI PERI PENI PENI PENI PENI SM RSF NRS FW RESU Parama	E MM	Renewaresources Total use endon-renew ma Total us primary Use of Use of rene Use of TH	ole prima nergy ca able prim as mate of renew ergy ress able prin as mate of renew ergy ress able prin energy ca able prin energy ca able prin energy ca able prin eriqu util erial util er of non y energy seconda ewable s erenewa fuels of net fre  Parame ous wast	ry energarrier lary ene lization lary e	gy as rgy zation imary ergy as ergy as able ees rial ry fuels pndary r	Unit  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]  [Kg]  [MJ]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0.00E+( 0.00E+( 0.00E+( 0.01E-( VS AN A1-3 2.36E-(	A 000 000 1.055 01 000 01 3.67E 01 0.00E 00 0.00E 00 0.00E 00 DWAS A 03 7.32E	E+00 (E+00 (CE+00 (CE+00) (CE+00 (CE+00 (CE+00 (CE+00 (CE+00 (CE+00 (CE+00 (CE+00 (CE+00) (CE+00 (CE+00 (CE+00 (CE+00 (CE+00) (CE+00) (CE+00 (CE+00) (CE+	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 A5 1.66E-06	3.71E 2.03E 0.00E 0.00E 9.15E  CRIES BI 2.81E	E+00 4. E+00 0. E+00 0. E+00 0. E+00 0. E+00 2. E-03 2 S: One		- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 0.00E+00 1.56E-05 of CLI C3	2 7.70 0 0.00 0 0.00 0 0.00 0 3.98 Q Log	E-03 E-02 E+00 E+00 E+00 E-04 E-04 E-04	-7.08E-05
PERI PERI PENR PENR PENR PENR PENR SM RSF NRS FW RESU Parame HWE NHW	E MM	Renewaresources Total use endon-renew endon-renew ma Total us primary Use of Use of non Use of Hazardo	ole prima anergy ca able prim as mate of renew ergy resc able prin and prim able prin	ry energarrier lary ene lary e	gy as rgy zation imary ergy as ergy as able ees rial ry fuels ondary r	Unit  [MJ]  [MJ]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0.00E+( 2.01E-( VS AN A1-3 2.36E-( 1.61E-(	A  000  000 1.050  01  01 0.000  02 3.070  D WAS  A  03 7.32	E-02 :: =+00 :: =+00 :: =+00 :: =-05 :: E-06 :: E-05 ::	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 0.00E+00 1.4E-04 A5 1.66E-06 1.85E-03	3.71E	6	.18E-04 .06E-02 .00E+00 .00E+00 .95E-07 .01E-02 .43E-08 .34E-06	- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-05 of CLI C3 4.80E-06 1.12E-05	3 5.26 2 7.70 0 0.00 0 0.00 0 0.00 5 3.98 Q Log 6 5.77 5 1.73		-3.12E-01 -3.12E-01 -7.97E+00 0.00E+00 0.00E+00 -3.98E-03  D -7.08E-05 1.46E-02
PERI PERI PENE PENE PENE PENE SM RSF NRS FW RESU Parame HWE NHW RWE	E MM	Renewaresources Total use environmente envir	ole prima anergy ca able prim as mate of renew ergy resc able prim as mate of renew ergy resc able prin anergy ca able prin able prin terial util e of non y energy seconda ewable s arenewa fuels of net fre  Parame  Dus wast rdous wast rdous wast exterious rescaled to the rescaled to th	ry energarrier lary ene erial utilizable pri ources mary ene erial utilizable pri ources mary ene erial utilization resource resource econdar ble secondar ble secondar electric edisposaste disposaste disposaste disposarte electric resource electric resource econdar ble secondar	gy as rgy zation imary ergy as ergy as able es rial ry fuels ondary r	Unit  [MJ]  [Kg]  [Kg]  [kg]  [kg]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 1.11E-( 0.00E+( 2.01E-( VS AN A1-3 2.36E-( 1.61E-( 2.17E-(	A  00	E+00 : E+00 (E+00 (E+0)(E+00(E+0)(E+0)(E+0)(E+0)(E+0)(E+0(E+0)(E+0)	A5 - 1.92E-03 - 2.42E-02 0.00E+00 0.00E+00 2.14E-04 ATEG A5 1.66E-06 1.85E-03 1.41E-06	3.71E	6 4 E+00 4 E+00 0. E+00 0. E+00 0. E+00 2. E-03 2. E-03 1. E-03 1.		- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-05 of CLI C3 4.80E-06 1.12E-05 4.99E-06	2 7.70 0 0.00 0 0.00		-3.12E-01 -3.12E-01 -7.97E+00 0.00E+00 0.00E+00 -3.98E-03  D -7.08E-05 1.46E-02 -1.80E-04
PERI PERI PENR PENR PENR PENR PENR SM RSF NRS FW RESU Parame HWE NHW	E MM	Renewaresources Total use environment envi	ole prima anergy ca able prim as mate of renew ergy resc able prin and prim able prin	ry energarrier lary ene erial utilization de la value priorier en la value priorier en la value priorier en la value en la val	gy as rgy zation imary ergy as ergy as able ees rial ry fuels ondary r ITPU seed oosed seed	Unit  [MJ]  [MJ]  [MJ]  [MJ]  [MJ]  [Kg]  [MJ]  [MJ]  [Kg]  [Kg]  [kg]  [kg]  [kg]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0.00E+( 2.01E-( VS AN A1-3 2.36E-( 1.61E-(	A	E-02  E+00  E+00  E-05  E-06  E-06  E-06  E-06	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 0.00E+00 1.4E-04 A5 1.66E-06 1.85E-03	3.71E 2.03E 0.00E 0.00E 9.15E - 2.81E 6.55E 2.92E 0.00E	6	.18E-04 .06E-02 .00E+00 .00E+00 .95E-07 .01E-02 .43E-08 .34E-06	- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-05 of CLI C3 4.80E-06 1.12E-05	2 7.70 0 0.00 0 0.00 0 0.00 5 3.98 1.73 6 5.77 5 1.73 6 3.16	E-03 E-02 E+00 E+00 E-04 E-04 E-06 E-02 E-06 E-02 E-06 E-00	-3.12E-01 -3.12E-01 -7.97E+00 0.00E+00 0.00E+00 -3.98E-03  D -7.08E-05 1.46E-02
PERI PERI PENE PENE PENE SM RSF NRS FW RESU Parame HWE NHW RWE CRU	E	Renewaresources Total use environment envi	ole prima nergy ca able prim as mate of renew ergy ress able prim as mate of renew ergy ress able prin nergy ca able prin terial util terial util te of non y energy seconda ewable se renewa fuels of net fre Parame  Dus wast rdous wast tive was soonents f rials for r	ry energarrier pary ene prial utiliz prier pary ene prization presourc pry mater presourc presour	gy as rgy zation imary ergy as ergy as able ees rial ry fuels bondary r TTPUT sed bosed sed ee	Unit  [MJ]  [Kg]  [Kg]  [kg]  [kg]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0.00E+( 0.00E+( 2.01E-( VS AN A1-3 2.36E-( 1.61E-( 2.17E-( 0.00E+( 0.00E+	A	E-02 :: E+00 :	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 0.00E+00 1.66E-06 1.85E-03 1.41E-06 0.00E+00	3.71E - 3.71E - 2.03E 0.00E 0.00E 9.15E  B( 2.81E 6.55E 2.92E 0.00E 0.00E	E+00 4.  E+00 0.  E+00 0.  E+00 0.  E+00 1.  E+00 1.  E+00 1.  E+00 0.  E+00 0.  E+00 1.  E+00 0.  E+00 0.  E+00 0.  E+00 0.		- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-05 of CLI C3 4.80E-06 1.12E-05 4.99E-06 0.00E+00	2 7.70 0 0.00 0 0.00 0 0.00 5 3.98 Q Log 6 5.77 5 1.73 6 3.16 0 0.00 2 0.00	E-03 E-02 E+00 E+00 E-04 E-04 E-06 E-06 E-06 E-00 E+00 E+00	-3.12E-01 -7.97E+00 0.00E+00 0.00E+00 -3.98E-03 -7.08E-05 1.46E-02 -1.80E-04 0.00E+00
PERI PERI PENE PENE PENE PENE SM RSF NRS FW RESU Parame HWE NHW RWE CRU	E MM	Renewaresources Total use endon-renew endon-renew ma Total us primary Use of Use of non Use of Hazardo Non-hazar Radioac Comp	ole prima nergy ca able prim as mate of renew ergy ress able prim as mate of renew ergy ress able prin nergy ca able prin terial util terial util te of non y energy seconda ewable se renewa fuels of net fre Parame  Dus wast rdous wast tive was soonents f rials for r	ry energarrier lary ene erial utilization de la control de	gy as rgy zation imary ergy as ergy as able es rial ry fuels ondary r  TTPUT sed oosed sed e g very	Unit	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0	A   A   C   C   C   C   C   C   C   C	E-02 E+00 (E+00 (E+0)(E+00 (E+00 (E+0)(E+0)(E+0)(E+0)(E+0)(E+0)(E+0)(E+0)	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 0.00E+00 1.66E-06 1.85E-03 1.41E-06 0.00E+00 0.00E+00	3.71E	6		- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-05 of CLI C3 4.80E-06 1.12E-05 4.99E-06 0.00E+00 9.45E-02	2 7.70 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00 0 0.00	E-03 E-02 E+00 E+00 E-04 E-04 E-06 E-06 E-06 E-00 E+00 E+00	-3.12E-01 -7.97E+00 0.00E+00 0.00E+00 -3.98E-03  D -7.08E-05 1.46E-02 -1.80E-04 0.00E+00 0.00E+00
PERI PERI PENR PENR PENR PENR SM RSF NRS FW RESU Parame HWE NHW RWE CRU MFR	E MM	Renewaresources Total use environment envi	ole prima anergy ca able prim as mate of renew ergy resc able prim as mate of renew ergy resc able prim anergy ca able prin terial util se of non of energy seconda ewable se arrenewa fuels of net fre  Parame  Dus wast rdous was titive was ponents f rials for energy	ry energarrier lary ene	gy as rgy zation imary ergy as ergy as ergy as able es rial ry fuels ondary r  TPU  sed oosed sed e g very rgy	Unit  [MJ]  [Kg]  [kg]  [kg]  [kg]  [kg]  [kg]  [kg]	A1-3 4.27E+( 0.00E+( 4.27E+( 5.50E+( 0.00E+( 5.50E+( 0.00E+( 0	A   A   C   C   C   C   C   C   C   C	E-02 E+00 (E+00 (E+0)(E+00 (E+00 (E+0)(E+0)(E+0)(E+0)(E+0)(E+0)(E+0)(E+0)	A5 1.92E-03 2.42E-02 0.00E+00 0.00E+00 0.00E+00 1.66E-06 1.85E-03 1.41E-06 0.00E+00 0.00E+00	3.71E	6		- 6.33E-03 - 3.46E-02 0.00E+00 0.00E+00 1.56E-05 0f CLI C3 4.80E-06 1.12E-05 4.99E-06 0.00E+00 9.45E-02	2 7.70 0 0.00 0 0.00	E-02 E+00 E+00 E-04 E-06 E-02 E-06 E-06 E+00 E+00 E+00	-3.12E-01 -3.12E-01 -7.97E+00 0.00E+00 0.00E+00 -3.98E-03  D -7.08E-05 1.46E-02 -1.80E-04 0.00E+00 0.00E+00



### 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 69% and 100% to the overall results for all the environmental impact assessment categories hereby considered, except for the Ozone Depletion Potential (42%).

Within the production stage, the main contribution for all the impact categories is the production of electronics with approx. 88%, mainly due to the energy consumption on this process. Electronics account with approx. 42% to the overall mass 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 13% and 58%, with the exception of ADPE (0.03%).

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

#### **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

#### **PCR Part A**

Institut Bauen und Umwelt e.V., Berlin(pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. April 2013 www.bau-umwelt.de

#### **IBU PCR Part B**

IBU PCR Part B: PCR Guidance-Texts for Building-Related Products and Services. From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU). Part B: Requirements on the EPD for Electronic Access Control Systems. November 2013

www.bau-umwelt.com

#### EN 15804

EN 15804:2012-04: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

#### **GaBi ts 2016**

GaBi ts 2016: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, thinkstep AG, Leinfelden-Echterdingen, 1992-2013.

#### GaBi 6 2013D

GaBi 6 2013D: Documentation of GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, thinkstep AG, Leinfelden-Echterdingen, 1992-2013. <a href="http://documentation.gabi-software.com/">http://documentation.gabi-software.com/</a>

#### ISO 14025

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

#### EMC Directive 2004/108/EC

Electro Magnetic Compatibility Directive

#### LVD Directive 2006/95/EC

Low Voltage Directive

#### RoHS Directive 2011/65/EU

Restriction of the use of certain hazardous substances Directive

#### EN 61000-6-2:2005

Information technology equipment - EMC standards

#### EN 61000-6-3:2007/A1:2011

Information technology equipment - EMC standards

## IEC 60950-1:2005+A1

Information technology equipment - Safety -- Part 1: General requirements, Amendment 1 (International)

#### EN 60950-1: 2006 + A11 + A1 + A12

Information technology equipment - Safety (CENELEC countries)

#### **UL94 V**0

Standard for Safety of Flammability of Plastic Materials

#### **EWC**

European Waste Catalog

#### ISO 14001:2004

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

#### **WEEE**

Waste Electrical and Electronic Equipment Directive (WEEE Directive), 2012/19/EU



# 9. Annex

Results shown below were calculated using TRACI Methodology.

DESC	RIP	TION O	F THE	SYST	ЕМ В	OUND	ARY	(X =	INCLUD	ED IN	LCA	MND	= MOD	ULE NO	OT DE	CLA	RED)		
PRODUCT STAGE CONSTRUCTI ON PROCESS STAGE						EM BOUNDARY (X = INCLUDED IN LCA; N  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 <sup>1)</sup>	Refurbishment <sup>1)</sup>	Operational energy use	Operational water	De-construction	Transport	Waste processing	Disposal	Reuse-	Recovery- Recycling- potential		
<b>A1</b>	A2	А3	A4	A5	B1	B2	В3	В4	B5	В6	В7	C1	C2	C3	C4		D		
Х	Χ	Χ	Χ	Χ	MND	MND	MND	MN	D MND	Х	MNE	MNE	X	Х	Χ		X		
RESU	LTS	OF TH	IE LCA	\ - EN\	VIRON	IMENT	AL II	MPAC	CT: One	piece	of CI	_IQ Lo	cal PD						
Parame	eter		Parame	ter		Unit		A1-3	3 A4	A	.5	В6	C2	С3	C	4	D		
GWF	)		l warming			[kg CO <sub>2</sub> -	Eq.]	3.66E+	-00 2.63E-	01 7.36	E-02	1.14E+00	7.69E-04	1.95E-0	03 1.59	E-01	-6.96E-01		
ODF		stratos	tion poter spheric o	zone laye	er l	kg CFC1	1-Eq.]	6.10E-	·10 2.02E-	13 3.58	E-13	8.30E-10	3.92E-15	1.42E-	12 5.08	E-13	-6.83E-11		
AP	4	Acidification	on potent water		d and	[kg SO <sub>2</sub> -	Eq.]	2.39E-	·02 1.02E-	03 2.03	E-05	5.09E-03	4.60E-06	8.69E-0	06 4.89	E-05	-6.30E-03		
EP		Eutro	ıl	[kg N-e	q.]	1.58E-	03 5.60E-	05 1.17	E-06	2.17E-04	3.25E-07	7 3.70E-0	07 1.63	E-06	-1.79E-04				
Smo	g G	round-leve	el smog fo	rmation p	otential	[kg O <sub>3</sub> -	eq.]	3.01E-	·01 2.95E-	02 4.75	E-04	4.61E-02	9.47E-05	7.87E-0	05 4.46	E-04	-7.33E-02		
Resour	ces	Resourc	es – reso	ources fo	ssil	[MJ]		4.52E+	-00 5.26E-	01 2.42	E-03	9.22E-01	1.53E-03	3 1.57E-0	03 7.09	E-03	-3.81E-01		
RESU	LTS	OF TH	IE LCA	\ - RES	SOUR	CE US	E: O	ne pi	ece of C	LIQ Lo	ocal I	PD							
Param	neter		Parar	neter		Unit	Α	1-3	A4	A5		В6	C2	C3	C	1	D		
PEF	RE	Renew	able prir energy		ergy as	[MJ]	4.27	'E+00	-	-		-		i	-		-		
PER	RM		wable pi es as ma			[MJ]	0.00	E+00	-	-		-	-				-		
PEF	RT	Total us	se of ren	ewable	primary	[MJ]	4.27	'E+00	1.05E-02	1.92E-0	3.7	1E+00 4.18E-04		18E-04 6.33E-03		-03	-3.12E-01		
PEN	RE	Non-rene		rimary e		s [MJ]	5.50	E+01	-	-		-	-				-		
PEN	RM	Non-rene	ewable p	rimary e		s [MJ]	0.00	E+00	-	-		-	-				-		
PEN	RT	Total	naterial use of n	on-rene	wable	[MJ]	5.50	E+01	3.67E+00	2.42E-0	2E-02 2.03E+0		1.06E-02	3.46E-02	2 8E-	02	-7.97E+00		
SN	Л		ary energon			[kg]	1.11	IE-01	0.00E+00	0.00E+0	0.0	0E+00	0.00E+00	0.00E+0	0 0.00E	+00	0.00E+00		
RS	F	Use of re	enewable	second	lary fuel	s [MJ]	0.00	E+00	0.00E+00	0.00E+0	0.0	0E+00	0.00E+00	0.00E+0	0 0.00E	+00	0.00E+00		
NRS	SF	Use of n	on-renev		econdar	/ [MJ]	0.00	E+00	0.00E+00	0.00E+0	0.0	0E+00	0.00E+00	0.00E+0	0.00E	+00	0.00E+00		
FV	V	Us	e of net		iter	[m³]	2.01	IE-02	3.07E-05	2.14E-0	9.1	5E-03	2.95E-07	1.56E-0	5 3.98E	-04	-3.98E-03		
RESU	LTS	OF TH	IE LCA	\	TPUT	FLOW	'S AN	ND W	ASTE C	ATEG	ORIE	S: On	e piece	of CLIC	Q Loca	al Pl	D		
Param			Paran			Unit		1-3	A4	A5		В6	C2	C3	C		D		
HW	D	Hazar	dous wa	ste disp	osed	[kg]	2.36	6E-03	7.32E-06	1.66E-0	06 2.8	31E-03	2.43E-08	4.80E-06	6 5.77E	-06	-7.08E-05		
NHW	/D	Non-haz	zardous v	waste di	sposed	[kg]	1.61	IE-01	2.77E-05	1.85E-0	3 6.5	5E-03	1.34E-06	1.12E-0	5 1.73E	-02	1.46E-02		
RW	D	Radioa	active wa	aste disp	osed	[kg]	2.17	7E-03	3.45E-06	1.41E-0	06 2.9	2E-03	1.39E-08	4.99E-06	3.16E	-06	-1.80E-04		
CRI	J	Con	nponents	for re-u	ıse	[kg]	0.00	E+00	0.00E+00	0.00E+0	0.0	0E+00	0.00E+00	0.00E+0	0.00E	+00	=		
MFI	٦	Mat	terials fo	r recyclii	ng	[kg]	0.00	E+00	0.00E+00	5.20E-0	0.0	0E+00	0.00E+00	9.45E-02	2 0.00E	+00	-		
MEI	R	Materia	als for en	ergy rec	covery	[kg]	0.00	E+00	0.00E+00	0.00E+0	0.0	0E+00	0.00E+00	0.00E+0	0.00E	+00	-		
	-		als for en			[kg]	-				-						-		

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