ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	ASSA ABLOY Sicherheitstechnik GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ASA-20150279-IAB1-EN
Issue date	29.09.2015
Valid to	28.09.2021

Access control systems – Aperio E100 Escutcheon

ASSA ABLOY

Institut Bauen und Umwelt e.V.

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

ASSA ABLOY

1. General Information

ASSA ABLOY Sicherheitstechnik GmbH

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

Declaration number
EPD-ASA-20150279-IAB1-EN

This Declaration is based on the Product Category Rules:
Electronic Access Control Systems, 11-2013
(PCR tested and approved by the independent expert committee)

Issue date
29.09.2015

Valid to
28.09.2021

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

Dr.-Ing. Burkhart Lehmann
(Managing Director IBU)

Aperio E100 Escutcheon

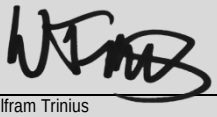
Owner of the Declaration
ASSA ABLOY Sicherheitstechnik GmbH
Bildstockstrasse 20
72458 Albstadt
Germany

Declared product / Declared unit
This Declaration represents one unit of a door device - escutcheon Aperio E100 including RFID reader and UHF transceiver.

Scope:
This declaration and its LCA study are relevant to the Aperio E100 including RFID reader and UHF transceiver. The primary manufacturing processes and the secondary manufacturing processes and assembly occur at our manufacturing factory in Albstadt, Germany. 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 according to ISO 14025
☐ internally ☒ externally



Dr Wolfram Trinius
(Independent verifier appointed by SVA)

2. Product

2.1 Product description

The Aperio E100 escutcheon, produced by ASSA ABLOY *Sicherheitstechnik*, is a door device (lock) that communicates with a personalized credential via RFID (Radio Frequency Identification) technology. The reader collects user's identity information from the RFID card (not considered in this declaration) and passes it along to a secured control unit via UHF (Ultra high frequency) to a corresponding communication hub (not considered in this declaration). The EAC (Electronic Access Control) system grants or denies access to the credential holder. The handle will engage and the lock will open. The reader is capable of communications using a high frequency RF signal and able to communicate with several credential formats.

2.2 Application

The Aperio E100 escutcheon is suitable for indoor and outdoor use, where ID authentication is required. Common applications include commercial buildings, industrial buildings, government buildings, education establishments, healthcare buildings.

2.3 Technical Data

The table presents the technical properties of Aperio E100 Escutcheon:

Technical data

Name	Value	Unit
Mounting	door escutcheon	-
Power supply	3VDC (CR123)	V
Current Requirements	<5uA	A
Operating Temperature	-25 to 55	°C
Operating Humidity	5% to 85%	%
RFID Frequency	13.56	MHz
Transceiver	2,4	GHz
Power consumption on mode	<10	mW
Power consumption stand-by mode	<0,1	mW

2.4 Placing on the market / Application rules

For the placing on the market in the EU/EFTA (with the exception of Switzerland) the following European Directives apply:

EMC Directive 2004/108/EG and
R&TTE Directive 1999/5/EG.

The products are subject to CE marking according to this harmonization legislation.

The following standards apply:

/EN 301489-1:2011/
/EN 55022:2010+AC 2011/
/EN 300330-1:2010/
/EN 50364:2010/
/EN 300340-2:2010/
/EN 301489-3:2013/
/EN 61000-6-2:2005 +AC: 2005/
/EN 300330-2:2010/
/EN 300440-1:2010/
/EN 62479:2010/.

Fort he application and use oft he products the respective national provisions apply.

2.5 Delivery status

The Aperio E100 is delivered as in a box size - 355 mm x 280 mm x 260 mm containing the installation instructions.

2.6 Base materials / Ancillary materials

The average composition for Aperio E100 is as following:

Component	Percentage in mass (%)
Aluminum	0.22
Plastics	9.00
Stainless Steel	73.79
Steel	10.77
Zinc	3.88
Electronic	0.83
Electro mechanics	0.96
Others	0.55
Total	**100.0**

2.7 Manufacture

The components come from different sub- suppliers:

1. Electronics and plastic-housing Populating PCB, electronic board assembling, programming and testing - ESCATEC/Malaysia.
2. Stainless steel mounting plates - punching and bending - China.
3. Handle - bending, polishing - China.
4. Clutch parts and square spindle parts from Assa Abloy manufactory at Albstadt.
5. Pre-assembling of different modules (Motor chassis, Spindle/clutch module, outside mounting plate with spring housing) from a local German service company.
6. Final assembly takes place at the Business Unit at Albstadt (order picking, laser engraving, PCB programming, assembling, final test and packaging).

The factory of Albstadt has a certification of Quality Management system according to
DIN EN ISO 9001:2008 standard.

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

EWC 12 01 01 Ferrous metal filings and turnings
EWC 12 01 03 Non-ferrous metal filings and turnings.

2.8 Environment and health during manufacturing

ASSA ABLOY is committed to producing and distributing door opening solutions with minimal environmental impact, where health & safety is the primary focus for all employees and associates.
• Environmental operations, Greenhouse Gas Emissions, energy, water, waste, VOC, surface treatment and H&S are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met to ensure Environmental Management program effectiveness.
• Code of Conduct covers human rights, labor practices and decent work.
• The factory of Albstadt has certification of Environmental Management to DIN EN ISO 14001:2009 and Occupational Health and Safety to OHSAS 18001:2007.
• Manufacturing waste is treated appropriately.

2.9 Product processing/Installation

Aperio Products are installed by trained system integrators, OEM partners or by door installation companies. Installation instructions are included with each E100. All Aperio products are part of an access control system. End users are not able to install the Aperio E100 as part of a system.

2.10 Packaging

The Aperio E100 is wrapped in plastic foil and packed in a cardboard box to avoid damage. Also included in the packaging are: paper installation instructions and a plastic bag containing the gasket and mounting hardware. Packaging materials shall be collected separately for recycling.

Material	Value (%)
Cardboard/paper	93.5
Plastic	6.5
Total	**100.0**

Waste codes according to European Waste Catalogue and Hazardous Waste List - Valid from 1 January 2002:
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 reader. Repairs or replacement are not usually necessary. No cleaning efforts need to be taken into consideration.

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 service life of the Aperio E100 is estimated to be 12 years. The service life is calculated by the usage of the product. The escutcheon is tested and designed up to 200.000 mechanical cycles.

2.14 Extraordinary effects

Fire

The housing of the Aperio E100, is stainless steel and a plastic cover which contain the RFID reader and UHF transceiver.

Water

International Protection Marking IP52/54 code.

Mechanical destruction
No danger to the environment.

2.15 Re-use stage
The product is possible to re-use during the reference service life and be moved to one door to another.

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 (2) other than those mentioned in 16 02 09 to 16 02 12
EWC 17 02 03 plastic
EWC 17 04 02 aluminium
EWC 17 04 05 iron and steel
EWC 17 04 11 Cables with the exception of those outlined in 17 04 10.

2.16 Disposal
The majority of components are of steel, iron and zinc which can be recycled. The Aperio E100 Escutcheon can be mechanically disassembled to separate the different materials. 98% of the materials used are recyclable. The plastic components can be used for energy recovery in an incineration plant. All electronic components used are recyclable.

2.17 Further information
More information on ASSA ABLOY and the Aperio Product range is available:
Assa Abloy Sicherheitstechnik
Bildstockstrasse 20
72458 Albstadt, Germany

Tel: +49 7431 123-0
www.assaabloy.de

3. LCA: Calculation rules

3.1 Declared Unit
The declaration refers to the functional unit of 1 piece of Aperio E100 Escutcheon with RFID reader and UHF transceiver 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 Aperio E100 Escutcheon
Mass of product (without packaging)	1.29	kg
Conversion factor to 1 kg	0.773	-

3.2 System boundary
Type of the EPD: cradle to gate - with options
The following life cycle stages were considered:
Production stage:

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

Construction stage:

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

Use stage related to the operation of the building includes:

- B6 – Operational energy use (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 stage:
For the use stage, it is assumed that the lock is used in the European Union, thus a European electricity grid mix is considered within this stage.
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 modeling of the considered products, the GaBi 6 Software System for Life Cycle Engineering, developed by thinkstep 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/.

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 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 2012/13 (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
- Thermal treatment of plastic parts
- 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

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).

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site: paper packaging	0.215	kg
Output substances following waste treatment on site: plastic packaging	0.015	kg

Reference service life

Name	Value	Unit
Reference service life	12	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	0.00196	kWh
Days per year in use	365	d
Hours per day in on mode	0.3	h
Hours per day in stand-by mode	23.7	h
Power consumption on mode	0.00001	kW
Power consumption stand-by mode	1.00E-07	kW

End of life (C2-C4)

Name	Value	Unit
Collected separately Aluminium, Plastic Parts, Stainless Steel, Steel, Zinc, Electronic and Electro Mechanic Parts	1.286	kg
Collected as mixed construction waste construction waste for landfilling	0.00708	kg
Recycling Aluminium	0.00287	kg
Reuse plastic parts	0.1164	kg
Recycling stainless steel	0.9545	kg
Recycling steel	0.1392	kg
Recycling zinc	0.05	kg
Recycling metals from electronic	0.0107	kg
Recycling metals from electro mechanic	0.0124	kg
Construction waste for landfill	0.007	kg

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

Name	Value	Unit
Collected separately waste Card reader (including packaging)	1.523	kg
Recycling Aluminium	0.19	%
Reuse plastic parts	8.63	%
Recycling Stainless Steel	62.65	%
Recycling Steel	9.14	%
Recycling Zinc	3.29	%
Recycling/Reuse Electronic	0.70	%
Recycling/Reuse Electro mechanics	0.81	%
Reuse Paper packaging	14.11	%
Loss Construction waste for landfilling (no recycling potential)	0.48	%

5. LCA: Results

Results shown below were calculated using CML 2000 – 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	MND	MND	MND	MND	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of Aperio E100 Escutcheon

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	1.43E+01	3.61E-02	3.42E-01	1.12E-02	3.61E-03	4.90E-03	3.12E-01	-1.94E+00
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.30E-09	1.73E-13	1.51E-12	7.65E-12	1.73E-14	3.35E-12	9.41E-13	-1.39E-10
AP	Acidification potential of land and water	[kg SO_2-Eq.]	8.38E-02	1.65E-04	7.90E-05	5.27E-05	1.65E-05	2.31E-05	8.21E-05	-1.38E-02
EP	Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	6.32E-03	3.78E-05	1.28E-05	2.97E-06	3.78E-06	1.30E-06	6.78E-06	-1.02E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	5.41E-03	-5.34E-05	5.39E-06	3.13E-06	-5.34E-06	1.37E-06	4.12E-06	-1.17E-03
ADPE	Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	2.03E-03	1.36E-09	7.97E-09	1.55E-09	1.36E-10	6.78E-10	2.23E-08	-1.15E-03
ADPF	Abiotic depletion potential for fossil resources	[MJ]	1.67E+02	4.99E-01	1.01E-01	1.27E-01	4.99E-02	5.56E-02	1.37E-01	-1.91E+01

RESULTS OF THE LCA - RESOURCE USE: One piece of Aperio E100 Escutcheon

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.95E+01	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.95E+01	1.97E-02	9.12E-03	3.63E-02	1.97E-03	1.59E-02	1.04E-02	-4.54E-01
PENRE	Non renewable primary energy as energy carrier	[MJ]	1.90E+02	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	1.90E+02	5.00E-01	1.18E-01	1.99E-01	5.00E-02	8.71E-02	1.52E-01	-1.97E+01
SM	Use of secondary material	[kg]	1.02E+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
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
FW	Use of net fresh water	[m^3]	7.69E-02	1.39E-05	9.78E-04	8.97E-05	1.39E-06	3.93E-05	7.73E-04	-6.08E-03

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of Aperio E100 Escutcheon

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	1.25E-02	1.14E-06	8.11E-06	2.75E-05	1.14E-07	1.21E-05	1.12E-05	9.62E-04
NHWD	Non hazardous waste disposed	[kg]	1.18E+00	6.29E-05	1.11E-02	6.42E-05	6.29E-06	2.81E-05	4.23E-02	3.55E-01
RWD	Radioactive waste disposed	[kg]	9.03E-03	6.55E-07	6.55E-06	2.86E-05	6.55E-08	1.26E-05	6.17E-06	-2.30E-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	2.15E-01	0.00E+00	0.00E+00	1.15E+00	0.00E+00	0.00E+00
MER	Materials for energy recovery	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	4.57E-01	0.00E+00	0.00E+00	0.00E+00	5.85E-01	0.00E+00
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+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 98% to the overall results for all the environmental impact assessment categories hereby considered. Within the production stage, the main contribution for all the impact categories is the production of electronics and steel mainly due to the energy consumption on these processes. Electronics accounts in total with app. 50%; steel and stainless steel account in total with almost 37% to the overall impact. 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 quite minor contribution for all the impact assessment categories considered (< 1%). This is a result of low operational energy use in both on and stand-by modes.

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

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. www.bau-umwelt.com

ISO 9001:1994
Quality systems – Model for quality assurance in design, development, production, installation and servicing

ISO 14001:1999
Environmental Management System Certificate

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

EN 15804
EN 15804:2012+A1:2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 1634:2000
Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware

EN 300330-1
Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short Range Devices (SRD) - Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz - Part 1: Technical characteristics and test methods

EN 300330-2
Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short Range Devices (SRD) - Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz - Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

EN 300440-1
Electromagnetic compatibility and Radio spectrum Matters (ERM) - Short range devices - Radio equipment to be used in the 1 GHz to 40 GHz frequency range - Part 1: Technical characteristics and test methods

EN 301489-1
Electromagnetic compatibility and Radio spectrum Matters (ERM) - ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 1: Common technical requirements (ETSI EN 301489-1 V1.9.2 (2011-09))

EN 301489-3
Electromagnetic compatibility and Radio spectrum Matters (ERM) - ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz

EN 50364
Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications

EN 55022:2011-1
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (CISPR 22:2008, modified)

EN 61000-6-1
Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005)

EN 61000-6-2
EN 61000-6-2: Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments (IEC 61000-6-2:2005)

EN 61000-4-2
EN 61000-4-2: Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test (IEC 61000-4-2:2008)

EN 61000-4-3
Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006 + A1:2007 + A2:2010)

EN 62479
Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz) (IEC 62479:2010, modified)

EN 62479
Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz) (IEC 62479:2010, modified)

EN 300 328
EN 300 328: Electromagnetic compatibility and Radio spectrum Matters (ERM) - Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques - Harmonized EN covering the essential requirements under article 3.2 of the R&TTE Directive (Endorsement of the English version EN 300328 V1.9.1 (2015-02) as German standard)

GaBi 6 2013
GaBi 6 2013: 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. http://documentation.gabi-software.com/

IP52/54
IP 52/54: IP code according to the DIN EN 60529. Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989 + A1:1999 + A2:2013); German version EN 60529:1991 + A1:2000 + A2:2013

OHSAS 18001:2007
OHSAS 18001:2007: Occupational Health and Safety

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	MND	MND	MND	MND	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of Aperio E100 Escutcheon

Parameter	Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	1.43E+01	3.61E-02	3.42E-01	1.12E-02	3.61E-03	4.90E-03	3.12E-01	-1.94E+00
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.48E-09	1.84E-13	1.60E-12	8.13E-12	1.84E-14	3.56E-12	1.00E-12	-1.87E-10
AP	Acidification potential of land and water	[kg SO_2-Eq.]	8.31E-02	2.16E-04	9.53E-05	4.99E-05	2.16E-05	2.19E-05	9.65E-05	-1.37E-02
EP	Eutrophication potential	[kg N-eq.]	5.22E-03	1.53E-05	5.19E-06	2.12E-06	1.53E-06	9.30E-07	3.21E-06	-5.18E-04
Smog	Ground-level smog formation potential	[kg O_3-eq.]	1.03E+00	4.45E-03	2.05E-03	4.52E-04	4.45E-04	1.98E-04	8.67E-04	-1.90E-01
Resources	Resources – fossil resources	[MJ]	1.36E+01	7.17E-02	1.16E-02	9.04E-03	7.17E-03	3.96E-03	1.41E-02	-2.21E-01

RESULTS OF THE LCA - RESOURCE USE: One piece of Aperio E100 Escutcheon

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.95E+01	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.95E+01	1.97E-02	9.12E-03	3.63E-02	1.97E-03	1.59E-02	1.04E-02	-4.54E-01
PENRE	Non renewable primary energy as energy carrier	[MJ]	1.90E+02	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	1.90E+02	5.00E-01	1.18E-01	1.99E-01	5.00E-02	8.71E-02	1.52E-01	-1.97E+01
SM	Use of secondary material	[kg]	1.02E+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
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
FW	Use of net fresh water	[m^3]	7.69E-02	1.39E-05	9.78E-04	8.97E-05	1.39E-06	3.93E-05	7.73E-04	-6.08E-03

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of Aperio E100 Escutcheon

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	1.25E-02	1.14E-06	8.11E-06	2.75E-05	1.14E-07	1.21E-05	1.12E-05	9.62E-04
NHWD	Non hazardous waste disposed	[kg]	1.18E+00	6.29E-05	1.11E-02	6.42E-05	6.29E-06	2.81E-05	4.23E-02	3.55E-01
RWD	Radioactive waste disposed	[kg]	9.03E-03	6.55E-07	6.55E-06	2.86E-05	6.55E-08	1.26E-05	6.17E-06	-2.30E-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	-
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	2.15E-01	0.00E+00	0.00E+00	1.15E+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	-
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	4.57E-01	0.00E+00	0.00E+00	0.00E+00	5.85E-01	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+00	-

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