DAPcons®.100.150

DECLARACIÓN AMBIENTAL DE PRODUCTO
ENVIRONMENTAL PRODUCT DECLARATION

According to the standards:
ISO 14025 y EN 15804 + A2:2020

cateb
Arquitectura Tècnica
Barcelona

dapcons®

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GENERAL INFORMATION

Product

SMARTair/TESA i-max electronic lock

Company

TESA ASSA ABLOY

Product description

Programmable electronic access control lock. Opening via RFID credentials / Bluetooth / wireless remote opening.

Reference RCP

RCP 100 (version 3 - 27/05/2021) Construction products in general

Production plant

Final assembly: Ventas, 35, 20305, Irun (Gipuzkoa, Basque Country).
Assembly of some components: Aranburuzabala Kalea, 23, 20540, Eskoriatza (Gipuzkoa, Basque Country).

Validity

From: 25/07/2023 Until: 25/07/2028

The validity of DAPcons®.100.150 is subject to the conditions of the regulation DAPcons®. The current edition of this DAPcons® is the one that appears in the registry maintained by Cateb; for informational purposes, it is included on the Program website www.csostenible.net

EXECUTIVE SUMMARY

SMARTair/TESA i-max electronic lock

	DAPconstruction® Programme Operator Environmental Product Declarations in the Construction sector www.csostenible.net
	Programme Manager Colegio de la Arquitectura Técnica de Barcelona (Cateb) Bon Pastor, 5 · 08021 Barcelona www.apabcn.cat
	Owner of the declaration Talleres de Escoriaza SAU Barrio Ventas 35 20305 - GUIPUZCOA (España) www.tesa.es
	Author of the Life cycle assessment: ECOPENTA SL C/ Tuset 19, 1º 3ª, 08006 - BARCELONA, España

Declared product

SMARTair/TESA i-max electronic lock

Geographic representation

Global

Variability between different products

In this document the results of each of the products are declared individually.

Declaration number

DAPcons®.100.150

Issue date

08/03/2023

Validity

This verified declaration authorizes its holder to carry the logo of the operator of the ecolabelling program DAPconstruction®. The declaration is applicable exclusively to the mentioned product and for five years from the date of registration. The information contained in this statement was provided under the responsibility of: **Talleres de Escoriaza SAU**

Programme Administrator Signature

Celestí Ventura Cisternas. President of Cateb

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Programme Verifier Signature

Josep Manuel Giner Pallarés. ReMa-INGENIERIA, S.L.. Verifier accredited by the administrator of the DAPcons® Programme

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ENVIRONMENTAL PRODUCT DECLARATION

1. DESCRIPTION OF THE PRODUCT AND ITS USE

Programmable electronic access control lock. Opening via RFID credentials / Bluetooth / wireless remote opening. Available in various formats, finishes, handles, and with or without a keypad.

The technical specifications of the electronic handle include:
– Option of fitting various handles and mortise locks.
– Long plate escutcheon with reader.
– Wireless installation. Electronic lock powered by AAA alkaline batteries.
– Unlimited number of doors, maximum 3,000 users per door.
– RFID identification technology MIFARE ISO 14443A, ISO 15693, Skidata, iCLASS® and DESFire.
– Standard stainless steel finish (I); other finishes available.
– Various handle-cylinder distances between axes (optional).
– Spindles measuring 8 mm, 9 mm, 7 mm and 7.8 mm.
– All control components (except the reader module) are housed inside (including batteries) to provide higher security against vandalism.

Product SKUs are distinguished and specified based on the components that can be changed:
– Handle model
– Mortise lock model
– Surface finish/color
– With or without wireless and Bluetooth module
– With or without internal Privacy
– With or without mechanical cylinder and handle-cylinder distances
– Standard or Extreme (outdoor) model
– Functionality based on the system it is integrated into (through single specific firmware that covers the standalone, offline, UoC, and wireless systems)

The LCA and this environmental impact declaration associated with the i-max escutcheons have been performed on the basis of the worst-case study of the products in the range.

Specifically, the i-max electronic lock, EUR model, with wireless and Bluetooth module, iCLASS® technology, keypad, Extreme for outdoor use, Granada handle, matt chrome and with 9 mm spindle has been analyzed.

This is the worst case of those presented as it includes the largest number of components, all possible accessories, the heaviest components (Granada handle), and also surface finishes.
The version without a mortise lock hole for the cylinder but with a latch is the worst case (called Blind Thumbturn). The analysis does not include the inner cylinder or the mortise lock as they are commercially available separately.

It is marketed in EURO and Scandinavian versions to be sold in these two main markets.

The product does not contain substances on the REACH list of hazardous substances.

1.1 Content information

Product components

The main components of the product are Zamak-5, steel, and stainless steel. A product composition table is provided.

Packaging materials

The packaging has the following composition:

Material type	Weight (g)	%
Paper with adhesive	5	0.97%
Cardboard	489	94.95%
Plastic	21	4.08%
Wood (pallet)	0.5	0.10%
TOTAL	515	100.00%

Composition of the product analyzed (worst case scenario):

	Weight (g)	%
Steel	315.51	17.42%
Stainless steel	351.59	19.41%
Zamak-5	1008.21	55.65%
Brass	18.56	1.02%
Electronics/PCB/Batteries	80.85	4.46%
Plastic (PA, PE, OS, PET)	35.583	1.96%
Wiring	1.262	0.07%
Aluminum	0.052	0.00%
TOTAL	1811.61	100.00%

I-max series handle options:

	Digit 10 - Handle
V	Vector fixed
S	Sena fixed
X	Xara fixed
Z	Zafira fixed
C	Cubo fixed
F	FSBE fixed
1	Vector changeable
2	Sena changeable
3	Xara changeable
4	Zafira changeable
5	Cubo changeable
6	FSBE changeable
B	Barcelona
G	Granada
H	Hermes
J	Jerez
K	Kira
T	Toledo
L	Flare
A	Arko
D	Delta
Q	Round knob
R	DDA
O	No handle


EUROPEAN MODEL
SCANDINAVIAN MODEL

2. DESCRIPTION OF THE STAGES OF THE LIFE CYCLE

2.1. Manufacturing (A1, A2 y A3)

Raw Materials and transport (A1 y A2)

Module A1 includes the supply of raw materials for the product and packaging (raw materials to be processed in TESA's plant or components already formed by suppliers).

The i-max electronic lock product consists mainly of alloy steel and Zamak components.

Module A2 includes the transport of raw materials and packaging to TESA's factories in Ezkoriatza or Irun

(Guipuzkoa). The distance and type of truck has been entered for each raw material and packaging, the average calculated based on the distances to the various suppliers and weighted with the quantities delivered in 2021.

Manufacturing (A3)

Stage A3 considers the energy use of the production process, the production and transport of auxiliary materials (chemicals, varnishes, lubricants, etc.), the treatment of waste generated during production, and the emissions from the production process and the discharge analysis.

The subassemblies of components (handles, privacy, guide, etc.) are assembled at the Eskoriatza plant. From there they are transported to the Irun plant where the assemblies are completed with their electronic components such as antenna or control circuit before finally performing mechanical and electronic checks.
Once the final testing is completed, the electronic lock is packed in 1/5 boxes for the trip, and in turn these boxes are put in a box pallet that will transport up to a total of 72 locks.

The manufacturing process is divided into the following phases:

- PHASE 1 – STAMPING PRESS (TESA manufactures some parts from steel strip while others are purchased as components prior to assembly)
- PHASE 2 - SURFACE TREATMENT
- PHASE 3 – SUBASSEMBLY ASSEMBLY (internal and external) => Includes transport to Irun of the subassemblies carried out in Ezkoriatza
- PHASE 4 – MECHANICAL AND ELECTRONIC TESTING
- PHASE 5 – PACKAGING
- PHASE 6 – SHIPPING

2.2. Construction process stage (A4 y A5)

Transport to the building site (A4)

The transport to the installation site stage has been calculated based on the weighting of 2021 sales (of the i-max range) by country (with countries accounting for more than 1%) and theoretically according to the CPR of 3,500 km in a 16-32 tn EURO 6 truck for those countries accounting for less than 1%.

Table 1. Basic of a scenario with the parameters described in the following table

Destinations	Type of transport	Percentage	Average km
Spain	Truck 16-32 Tn EURO VI	35.5	475
Europe	Truck 16-32 Tn EURO VI	50.50	2196
Rest of the world	Truck 16-32 Tn EURO IV, VI, Cointarner ship	14	12600

Product installation process and construction (A5)

According to the CPR, it can be assumed that manual installation is the default way to install hardware on doors and windows or directly in buildings. This entails zero impacts to be declared in module A5 arising from the machining of the door where it is installed.

The installation requires fitting the batteries, closing the inside and initializing the lock, i.e. assigning a name and a list of authorized users which is transferred to the lock by means of a portable programmer. The impact of the use of this portable programmer required for the configuration of the locks is below the cut-off rules and therefore not considered in the study.

What is considered outside the scope of the study is the impact of the other electronic lock management system devices: hub (wireless system) and PC central computer.

These communications between the central computer where the management software is run are enabled by the installation of hubs in wireless systems. These devices are powered and connected via Ethernet communication to the central computer through a network cable (LAN). This means up to 30 electronic locks can communicate with a single hub which in turn can communicate with the management software to update, in both directions (PC - locks - PC), the information on the locks' status.

This same process can also be performed using the card updaters (Read and Write system), although in this case the device is at the entrance to the site and has a wall reader that can be used to write and collect the data and events gathered in the RFID credentials when they are read. As with the hub, the data are transferred to the management software via Ethernet communication.

The data in both cases are the same; those concerning the information of users who may or may not open the door.

The end-of-life impacts of the product packaging (plastic, cardboard, adhesive paper and wooden pallet) are also included in this installation stage. The electronic lock is normally installed on doors that have been previously machined, so only packaging waste is included.

It is managed as follows in plants at a distance of 50 km from the installation site:

- Paper and cardboard waste: 85% recycling, 15% landfill (PEF, 2021).
- Plastic waste: 42% recycling, 40% energy recovery and 18% landfill (Reference: Plastic Europe 2018).
- Wood waste (pallets): Pallets are reused an estimated average of 6 times (sector).

2.3. Product use (B1-B7)

Use (B1)

Once installed, the electronic lock is powered by standard alkaline batteries. It is estimated that the energy input for its use is 4.5 Wh/year.
Likewise, while the lock is in operation it also has usage associated with the wireless system equipment: hub and central computer.

The reference service life is 15 years under normal working conditions. This equates to passing a mechanical endurance test of 200,000 cycles as specified in /EN 1906/. The reference service life depends on the actual frequency of use and environmental conditions. The product should be installed and maintained following the manufacturer's instructions.

Maintenance (B2)

The product under study does not require any significant maintenance during its service life.

Repair (B3)

The product does not require any repairs during its service life (15 years).

Replacement (B4)

No replacement of the product is required throughout its service life (15 years) except for changing the batteries. The waste generated by the batteries is managed according to WEEE treatments.

Refurbishment (B5)

It does not require any kind of rehabilitation during its service life.

Operational energy use (B6)

Once installed, the electronic lock is powered by standard alkaline batteries. It is estimated that the energy input for its use is 4.5 Wh/year.
Likewise, while the lock is in operation it also has usage associated with the wireless system equipment: hub and central computer.

Operational water use (B7)

It does not require any water use during its service life.

2.4. End of life (C1-C4)

Deconstruction and demolition (C1)

At the end of its service life, the product will be removed during demolition. In the context of the demolition of a building, the impacts attributable to the removal of the product are negligible.

Transport to waste processing (C2)

The product's waste is shipped by 16-32 ton truck complying with the Euro VI standard over a distance of 50 km to the treatment plant.

Waste processing for reuse, recovery and/or recycling (C3)

According to EUROSTAT> Recovery rate of construction and demolition waste, a recycling and recovery for reuse scenario of 90% is considered.
When a material is sent for recycling, the electricity usage of a crusher (corresponding to the process “Grinding, metals”) is taken into account.

Disposal (C4)

The remaining % not included in module C3 is expected to go to landfill: 10%.

2.5. Reuse/recovery/recycling potential (D)

The net impacts of recycling the lock have been considered as follows:
• Metal waste: 90% recycling.
The difference between the avoided impacts of no longer extracting virgin metal and the impact of the second metal transformation (scrap) is considered for the calculations.

3. LIFE CYCLE ASSESSMENT

Carrying out a “cradle to grave” Life Cycle Assessment, covering the stages of product manufacture, construction, use and end of life according to ISO 14040:2006 and ISO 14044:2006 of the products, taking into account the environmental impacts (UNE-EN 15804+A2:2019) according to the Product Category Rules PCR 100 Environmental Product Declaration for construction products in general (version 3 - 27.05.2021).
Supplemented with EN 17610 Building hardware - Environmental product declarations - Product category rules complementary to EN 15804 for building hardware.
The application used is Simapro version 9.3.0.2, 2022.
Specific data from the manufacturing plant at Ezkoriatza (Gipuzkoa) for 2021 have been used to inventory the manufacturing stage. Generic data from the Ecoinvent v3.8 database have been used for the rest of the stages.

3.1. Functional Unit

A programmable access control device using an electronic handle and able to read RFID or Bluetooth credentials to ensure the function of opening and holding doors in a closed position, with a net mass of 1.81 kg over the reference service life of 15 years with an average of 36 uses per day, corresponding to a minimum of 200,000 use cycles.
The product under study does not include the inner cylinder or the mortise lock as they are commercially available separately.

Additional comments

-

3.2. Scope and modules that are declared

Table 2. Declared modules

Product stage			Construction Process Stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw materials supply	Transport	Manufacturing	Transport	Construction - Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

X = Declared module **MND** = Undeclared module

3.3. LCA results of potential environmental impact referred to the declared unit (ACV)

Table 3. Parameters of environmental impact

Parameter	Unit	Life cycle stage																Module D
		Product stage			Construction Process Stage		Use stage							End of life stage				
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
Climate change - total (GWP-total)	kg CO2 eq	1,28E+01	3,74E-02	2,17E+00	1,59E-01	5,61E-01	0,00E+00	0,00E+00	0,00E+00	1,67E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,48E-02	3,74E-02	1,07E-02	-1,31E+00
Climate change - fossil (GWP-fossil)	kg CO2 eq	1,26E+01	3,73E-02	2,16E+00	1,58E-01	5,60E-01	0,00E+00	0,00E+00	0,00E+00	1,65E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,47E-02	3,80E-02	1,06E-02	-1,32E+00
Climate change - biogenic (GWP-biogenic)	kg CO2 eq	1,47E-01	2,36E-05	1,12E-02	2,44E-04	4,32E-04	0,00E+00	0,00E+00	0,00E+00	2,13E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,27E-05	-6,69E-04	4,29E-06	1,16E-02
Climate change - land use and changes in land use (GWP-luluc)	kg CO2 eq	3,37E-02	1,78E-05	6,55E-03	9,65E-04	2,41E-04	0,00E+00	0,00E+00	0,00E+00	3,10E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,89E-06	7,25E-05	1,04E-05	1,71E-04
Ozone layer depletion (ODP)	kg CFC 11 eq	8,73E-07	8,36E-09	4,60E-07	1,59E-08	1,28E-07	0,00E+00	0,00E+00	0,00E+00	1,32E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,42E-09	5,05E-09	6,76E-10	-4,46E-08
Acidification (AP)	mol H+ eq	1,08E-01	3,67E-04	1,07E-02	1,18E-03	3,28E-03	0,00E+00	0,00E+00	0,00E+00	3,40E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,19E-05	4,53E-04	3,77E-05	-3,95E-03
Eutrophication of fresh water (EP-freshwater)	kg P eq	1,15E-02	2,16E-06	5,40E-04	5,33E-05	3,49E-05	0,00E+00	0,00E+00	0,00E+00	2,54E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,66E-07	2,41E-05	2,18E-06	-5,76E-04
Eutrophication of sea water (EP-marine)	kg N eq.	1,94E-02	8,75E-05	2,14E-03	1,99E-04	7,80E-04	0,00E+00	0,00E+00	0,00E+00	2,84E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,50E-06	1,03E-04	8,42E-05	-1,03E-03
Terrestrial eutrophication (EP-terrestrial)	mol N eq.	1,98E-01	9,69E-04	1,85E-02	1,95E-03	8,59E-03	0,00E+00	0,00E+00	0,00E+00	3,11E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,27E-05	1,15E-03	1,02E-04	-1,12E-02
Photochemical ozone formation (POCP)	kg NMVOC eq	5,65E-02	2,73E-04	5,91E-03	6,17E-04	2,61E-03	0,00E+00	0,00E+00	0,00E+00	9,44E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,56E-05	3,17E-04	3,35E-05	-7,27E-03
Depletion of abiotic resources - minerals and metals (ADP-minerals&metals)	kg Sb eq	3,33E-03	1,13E-07	2,06E-05	1,58E-06	1,87E-06	0,00E+00	0,00E+00	0,00E+00	6,28E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,22E-08	4,51E-06	6,68E-08	2,81E-06
Depletion of abiotic resources - fossil fuels (ADP-fossil)	MJ, net calorific value	1,67E+02	5,45E-01	3,96E+01	3,48E+00	8,37E+00	0,00E+00	0,00E+00	0,00E+00	2,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,23E-01	5,25E-01	9,02E-02	-1,04E+01
Water consumption (WDP)	m3 worldwide eq. private	7,15E+00	1,51E-03	1,16E+00	1,15E-01	2,46E-02	0,00E+00	0,00E+00	0,00E+00	9,36E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,80E-04	6,92E-03	2,22E-03	-1,00E-01
The Indicador includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This Indicador is thus equal to the GWP Indicador originally defined in EN 15804:2012+A1:2013. Can be obtained from IPCC characterization factors.																		
Global Warming Potential (GHG)	kg CO2 eq	1,25E+01	3,71E-02	2,12E+00	1,57E-01	5,56E-01	0,00E+00	0,00E+00	0,00E+00	1,62E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,46E-02	3,76E-02	9,82E-03	-1,24E+00

A1 Supply of raw materials. **A2** Transport to waste processing. **A3** Manufacturing. **A4** Transport to waste processing. **A5** Installation and construction processes. **B1** Use. **B2** Maintenance. **B3** Repair. **B4** Replacement. **B5** Refurbishment. **B6** Operational energy use. **B7** Operational water use. **C1** Deconstruction and demolition. **C2** Transport to waste processing. **C3** Waste management for reuse, recovery and recycling. **C4** Fine removal. **D** Environmental benefits and burdens beyond the system boundary. **MND** Undeclared module.

Table 4. Parameters for the use of resources, waste and output material flows

Parameter	Unit	Life cycle stage																Module D
		Product stage			Construction Process Stage		Use stage							End of life stage				
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
Use of renewable primary energy excluding renewable primary energy resources used as feedstock	MJ, net calorific value	3,12E+01	6,95E-03	5,49E+00	7,38E-01	1,14E-01	0,00E+00	0,00E+00	0,00E+00	2,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,19E-03	8,16E-02	7,10E-03	5,37E-01
Use of renewable primary energy used as raw material	MJ, net calorific value	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	3,12E+01	6,95E-03	5,49E+00	7,38E-01	1,14E-01	0,00E+00	0,00E+00	0,00E+00	2,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,19E-03	8,16E-02	7,10E-03	5,37E-01
Non-renewable primary energy use, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	1,67E+02	5,45E-01	3,96E+01	3,48E+00	8,37E+00	0,00E+00	0,00E+00	0,00E+00	2,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,23E-01	5,25E-01	9,02E-02	-1,04E+01
Use of non-renewable primary energy used as raw material	MJ, net calorific value	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	1,67E+02	5,45E-01	3,96E+01	3,48E+00	8,37E+00	0,00E+00	0,00E+00	0,00E+00	2,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,23E-01	5,25E-01	9,02E-02	-1,04E+01
Use of secondary materials	kg	4,16E-01	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ, net calorific value	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ, net calorific value	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of freshwater resources	m3	7,00E+00	1,52E-03	1,15E+00	1,19E-01	2,47E-02	0,00E+00	0,00E+00	0,00E+00	9,22E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,84E-04	6,86E-03	2,19E-03	-9,61E-02
Hazardous waste removed	kg	1,05E-02	1,24E-06	4,88E-05	3,19E-06	2,07E-05	0,00E+00	0,00E+00	0,00E+00	8,77E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,83E-07	1,51E-06	1,03E-07	-1,75E-04
Non-hazardous waste eliminated	kg	4,94E+00	2,30E-02	6,59E-01	2,37E-02	4,04E-01	0,00E+00	0,00E+00	0,00E+00	5,40E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,17E-02	1,62E-02	2,05E-01	1,83E-01
Radioactive waste disposed of	kg	6,11E-04	3,71E-06	1,72E-04	2,37E-05	5,67E-05	0,00E+00	0,00E+00	0,00E+00	5,55E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,51E-06	3,10E-06	4,05E-07	1,95E-05
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20E-04	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	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	6,00E-01	0,00E+00	4,20E-01	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	1,63E+00	0,00E+00	0,00E+00
Materials for energy recovery (energy recovery)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,40E-03	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	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ by energy vector	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,54E-04	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	0,00E+00	0,00E+00	0,00E+00

A1 Supply of raw materials. **A2** Transport to waste processing. **A3** Manufacturing. **A4** Transport to waste processing. **A5** Installation and construction processes. **B1** Use. **B2** Maintenance. **B3** Repair. **B4** Replacement. **B5** Refurbishment. **B6** Operational energy use. **B7** Operational water use. **C1** Deconstruction and demolition. **C2** Transport to waste processing. **C3** Waste management for reuse, recovery and recycling. **C4** Fine removal. **D** Environmental benefits and burdens beyond the system boundary. **MND** Undeclared module.

Table 5. Kg of biogenic carbon

Contenido Carbono (biogénico) - embalaje	0,247
Contenido Carbono (biogénico) - producto	0,0

3.4. Recommendations of this DAP

Construction products should be compared on the basis of the same functional unit and at building level, i.e. including the performance of the product over its entire life cycle.
Environmental product declarations of different type III eco-labeling schemes are not directly comparable as the calculation rules may be different.
Product covered by this EPD: SMARTair/TESA i-max electronic lock.

3.5. Cut-off rules

General cut-off criteria are given in EN 15804, clause 6.3.5. This clause states that a maximum of 1% of the energy and raw material use per process unit can be excluded. This is provided that the total amount excluded does not exceed 5% of the total energy or material use for a module (A1, A2, A3, etc.).
More than 95% of all mass and energy inputs and outputs of the system have been included, leaving out auxiliary materials that account for less than 1% of the total material use in module A3.
Also, infrastructure for machinery, production facilities and offices are estimated to contribute less than 1% and are therefore not included.
Allocation rules:
The polluter pays principle and the modularity principle (environmental burdens are allocated to the stage where the impact occurs) have been followed in the LCA.
Usage of energy, water, auxiliary materials and internal waste production have been allocated equally between all products through mass allocation (based on total production).

3.6. Additional environmental information

The product is certified as follows:
- RADIO EQUIPMENT DIRECTIVE 2014/53/EU
- RoHS 2 DIRECTIVE 2011/65/EU
- RoHS 3 DIRECTIVE 2015/863/EU
- UNE-EN 60529:2018 (IP56)
- EN 1906 Grade 4
- DIN18273
- Fire EN 1634-1:2014+A1:2018 (RF60).

TESA ASSA ABLOY is ISO 9001 and ISO 14001 certified.

3.7. Other data

According to EUROSTAT>Recovery rate of construction and demolition waste, a recycling and recovery for reuse scenario of 90% and the remaining 10% to landfill is estimated.

4. ADDITIONAL TECHNICAL INFORMATION AND SCENARIOS

4.1. Transport to the building site (A4)

Parameter	Parameter expressed per functional unit
Type and fuel consumption, type of vehicle used for transportation	Road: Truck between 16 and 32 tons. Euro VI and Euro VI, uses 0.047 kg/ton/km diesel.
Distance	Transport by road and ship depending on sales in each country.
Capacity utilization (including empty return)	Road transport: 100% Ecoinvent 3.5 database-driven.
Apparent density of transported product	7,850 kg/m3.
Useful capacity factor (1, <1 or >1 for products that are packed compressed or nested)	1

4.2. Installation processes (A5)

Parameter	Parameter expressed per functional unit
Auxiliary materials for construction (specifying each material)	3 x 11.5 g AAA alkaline batteries Out of scope because they are used by many connected devices: • Hub • Central computer
Water use	N/A
Use of other resources	N/A
Quantitative description of the type of energy (regional mix) and consumption during the installation process	Energy use during installation is considered to be insignificant.
Waste of materials in the work before the treatment of waste, generated by the installation of the product (specify by type)	21 g Plastic 5 g Paper 489 g Cardboard 0.5 g Wood (pallet) by 6 reuses
Material outputs (specified by type) as a result of waste treatment on the building site. For example: collection for recycling, energy recovery, disposal (specified by route)	• Paper and cardboard waste: 85% recycling, 15% landfill (PEF, 2021). • Plastic waste: 42% recycling, 40% energy recovery and 18% landfill (Reference: Plastic Europe 2018). • Wood: 100% reused – 6 reuses (Manufacturer data 2019).
Direct emissions to air, soil and water	N/A

4.3. Reference life (B1)

Parameter	Parameter expressed per functional unit
Reference Lifetime (RSL)	15 years corresponding to a minimum of 200,000 use cycles
Characteristics and properties of the product	Programmable electronic access control lock. Opening via RFID credentials / Bluetooth / wireless remote opening. Available in various formats, finishes, handles, and with or without a keypad.
Requirements (conditions of use, frequency of maintenance, repair, etc.)	N/A

4.4. Maintenance (B2), Repair (B3), Replacement (B4), or Rehabilitation (B5)

Maintenance (B2)

Parameter	Parameter expressed per functional unit
Maintenance process, for example; cleaning agent, surfactant type	N/A
Maintenance cycle	N/A
Auxiliary materials for the maintenance process (specifying each material)	None
Energy inputs for the maintenance process (quantity and type of energy vector)	None
Net consumption of fresh water during maintenance or repair	None
Material waste during maintenance (specifying the type)	N/A

Repair (B3)

Parameter	Parameter expressed per functional unit
Repair process	N/A
Proceso de inspección	N/A
Repair cycle	N/A
Auxiliary materials (specifying each material], for example lubricant	None
Interchange of parts during the product life cycle	None

Parameter	Parameter expressed per functional unit
Energy inputs during maintenance, type of energy, example: electricity, and quantity	None
Energy input during the repair, renovation, replacement process if applicable and relevant (quantity and type of energy vector)	None
Material waste during repair (specifying each material)	N/A
Consumo neto de agua dulce	None

Replacement (B4)

Parameter	Parameter expressed per functional unit
Energy input during substitution, for example for the use of cranes (quantity and energy vector)	None
Change of worn parts in the product life cycle (specifying each material)	3 AAA alkaline batteries/every two years *6 replacement (for the escutcheon's 15 year life, starting at the end of the second year) = 18 AAA batteries The waste is: 3 batteries x 7 = 21 waste batteries Replaced batteries should be treated as electronic electrical waste.
Net freshwater consumption	None

Refurbishment (B5)

Parameter	Parameter expressed per functional unit
Rehabilitation process	N/A
Rehabilitation cycle	N/A
Energy input during rehabilitation, for example for the use of cranes (quantity and energy vector)	None
Input material for rehabilitation, including auxiliary materials (specifying by material)	None
Waste of material during rehabilitation (specifying each material)	None

Parameter	Parameter expressed per functional unit
Other scenario development assumptions	None

4.5. Reference life

Parameter	Parameter expressed per functional unit
Reference life	15 years corresponding to a minimum of 200,000 use cycles
Declared properties of the product, finishes, etc.	N/A
Application design parameters (manufacturer's instructions)	N/A
Estimation of the quality of execution, when installed according to the manufacturer's instructions	N/A
Outdoor environment for outdoor applications. For example, weather, pollutants, UV radiation, temperature, etc.	N/A
Indoor environment for indoor applications. For example, temperature, humidity, chemical exposure	N/A
Terms of use. For example, frequency of use, mechanical exposure, etc.	N/A
Maintenance. For example, the required frequency, etc.	N/A

4.6. Operational energy use (B6) and operational water use (B7)

Parameter	Parameter expressed per functional unit
Auxiliary materials (specified by material)	None
Type of energy vector. For example, electricity, natural gas, district heating	Electricity (the impact of batteries and their replacement has already been considered and does not lead to impacts due to direct emissions or processing).

Parameter	Parameter expressed per functional unit
Equipment output power	The use of 3 AAA alkaline batteries with a 2-year service life is considered for the use stage of the product (B1-B7). It is estimated that the derived annual energy use is: • The capacity of the AAA alkaline batteries varies between 1000 and 1200 mAh: 1000 mAh x 3 batteries = 3000 mAh = 3 Ah • Nominal voltage is 1.5V • Power = 3 Ah x 1.5V = 4.5 Wh = 0.0045 kWh / 2 years • SMARTair i-max/TESA product service life = 15 years = 7x0.0045 kWh = 0.0315 kWh
Net freshwater consumption	None
Characteristic features (energy efficiency, emissions, etc.)	N/A
Other scenario development assumptions. For example, transportation	N/A

4.7. End of life (C1-C4)

	Process				
	Collection processes (specified by types)	Recovery systems (specified by type)			Elimination
	kg collected with mixed construction waste	kg for reuse	kg for recycling	kg for energy recovery	kg for final disposal
	1.81	0	1.52	0	0.29
Assumptions for scenario development	90% of the metal is recycled. The remaining 10% of the metal is considered to end up in landfill. 100% of the remaining materials (EE, wiring and plastic) go to landfill.				

5. ADDITIONAL INFORMATION

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6. RCP AND VERIFICATION

This statement is based on Document

RCP 100 (version 3 - 27/05/2021) Construction products in general

Independent verification of the declaration and data, in accordance with ISO 14025 and IN RCP 100 (version 3 - 27/05/2021)

☑ External

Third party Verifier

Josep Manuel Giner Pallarés

Accredited by the administrator of the DAPcons® Programme

ReMa-INGENIERÍA, S. L.

Verification date:

25/07/2023

References

PRODUCT LIFE CYCLE ANALYSIS: SMARTair i-max electronic lock/TESA

By: ECOPENTA SL. July 2023 (v2) (unpublished)

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