ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**TESA ASSA ABLOY**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ASA-20150164-IBA1-EN
Issue date	10.06.2015
Valid to	09.06.2020

Access control systems – SMARTair Cylinder

TESA ASSA ABLOY

Institut Bauen und Umwelt e.V.

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

1. General Information

TESA ASSA ABLOY

Programme holder

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

Declaration number

EPD-ASA-20150164-IBA1-EN

This Declaration is based on the Product Category Rules:

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

Issue date

10.06.2015

Valid to

09.06.2020

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

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

SMARTair Cylinder

Owner of the Declaration

TESA ASSA ABLOY
Bº Ventas, 35 20305
Irun, Gipuzkoa
SPAIN

Declared product / Declared unit

This Declaration represents 1 piece of SMARTair Cylinder

Scope:

This declaration and its LCA study are relevant to SMARTair Cylinder

Main primary manufacturing processes are made by external suppliers and the final manufacturing processes and assembly occur at our manufacturing factory in TESA, Spain. 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 SMARTair Cylinder, produced by TESA, an ASSA ABLOY Group brand, is a device that communicates with a personalized credential via RF technology. It collects identity information from the credential and passes it along to a secured control unit. The control unit then grants or denies access to the credential holder engaging the clutch of the cylinder allowing it to open the door. It is capable of communications using a high frequency RF signal and able to communicate with several credential formats.
Supported credential formats:
• iCLASS SE (Cards/Tags/Fobs)
• SE for DESFire EV1 (Cards)
• SE for MIFARE Classic (Cards/Tags/Fobs)
• NFC compatible
• ISO/IEC 15693

2.2 Application

The SMARTair Cylinder is suitable for indoor and outdoor use, where ID authentication is required. Common applications include: Commercial buildings, Industrial buildings, Government buildings, Military installations, Education establishments, Healthcare buildings.

2.3 Technical Data

The table presents the technical properties of SMARTair Cylinder:

Technical data

Name	Value	Unit
Power supply	3VDC	V
Current Requirements	100mA	A
Operating Temperature	-20 to 70	°C
Operating Humidity	up to 85	%
Power consumption (standby)	3	µW
Peak Power Draw (During read)	100	mW

2.4 Placing on the market / Application rules

EMC Directive 2004/108/CE
LV Directive 2006/95/CE
R&TTE Directive 1999/05/CE
ROHS Directive 2011/65/CE

IP 56 Certified
Fire resistance /UNE-EN 1634:2000/ 30' - 60'

2.5 Delivery status

Each knob unit is delivered individually packaged with mounting hardware, and gasket. Packing dimensions: 120mm x 90mm x 50mm

2.6 Base materials / Ancillary materials

The average composition of the SMARTair Cylinder is as following:

Component	Percentage in mass
Brass	33.14
Plastic Parts	5.12
Stainless Steel	15.29
Steel	26.42
Electronic	0.61
Electro mechanics	18.74
Total	**100.0**

2.7 Manufacture

The SMARTair Cylinder is assembled at the production facility at TESA, Irun. The electronics are produced in China/Malaysia and the mechanics in Germany. The components come from processes like stamped steel, turning, zinc and steel casting.
The factory of TESA has a certification of Quality Management system in accordance with /ISO 9001:1994/.

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, GHG, 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 and environmental management program effectiveness is evaluated.
• Code of Conduct covers human rights, labor practices and decent work. Management of ASSA ABLOY is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
• The factory of TESA has certification of Environmental Management to /ISO 14001:1999/.
• Any waste metals during machining are separated and recycled. The waste from the water-based painting process is delivered to waste treatment plant.

2.9 Product processing/Installation

SMARTair Cylinders are installed by trained product integrators or by the product end user. Installation instructions are included with each unit.

2.10 Packaging

The cylinder is packed in a carton box with foam spacers to avoid damage. Also included in the packaging are paper installation instructions, the gasket, and a plastic bag containing the connectors and mounting hardware. Packaging materials shall be collected separately for recycling.

Material	Value (%)
Cardboard/paper	28.3
Plastic	71.7
Total	**100.0**

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 are no interactions between products, the environment and health.

2.13 Reference service life

Approved for a conservative value of 400.000 cycles under normal working conditions, that means 15 years depending on cycle frequency.

2.14 Extraordinary effects

Fire

Suitable for use in fire and smoke doors /EN 1634:2000/.

Water

Contain no substances that have any impact on water in case of flood. Electric operation of the device will be influenced negative.

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 to one door to another.
Waste codes according to European Waste Catalogue /EWC/ 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/ 17 02 03 plastic
/EWC/ 17 04 01 copper, bronze, brass
/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 TESA ASSA ABLOY SMARTair Cylinders is available from:

TESA ASSA ABLOY
Bº Ventas, 35 20305
Irun, Gipuzkoa
SPAIN
Tel: +34 943669100
Internet: www.tesa.es

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of SMARTair Cylinder 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 SMARTair Cylinder
Mass of product (without packaging)	0.293	kg
Conversion factor to 1 kg	3.413	-

3.2 System boundary

Type of the EPD: cradle to gate - with options
The following life cycle phases were considered for Reader:
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 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 European Union, thus an European 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 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
- 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).

Transport to the building site (A4)

Name	Value	Unit
Truck transport		
Litres of fuel diesel with maximum load (27 t payload)	39.4	l/100 km
Transport distance truck	500	km
Capacity utilization (incl. empty runs) of truck	85	%

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site: paper packaging	0.0083	kg
Output substances following waste treatment on site: plastic packaging	0.021	kg

Reference service life

Name	Value	Unit
Reference service life	15	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	0.113	kWh
Days per year in use	365	d
Hours per day in different modes	24	h
Power consumption on mode	0.1	W
Power consumption stand-by mode	0.00003	W

End of life (C1-C4)

Name	Value	Unit
Collected separately Brass, Copper, Plastic Parts, Stainless Steel, Steel, Electronic, Electro mechanics	0.293	kg
Reuse plastic parts	0.015	kg
Recycling metals from electronic	0.0567	kg
Recycling Brass	0.0971	kg
Recycling Copper	0.002	kg
Recycling Stainless Steel	0.0448	kg
Recycling Steel	0.0774	kg

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

Name	Value	Unit
Collected separately waste Card reader (including packaging)	0.293	kg
Recycling Brass	30.13	%
Recycling Copper	0.62	%
Recycling/Reuse Electronic	17.59	%
Recycling Stainless Steel	13.9	%
Recycling Steel	24.01	%
Reuse Plastic parts	4.65	%
Reuse Paper packaging	2.58	%
Reuse Plastic packaging	6.52	%

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 SMARTair Cylinder

Parameter		Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	5.16E+00	9.73E-03	6.42E-02	5.39E-02	9.73E-03	9.72E-03	4.16E-02	-5.26E-01
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.72E-09	1.42E-12	2.12E-13	3.69E-11	1.42E-12	6.65E-12	1.32E-13	-2.91E-11
AP	Acidification potential of land and water	[kg SO_2-Eq.]	3.37E-02	4.52E-05	1.60E-05	2.54E-04	4.52E-05	4.58E-05	1.59E-05	-4.42E-03
EP	Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	2.00E-03	8.61E-06	1.48E-06	1.43E-05	8.61E-06	2.58E-06	1.76E-06	-2.72E-04
POCP	Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	2.04E-03	-1.07E-05	8.39E-07	1.51E-05	-1.07E-05	2.72E-06	1.03E-06	-2.82E-04
ADPE	Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	3.71E-04	5.89E-10	3.68E-09	7.46E-09	5.89E-10	1.35E-09	3.82E-09	-3.04E-04
ADPF	Abiotic depletion potential for fossil resources	[MJ]	6.24E+01	1.36E-01	2.55E-02	6.12E-01	1.36E-01	1.10E-01	2.83E-02	-5.62E+00

RESULTS OF THE LCA - RESOURCE USE: One piece of SMARTair Cylinder

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.06E+01	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.06E+01	1.10E-02	1.93E-03	1.75E-01	1.10E-02	3.16E-02	2.37E-03	-2.52E-01
PENRE	Non renewable primary energy as energy carrier	[MJ]	8.13E+01	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	8.13E+01	1.50E-01	2.85E-02	9.58E-01	1.50E-01	1.73E-01	3.11E-02	-5.87E+00
SM	Use of secondary material	[kg]	2.21E-01	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	[m³]	4.64E-02	1.94E-05	1.62E-04	4.32E-04	1.94E-05	7.80E-05	7.84E-05	-3.32E-03

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of SMARTair Cylinder

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	7.54E-03	5.24E-06	1.99E-06	1.33E-04	5.24E-06	2.40E-05	2.26E-06	-2.35E-05
NHWD	Non hazardous waste disposed	[kg]	2.71E-01	2.59E-05	5.18E-03	3.09E-04	2.59E-05	5.58E-05	5.92E-02	-1.75E-02
RWD	Radioactive waste disposed	[kg]	7.52E-03	5.33E-06	1.21E-06	1.38E-04	5.33E-06	2.49E-05	1.10E-06	-9.90E-05
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	8.30E-03	0.00E+00	0.00E+00	2.21E-01	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	1.15E-01	0.00E+00	0.00E+00	0.00E+00	7.17E-02	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	3.17E-01	0.00E+00	0.00E+00	0.00E+00	1.97E-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 96% and 100% to the overall results for all the environmental impact assessment categories hereby considered. Within the production phase, the main contribution for all the impact categories is the production of steel, with app. 99%, mainly due to the energy consumption on this process. Brass, steel and stainless steel account with app. 74% 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.

In the end-of-life phase, 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. www.bau-umwelt.com

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

ISO 14001:1999
Environmental Management System Certificate

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

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

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

EN 1634: 2000
Fire resistance tests for door and shutter assemblies

GaBi 6 2013
GaBi 6 2013: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, PE INTERNATIONAL 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, PE INTERNATIONAL AG, Leinfelden-Echterdingen, 1992-2013.
http://documentation.gabi-software.com/

UNE-EN 1634:2000
Ensayos de resistencia al fuego y de control de humo de puertas y elementos de cerramiento de huecos, ventanas practicables y herrajes para la edificación. Parte 1: Ensayos de resistencia al fuego de puertas y elementos de cerramiento de huecos y ventanas practicables

EWC
European Waste Catalog

WEEE
Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)

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: declared unit and product

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	5.16E+00	9.73E-03	6.42E-02	5.39E-02	9.73E-03	9.72E-03	4.16E-02	-5.26E-01
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.88E-09	1.51E-12	2.25E-13	3.92E-11	1.51E-12	7.08E-12	1.41E-13	-3.81E-11
AP	Acidification potential of land and water	[kg SO_2-Eq.]	3.21E-02	5.54E-05	1.89E-05	2.40E-04	5.54E-05	4.34E-05	1.85E-05	-4.26E-03
EP	Eutrophication potential	[kg N-eq.]	1.48E-03	3.68E-06	6.65E-07	1.02E-05	3.68E-06	1.85E-06	9.66E-07	-1.31E-04
Smog	Ground-level smog formation potential	[kg O_3-eq.]	3.24E-01	1.03E-03	1.99E-04	2.18E-03	1.03E-03	3.93E-04	2.59E-04	-4.91E-02
Resources	Resources – resources fossil	[MJ]	5.13E+00	1.79E-02	2.67E-03	4.36E-02	1.79E-02	7.86E-03	3.13E-03	-2.60E-01

RESULTS OF THE LCA - RESOURCE USE: One piece of SMARTair Cylinder

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.06E+01	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.06E+01	1.10E-02	1.93E-03	1.75E-01	1.10E-02	3.16E-02	2.37E-03	-2.52E-01
PENRE	Non renewable primary energy as energy carrier	[MJ]	8.13E+01	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	8.13E+01	1.50E-01	2.85E-02	9.58E-01	1.50E-01	1.73E-01	3.11E-02	-5.87E+00
SM	Use of secondary material	[kg]	2.21E-01	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]	4.64E-02	1.94E-05	1.62E-04	4.32E-04	1.94E-05	7.80E-05	7.84E-05	-3.32E-03

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of SMARTair Cylinder

Parameter	Parameter	Unit	A1 - A3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	7.54E-03	5.24E-06	1.99E-06	1.33E-04	5.24E-06	2.40E-05	2.26E-06	-2.35E-05
NHWD	Non hazardous waste disposed	[kg]	2.71E-01	2.59E-05	5.18E-03	3.09E-04	2.59E-05	5.58E-05	5.92E-02	-1.75E-02
RWD	Radioactive waste disposed	[kg]	7.52E-03	5.33E-06	1.21E-06	1.38E-04	5.33E-06	2.49E-05	1.10E-06	-9.90E-05
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	8.30E-03	0.00E+00	0.00E+00	2.21E-01	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	1.15E-01	0.00E+00	0.00E+00	0.00E+00	7.17E-02	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	3.17E-01	0.00E+00	0.00E+00	0.00E+00	1.97E-01	-

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