DAPcons®.100.157

DECLARACIÓN AMBIENTAL DE PRODUCTO
ENVIRONMENTAL PRODUCT DECLARATION

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

cateb
Arquitectura Tècnica
Barcelona

dapcons®

DECLARACIÓN AMBIENTAL DE PRODUCTO
ENVIRONMENTAL PRODUCT DECLARATION

DAPcons®.100.157

According to the standards:

ISO 14025 y EN UNE 15804 + A2:2020

GENERAL INFORMATION

Product

SMARTair Electronic Knob Cylinder/TESA

Company

Product description

Electronic knob cylinder compatible with all types of mortise locks. For doors with a wooden profile, metal profile or glass. Installation without wiring or drilling.

Reference RCP

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

Production plant

Final assembly: Ventas, 35, 20305 Irun (Gipuzkoa, Spain)

Assembly of some components: Aranburuzabala Kalea, 23, 20540 Eskoriatza (Gipuzkoa, Spain)

Validity

From: 16/10/2023 Until: 16/10/2028

The validity of DAPcons®.100.157 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 Electronic Knob Cylinder/TESA

	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 Electronic Knob Cylinder/TESA

Geographic representation

Global

Variability between different products

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

Declaration number

DAPcons®.100.157

Issue date

22/03/2023

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

Verifier Signature

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

36548201M CELESTINO VENTURA (R: Q0875009C) 36548201M CELESTINO VENTURA (R: Q0875009C) 17.10.2023 14:21:24 +0200

GINER PALLARES JOSEP MANUEL - 18909128T GINER PALLARES JOSEP MANUEL - 18909128T 17.10.2023 14:21:23 +0200

ENVIRONMENTAL PRODUCT DECLARATION

1. DESCRIPTION OF THE PRODUCT AND ITS USE

Electronic knob cylinder compatible with all types of mortise locks. For doors with a wooden profile, metal profile or glass. Installation without wiring or drilling.

The electronic technical specifications include:
– The knob has all the components: reader, battery module, and control unit.
– A Bluetooth and RF module is also available for the Openow™ and Wireless options.
– Reader:
• 13.56 MHz RFID technology: the knob cylinder can read different reading technologies: MIFARE Classic (or Ultralight), HID iCLASS or DESFire.
• Activation mode: the knob cylinder wakes up when a credential is held close to it with no need to touch it or perform any previous action.
• Read/write distance: 2-4 cm depending on RFID credentials.
• RFID reader with LED (blue/red) for warning signals: granted or denied access, low battery level, etc.
– Control unit:
• 3000 users and 1000 events.
– Real-time clock and calendar.

Product SKUs are distinguished and specified based on the components that can be changed:
– Single knob or double knob cylinder.
– The double knob cylinders can have the following configuration
• Mechanical Internal Knob + Electronic External Knob
• Electronic Internal Knob + Electronic External Knob
– Knob types:
• EURO / EURO auto return knob (double)
• SCANDINAVIAN knob (single)
• AUSTRALASIAN knob (single)
• ANSI knob (single)
– External length: usually from 30 to 60 mm (depending on type; not all are available). Lengths up to 90 mm possible.
– Internal length: usually from 10 to 55 mm (depending on type; not all are available). Lengths up to 70 mm possible.
– Modular or non-modular (monoblock) knob system.
– Range of surface finishes or colors: Stainless steel, matte chrome, polished brass, matte brass, and shiny chrome.
– Range of configurations of the electronic system.

The LCA and this environmental impact declaration associated with SMARTair Electronic Knob Cylinders have been performed on the basis of the worst-case study of the products in the range.

Specifically, the SNZB12X090E70MM (KNB EUR MF EXT 90E70M WIR LSDB) product has been analyzed.
• EURO knob.
• MIFARE Proximity Technology. The weight of the electronic components is negligible (less than a few milligrams).
• EURO DOUBLE model (version with the most components and with the interior also assembled).

• Cylinder: external measuring 90 mm and electronic and internal 70 mm only mechanical (although it can have two electronic components, the internal mechanical part is heavier). The selected SKU, maximum width 160 mm, is the longest possible.
• Wireless + BLE; a physical module is added consisting of a TESA plug-in circuit that allows Wireless and BLE communication.
• Color with surface finish (includes finish of the two external covers).
NON-MODULAR system (or monoblock). There is no MODULAR model equivalent to the NON-MODULAR model selected, but if there were the monoblock would be heavier.

This is the most unfavorable configuration that currently EXISTS because it includes ALL the components available when configuring the product which means that ALL the subassemblies and parts that may be needed are taken into consideration.

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

1.1 Content information

Product components

The main components of the SMARTair Knob Cylinder/TESA product are brass, alloy steel, and Zamak. A product composition table is provided.

Packaging materials

The packaging has the following composition:

The packaging has the following composition:

Material type	Weight (g)	%
Paper with adhesive	35.00	65.50%
Cardboard	17.06	31.93%
Wood (pallet)	1.38	2.58%
TOTAL	53.44	100.00%

Composition of the product analyzed (worst case scenario):

	Weight (g)	%
Steel	150.00	20.62%
Stainless steel	18.08	2.49%
Zamak-5	56.00	7.70%
Brass	439.77	60.45%
Electronics/PCB/Batteries	22.10	3.04%
Plastic (PA, PE, PS, PET)	28.975	3.98%
Magnet	6.400	0.88%
Other (interior packaging, user instructions, hardware)	6.126	0.84%
TOTAL	727.45	100.00%

Photo of the product analyzed (EURO double knob, NON-modular, electronic external 90 mm and mechanical internal 70 mm cylinder)

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 SMARTair Electronic Knob Cylinder/TESA product consists mainly of brass, 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 product is manufactured at TESA in Irun (Spain), although some modules are previously assembled in TESA's plant in Eskoriaza: Internal mechanical subassembly, external mechanical subassembly, etc. From there they are transported to the Irun plant where the assemblies are completed with their electronic components such as antenna, wireless and BLE module, and control circuit before finally performing mechanical and electronic checks.
Once the final testing is completed, the knob is packed in 1/1 cardboard boxes for the trip which are then put in travel boxes, and in turn these boxes are put in a box pallet for transport to their end destination.
The knob is packed in an individual transport box which also includes all the accessories required for its installation: User instructions, hardware for installation on wood, glass or metal doors and lock. Also included are the battery and a disassembly tool (plastic) for the outer cover.
The manufacturing process can be summarized in 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 Electronic Knob Cylinder) 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	47.06	475
Europe	Truck 16-32 Tn EURO VI	51.35	1272
Rest of the world	Truck 16-32 Tn EURO IV, VI, Container ship	1.59	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 (its impact accounted for in A1), closing the inside and initializing the knob, i.e. assigning a name and a list of authorized users which is transferred to the device by means of a portable programmer. The impact of the use of this portable programmer required for the configuration of the knobs is below the cut-off rules and therefore not considered in the study.

What is also considered outside the scope of the study is the impact of the other electronic knob 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 devices can communicate with a single hub which in turn can communicate with the management software to update, in both directions (PC - knob - PC), the information on the status of the devices on the door.

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.

This installation stage includes the impacts of the manufacturing of the control hub (its impact divided by the 30 accesses it controls) and of the end-of-life of the product packaging (cardboard, adhesive paper and wooden pallet).

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).

• Wood waste (pallets): Pallets are reused an estimated average of 6 times (sector).

2.3. Product use (B1-B7)

Use (B1)

The reference service life is 15 years under normal working conditions. This equates to passing a mechanical endurance test of 100,000 cycles as specified in /EN 15684/. 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 does not require any kind of maintenance during its service life (15 years).

Repair (B3)

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

Replacement (B4)

The product does not require any kind of replacement during its service life (15 years) except for changing the batteries.

Refurbishment (B5)

The product does not require any kind of rehabilitation during its service life (15 years).

Operational energy use (B6)

Once installed, the knob is powered by 1 CR2 battery. It is estimated that the energy input for its use is 1.5 Wh/year and that it has a service life of 2 years. Likewise, while in use the knob also has usage associated with the wireless system equipment: hub and central computer (the latter is not very significant since the computer is used for many other applications).

Operational water use (B7)

It does not require any water use.

2.4. End of life (C1-C4)

Deconstruction and demolition (C1)

Deconstruction and demolition: 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 knob 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 knob 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 0.727 kg over the reference service life of 15 years corresponding to a minimum of 100,000 use cycles.

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	5,61E+00	5,68E-02	7,35E-01	9,20E-02	1,65E-01	0,00E+00	0,00E+00	0,00E+00	4,20E-01	0,00E+00	2,15E+01	0,00E+00	0,00E+00	5,93E-03	1,47E-02	5,21E-03	-5,12E-01
Climate change - fossil (GWP-fossil)	kg CO2 eq	5,57E+00	5,68E-02	7,29E-01	9,19E-02	1,49E-01	0,00E+00	0,00E+00	0,00E+00	4,13E-01	0,00E+00	2,08E+01	0,00E+00	0,00E+00	5,92E-03	1,49E-02	5,20E-03	-5,16E-01
Climate change - biogenic (GWP-biogenic)	kg CO2 eq	1,47E-02	4,37E-05	3,55E-03	7,82E-05	1,54E-02	0,00E+00	0,00E+00	0,00E+00	5,31E-03	0,00E+00	6,42E-01	0,00E+00	0,00E+00	5,11E-06	-2,63E-04	2,70E-06	4,53E-03
Climate change - land use and changes in land use (GWP-luluc)	kg CO2 eq	1,77E-02	2,43E-05	2,41E-03	3,71E-05	2,04E-04	0,00E+00	0,00E+00	0,00E+00	7,79E-04	0,00E+00	4,93E-02	0,00E+00	0,00E+00	2,37E-06	2,85E-05	3,81E-06	6,70E-05
Ozone layer depletion (ODP)	kg CFC 11 eq	3,76E-07	1,30E-08	1,48E-07	2,13E-08	8,41E-09	0,00E+00	0,00E+00	0,00E+00	3,31E-08	0,00E+00	1,05E-06	0,00E+00	0,00E+00	1,37E-09	1,98E-09	2,89E-10	-1,75E-08
Acidification (AP)	mol H+ eq	2,48E-01	3,96E-04	3,79E-03	2,95E-04	3,53E-03	0,00E+00	0,00E+00	0,00E+00	8,55E-03	0,00E+00	1,18E-01	0,00E+00	0,00E+00	1,68E-05	1,78E-04	1,43E-05	-1,55E-03
Eutrophication of fresh water (EP-freshwater)	kg P eq	1,22E-03	3,84E-07	2,49E-05	6,51E-07	1,82E-05	0,00E+00	0,00E+00	0,00E+00	4,65E-05	0,00E+00	2,23E-03	0,00E+00	0,00E+00	4,22E-08	7,26E-07	8,59E-08	-2,15E-05
Eutrophication of sea water (EP-marine)	kg N eq.	2,90E-02	1,13E-04	6,97E-04	6,03E-05	2,46E-04	0,00E+00	0,00E+00	0,00E+00	6,56E-04	0,00E+00	1,51E-02	0,00E+00	0,00E+00	3,34E-06	3,92E-05	6,83E-06	-3,73E-04
Terrestrial eutrophication (EP-terrestrial)	mol N eq.	1,95E-01	1,25E-03	6,50E-03	6,72E-04	3,04E-03	0,00E+00	0,00E+00	0,00E+00	7,82E-03	0,00E+00	1,74E-01	0,00E+00	0,00E+00	3,72E-05	4,51E-04	3,86E-05	-4,38E-03
Photochemical ozone formation (POCP)	kg NMVOC eq	5,48E-02	3,53E-04	2,07E-03	2,46E-04	9,53E-04	0,00E+00	0,00E+00	0,00E+00	2,37E-03	0,00E+00	4,78E-02	0,00E+00	0,00E+00	1,43E-05	1,24E-04	1,14E-05	-2,84E-03
Depletion of abiotic resources - minerals and metals (ADP-minerals&metals)	kg Sb eq	6,09E-03	1,89E-07	6,99E-06	3,23E-07	7,61E-05	0,00E+00	0,00E+00	0,00E+00	1,58E-04	0,00E+00	1,93E-04	0,00E+00	0,00E+00	2,10E-08	1,77E-06	2,40E-08	1,10E-06
Depletion of abiotic resources - fossil fuels (ADP-fossil)	MJ, net calorific value	7,07E+01	8,51E-01	1,36E+01	1,39E+00	1,86E+00	0,00E+00	0,00E+00	0,00E+00	5,42E+00	0,00E+00	4,41E+02	0,00E+00	0,00E+00	8,97E-02	2,06E-01	3,59E-02	-4,08E+00
Water consumption (WDP)	m3 worldwide eq. private	5,10E+00	2,48E-03	4,04E-01	4,21E-03	8,60E-02	0,00E+00	0,00E+00	0,00E+00	2,35E-01	0,00E+00	5,17E+00	0,00E+00	0,00E+00	2,73E-04	2,72E-03	1,00E-03	-3,93E-02
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	5,51E+00	5,64E-02	7,16E-01	9,12E-02	1,55E-01	0,00E+00	0,00E+00	0,00E+00	4,07E-01	0,00E+00	2,07E+01	0,00E+00	0,00E+00	5,88E-03	1,48E-02	4,67E-03	-4,86E-01

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	1,51E+01	1,16E-02	1,99E+00	1,98E-02	2,71E-01	0,00E+00	0,00E+00	0,00E+00	7,42E-01	0,00E+00	8,86E+01	0,00E+00	0,00E+00	1,28E-03	3,20E-02	2,58E-03	2,11E-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	1,51E+01	1,16E-02	1,99E+00	1,98E-02	2,71E-01	0,00E+00	0,00E+00	0,00E+00	7,42E-01	0,00E+00	8,86E+01	0,00E+00	0,00E+00	1,28E-03	3,20E-02	2,58E-03	2,11E-01
Non-renewable primary energy use, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	7,07E+01	8,51E-01	1,36E+01	1,39E+00	1,86E+00	0,00E+00	0,00E+00	0,00E+00	5,42E+00	0,00E+00	4,41E+02	0,00E+00	0,00E+00	8,97E-02	2,06E-01	3,59E-02	-4,08E+00
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	7,07E+01	8,51E-01	1,36E+01	1,39E+00	1,86E+00	0,00E+00	0,00E+00	0,00E+00	5,42E+00	0,00E+00	4,41E+02	0,00E+00	0,00E+00	8,97E-02	2,06E-01	3,59E-02	-4,08E+00
Use of secondary materials	kg	1,67E-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	5,05E+00	2,49E-03	4,04E-01	4,24E-03	8,52E-02	0,00E+00	0,00E+00	0,00E+00	2,32E-01	0,00E+00	5,08E+00	0,00E+00	0,00E+00	2,75E-04	2,69E-03	9,93E-04	-3,76E-02
Hazardous waste removed	kg	2,27E-03	2,11E-06	1,63E-05	3,61E-06	8,65E-05	0,00E+00	0,00E+00	0,00E+00	2,21E-04	0,00E+00	3,36E-04	0,00E+00	0,00E+00	2,34E-07	5,94E-07	4,13E-08	-6,86E-05
Non-hazardous waste eliminated	kg	1,90E+00	4,08E-02	2,13E-01	7,21E-02	5,19E-02	0,00E+00	0,00E+00	0,00E+00	1,36E-01	0,00E+00	1,62E+00	0,00E+00	0,00E+00	4,70E-03	6,35E-03	9,56E-02	7,16E-02
Radioactive waste disposed of	kg	7,56E-04	5,77E-06	6,27E-05	9,40E-06	5,97E-06	0,00E+00	0,00E+00	0,00E+00	1,39E-05	0,00E+00	3,23E-03	0,00E+00	0,00E+00	6,06E-07	1,22E-06	1,67E-07	7,66E-06
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	6,54E-01	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	0,027 Kg
Contenido Carbono (biogénico) - producto	0 Kg

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 electronic knob/TESA

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.
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 has 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)
-EN15684
-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)	1 hub controls 30 devices. Out of scope because they are devices used by many connected devices: • Central computer The device's battery is not considered in this stage as it is included in stage A1.
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)	35 g Paper 17 g Cardboard 1 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). • 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 100,000 use cycles
Characteristics and properties of the product	Programmable electronic access control knob. Opening via RFID credentials / Bluetooth / wireless remote opening. Available in various formats and finishes.
Requirements (conditions of use, frequency of maintenance, repair, etc.)	N/A

4.4. Maintenance (B2), Repair (B3), Replacement (B4), or Refurbishment (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)	N/A
Energy inputs for the maintenance process (quantity and type of energy vector)	N/A
Net consumption of fresh water during maintenance or repair	N/A
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	N/A

Parameter	Parameter expressed per functional unit
Interchange of parts during the product life cycle	N/A
Energy inputs during maintenance, type of energy, example: electricity, and quantity	N/A
Energy input during the repair, renovation, replacement process if applicable and relevant (quantity and type of energy vector)	N/A
Material waste during repair (specifying each material)	N/A
Consumo neto de agua dulce	N/A

Replacement (B4)

Parameter	Parameter expressed per functional unit
Energy input during substitution, for example for the use of cranes (quantity and energy vector)	N/A
Change of worn parts in the product life cycle (specifying each material)	1 CR2 battery/every two years *6.5 replacement (for the knob's 15 year life, starting at the end of the second year) = 6.5 batteries The waste is: 1 battery x 7.5 = 7.5 waste batteries Replaced batteries should be treated as electronic electrical waste.
Net freshwater consumption	N/A

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)	N/A
Input material for rehabilitation, including auxiliary materials (specifying by material)	N/A
Waste of material during rehabilitation (specifying each material)	N/A

Parameter	Parameter expressed per functional unit
Other scenario development assumptions	N/A

4.5. Reference life

Parameter	Parameter expressed per functional unit
Reference life	15 years corresponding to a minimum of 100,000 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)	N/A
Type of energy vector. For example, electricity, natural gas, district heating	Electricity (electrical usage of the hub). The electrical usage of the batteries is underlying (they are charged in their manufacture and do not result in impacts due to direct emissions or processing).
Equipment output power	1 Hub controls 30 devices. Hub power considered: 12W (12-24 Vdc; max current 1A @ 12Vdc and 0.5A @ 24Vdc). Hub power usage (in 15 years): 12W x 365 d x 24h/d x 15 years = 1576.8 kWh / 30 devices = 52.6 kWh
Net freshwater consumption	N/A

Parameter	Parameter expressed per functional unit
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	kg for final disposal
	0.727	0.598	0.129
Assumptions for scenario development	According to EUROSTAT>Waste for building products, a recycling and recovery scenario is considered for reuse of 90% and remaining 10% to landfill.		

5. ADDITIONAL INFORMATION

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

Verification date:

16/10/2023

References

PRODUCT LIFE CYCLE ANALYSIS: SMARTair Electronic Knob/TESA
By: ECOPENTA SL. July 2023 (v2) (unpublished)

Programme Manager

Colegio de la Arquitectura Técnica de Barcelona (Cateb)
Bon Pastor, 5 · 08021 Barcelona www.apabcn.cat