ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Salto Systems
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SAL-20240577-IBA1-EN
Issue date	17/04/2025
Valid to	16/04/2030

Salto Neo cylinder

Salto Systems

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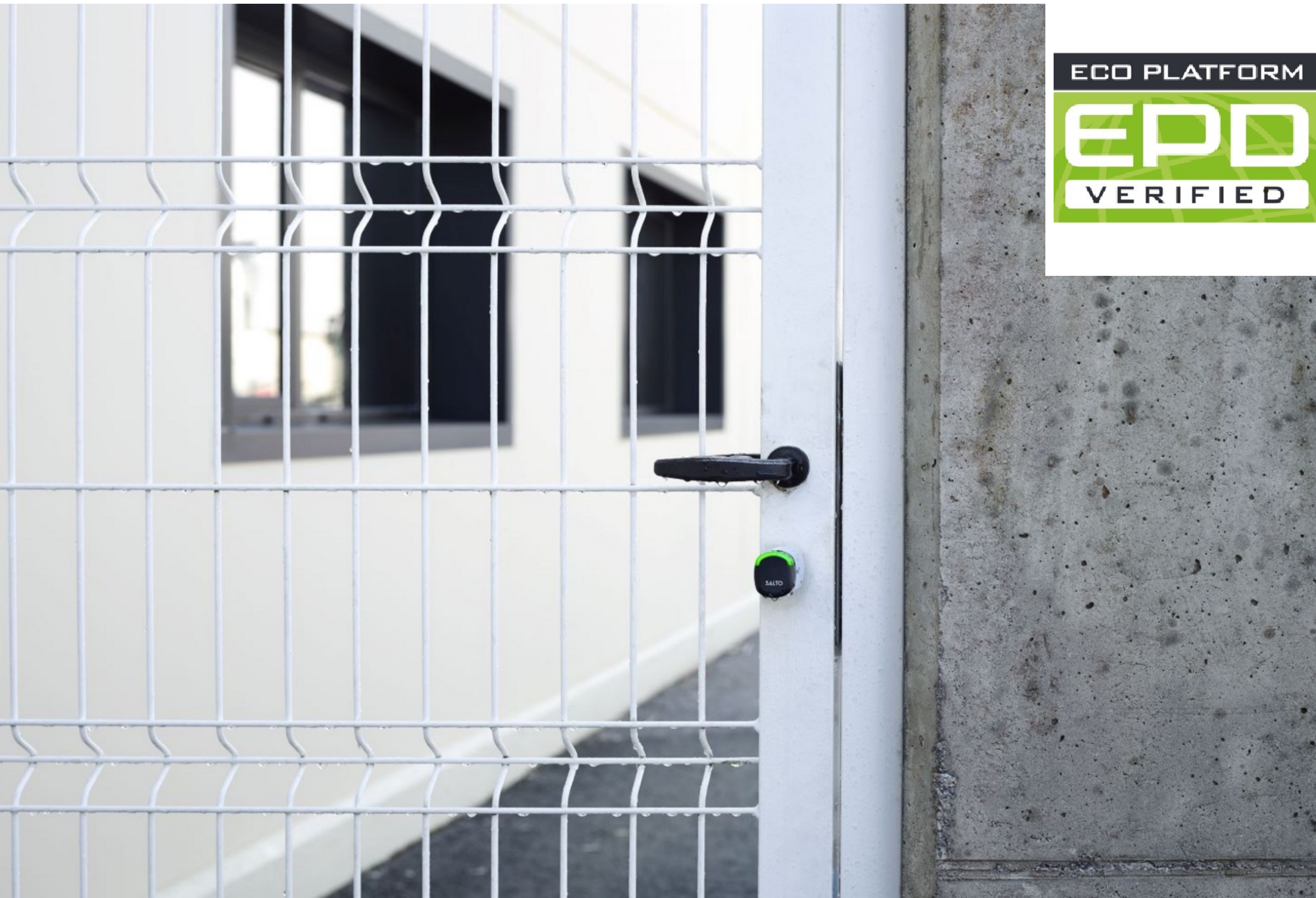

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1. General Information

Salto Systems

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-SAL-20240577-IBA1-EN

This declaration is based on the product category rules:

Building Hardware products, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

17/04/2025

Valid to

16/04/2030

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Salto Neo cylinder

Owner of the declaration

Salto Systems
Arkotz, Polígono Lanbarren 9
20180 Oiartzun
Spain

Declared product / declared unit

The declared unit consists of 1 piece of Salto Neo cylinder.

Scope:

This declaration is based on LCA data for Salto Neo cylinder.

Final assembly takes place in Salto Spain manufacturing facilities in Oiartzun, being external suppliers who provide the different elements to be incorporated into the device.

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.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Dr. Matthew Fishwick,
(Independent verifier)

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2. Product

2.1 Product description/Product definition

The SALTO Neo Cylinder is a smart door lock, that provides tailor-made wire-free access control.

The reader circuit, located within the cylinder knob, includes an RFID (Radio-Frequency Identification) smart reader. This includes a proximity RFID reading module that utilizes an inductive sensor to detect the presence of a smart credential in close proximity to the circuit. The module aims to identify a nearby proximity device such as a card, tag, fob, or mobile. Upon detecting a compatible device, it transmits the card information to the control circuit. The cylinder smart control unit either grants or denies access, consequently either opening the door or keeping it closed. An electronic cylinder lock seamlessly integrates with smart cards or mobile access systems, providing a secure and convenient solution for user authentication and access control.

Users are provided with smart keycards or mobile credentials that have unique IDs and customized access levels. To access a secure area, users simply place their keycard or smartphone near a reader connected to the electronic cylinder knob. The system verifies the credentials against predefined access rights and schedules. If authentication is successful, the lock is released. The electronic cylinder reader ID technology supports communication through RFID-based industry-standard technologies, Bluetooth Low Energy (BLE), or Near Field Communication (NFC), and is compatible with Salto JustIn Mobile core technology for the Salto smart access platform.

This EPD covers various cylinder standards, including: European standards, Scandinavian oval cylinders and security cylinders, American standard lock cylinders (mortise, rim, and deadbolt), Swiss standard cylinders and UK standard cylinders.

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) 2014 (with the exception of Switzerland) the following legal provisions apply: *Directive 2014/53/EU*, 16 April 2014, on the harmonisation of the laws of the Member States relating to the marking available on the market of radio equipment and repealing *Directive 1995/5/EC*, and the harmonised standards based on these provisions: *ETSI EN 300 328 / ETSI EN 300 330 / ETSI EN 301 489-1 / ETSI EN 301 489-3 / ETSI EN 301 489-17 / EN IEC 62368-1:2020 + A11:2020 / EN IEC 62311:2020 / EN IEC 63000:2018.*

The CE-marking considers the proof of conformity with the respective harmonized standards based on the legal provisions above. For the application and use the respective national provisions apply.

2.2 Application

The Salto Neo cylinder does not require hard wiring and it provides a totally wire-free networked electronic locking solution with a range of features.
The Salto Neo cylinder range is especially designed to fit on most standard doors and to work with the majority of Scandinavian, European and American standard lock cylinders (including mortise cylinders, rim cylinders, and deadbolt cylinders).
The Salto Neo cylinder can be installed indoors or outdoors (*), is the perfect solution for doors where fitting an electronic lock is either not possible or not required. Compact and wire-free, it can be installed on standard doors, server racks, gates, cabinets, electric switches, sliding doors, and more. This electronic cylinder is available in an extensive range of models to suit almost any kind of door need.
(*) A specific IP66 version is designed for outdoor installation.

SALTO has an international market and is primarily an exporter. This product is sold all over the world, in more than 80 different countries, in 12 different sectors or industries.

The main purpose of EPDs is for business-to-business communication. As all EPDs are publicly available and therefore are accessible to the end consumer they can also be used in business-to-consumer communication.

Salto's motivations for obtaining EPDs include the fulfilment of customer requirements, identification of products' main hotspots to establish improvements and reduce the environmental footprint, and justification to apply an eco-design methodology.

The intended use of the EPD is to communicate environmentally relevant information and LCA results to support the assessment of the sustainable use of resources and of the impact of construction works on the environment *CPR*.

2.3 Technical Data

The technical properties of Salto Neo cylinder are detailed in the next table:

Technical data

Name	Value	Unit
Power supply (batteries - VDC)	6	V
Current Requirements ...Peak opening	0.114	A
Current Requirements ...Standby	0.000014	A
Operating Temperature	-20 - 55	°C
Operating Humidity up to	80	%
Transmit Frequency	13560	kHz
Power Consumption NSC - w/IPM	0.150 standby	mW
Peak Power Draw during card read	225 - 0.177	W

VDC - Volts Direct Current
NSC - Normal Standby Current
IPM - Intelligent Power Management Mode

CE marked product *RED Directive* compliance.
Additional internal testing for humidity.
Performance data of the product with respect to its characteristics in accordance with the relevant technical provision which can be applied are mentioned above.

2.4 Delivery status

Units are packed individually in cardboard boxes together with specifications, mounting scheme and batteries.
Cardboard packaging dimensions are: 200 mm x 52 mm x 64 mm.

2.5 Base materials/Ancillary materials

Materials

The material composition of a single device is given in percentages (%); packaging and labelling are not included in this table.

Name	Value	Unit
Steel	14.9	%
Stainless steel	8.2	%
Batteries (Other)	8.1	%
Bronze	0.1	%
Electronic	1.3	%
Zinc alloy	27.4	%
Plastics	5.6	%
Brass	34.4	%

REACH compliance
This product contains substances listed in the *candidate list* (date: 28.06.2023) exceeding 0.1 percentage by mass: no.

This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on *the candidate list*, exceeding 0.1 percentage by mass: no' Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no

2.6 Manufacture

Salto Neo cylinders are fully designed and assembled manually in Salto 's facilities in Oiartzun, Spain. Most of the components included in the device are produced in Spain by different companies except for some steel pieces (made in China) and a washer (made in USA).
The factory of Salto has a certification of Quality Management System in accordance with *ISO 9001*.

2.7 Environment and health during manufacturing

Salto Systems is highly committed to the health and safety of the people working in its facilities and offices.

All relevant risks have been evaluated and controlled, training activities promoted and communication plans defined to keep workers protected.

There is a Code of Conduct covering human rights, adequate labour conditions, ethics and respect for the environment, for supplies in risk areas defined by UNESCO.

Environmental protection.

Salto's factory is *ISO 14001* certified, meaning that environmental aspects (water, energy, wastes, etc.) are identified, monitored and audited periodically, and that there is a verification of
complete compliance with environmental legislation.

In addition, Salto has calculated the carbon footprint of the main products focusing on the life cycle. There are plans to reduce greenhouse gas emissions in the manufacturing and transport processes and other different plans about environmental sustainability in design and manufacture. There is also a Climate Change Policy.
All wastes generated are controlled, minimized when possible and recycled.

2.8 Product processing/Installation

The installation of Salto Neo cylinder is performed with the aid of hand tools by trained installers. The assembly instructions and mounting scheme are included inside the packaging of each unit.

2.9 Packaging

Product packaging consists of a cardboard box including product labels, batteries, a mounting scheme and instructions in a plastic bag, all of which are transported in a wooden pallet with more plastic film.
The amount of packaging material per product is 0.287 kg of cardboard/paper (63.3 %), 0.024 kg of plastic (5.3 %) and 0.142 kg of wood (31.4 %). The total weight of the packaging is 0.454 kg.

All packaging materials are recyclable.

European waste codes:

- Cardboard packaging 15 01 01
- Plastic packaging 15 01 02

2.10 Condition of use

During the use of the device under normal conditions, no maintenance is needed, with the exception of replacement batteries when required.

Special cleaning is not needed.

2.11 Environment and health during use

There are no interactions between the device and the environment or health while it is operating.

2.12 Reference service life

According to *EN 15684*, 100.000 cycles have been certified for the Salto Neo Cylinder. Each cycle includes opening and movement on one side to open plus movement on the other side to close. This adds up to 200.000 openings and movements.
A battery change is calculated every 4 years approximately, depending on use. Four battery exchanges are considered within the RSL.
Description of the influences on the ageing of the product when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire
The Fire resistance is *EN 1634-1 Ei60*, Ei90 and Ei120 compliant (European models) and *UL10C* (Mortise model US).

The product is Solid particle resistant IP66, meaning that the quantity of dust ingress is not sufficient to interfere with normal operation.
Water
There is no interaction between the device and water under normal conditions or in case of flood.

Liquid ingress resistant: water projected against powerful jets 12.5 mm (IP66) for outdoor version.

Mechanical destruction
During unexpected mechanical destruction, batteries might be broken and their content released.

2.14 Re-use phase

The device can be re-used, moving it from one door to another one until the end of its service life, though this is not a typical procedure.

2.15 Disposal

Disposal of the device is under Waste of Electrical and Electronic Equipment - WEEE) European
Directive (*Directive 2012/19/EU WEEE*).

The device can be disassembled and most of the components are recyclable or reused; the rest are used for energy recovery by incineration.

According to *EWC- European Waste Codes,* waste codes are*:*

- *EWC/ 16 02 13* discarded equipment containing hazardous components (1) other than those mentioned in 16 02 09 to 16 02 1*
- *EWC/ 17 04 05 iron, steel*
- *EWC/ 17 04 01 copper, bronze*
- *EWC/ 17 04 11 cables*
- *EWC/ 17 04 04 zinc*
- *EWC/ 17 02 03 plastic*

2.16 Further information

Additional information about Salto Neo cylinder can be found in:

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20180 Oiartzun – Gipuzkoa - Spain

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3. LCA: Calculation rules

3.1 Declared Unit

The declared unit refers to 1 piece of Salto Neo cylinder as specified in IBU PCR PART B requirements on the EPD for Building Hardware products.

Declared unit

Name	Value	Unit
Declared unit	1	pce.
Mass total system	0.45	kg
Conversion factor to 1 kg	2.222	-
Mass reference	0.45	kg/pce

3.2 System boundary

The EPD is of type "cradle to gate - with options". The following life cycle stages have been considered under this declaration as part of the system boundaries:
Module A1-A3 – The product stage includes provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage.
Module A5 – installation, only packaging waste treatment included.
Module B6 – operational energy use, including the production of batteries and their disposal over their lifetime. Salto Neo cylinder is powered using batteries and is not connected to mains electricity.
Modules C1 to C4 for End-of-Life (EoL) stages, including waste processing for thermal recovery of plastic parts and incineration of the printed wired board and recycling of metals. It starts when the product is replaced, dismantled, or deconstructed from the building or construction works and does not provide any further function.
This stage comprises: De-installation (C1), Transport to waste processing (C2), Waste processing for reuse, recovery and/or recycling (C3), Disposal (C4).
Module D includes benefits and loads beyond the system boundaries resulting from the recycling and recovery processes taking place under modules A5 and C3.

3.3 Estimates and assumptions

For transporting components from European suppliers, a worst-case distance of 590 km has been used (module A2), a worst-case approach has been applied in the model for all materials in the product and packaging coming from European suppliers: 590 km by truck.
A few exceptions apply:
One sinterized steel component comes from Italy and a distance of 1.250 km by truck has been used.
Some steel components come from Asia (China and Taiwan) so a distance of 570 km by truck and 10.400 km by plane has been used according to the data collected by SALTO.
One component comes from US, so a distance of 800 km by truck and 5.800 km by plane has been used according to the data collected by Salto.

For the environmental impact in A3, Salto has a photovoltaic system installed on site that generated 22 % of their electricity requirements during the year of this study. The remaining electricity is purchased from a Spanish electricity provider that has guarantees of origin for 100 % of the electricity sold to Salto with the following composition, which has been represented accordingly in the model following the requirements of the PCR Part A. The proportion of the electricity demand covered by green electricity in the total electricity demand is 100 %. In the end-of-life phase, a 100 % collection rate is assumed for the recycling scenarios.

3.4 Cut-off criteria

All available relevant data from the production process have been considered, i.e. all raw materials usage and electric power consumption, and modelled using the best available Life Cycle Inventory (LCI) datasets.

Only small amounts of oil used in the laboratory or grease for some machines, as well as production waste, were not considered in the modelling. These represent less than 1 % of mass and have negligible environmental impact relevance compared with the rest of the materials and energy inputs used to make the product.

The sum of the excluded material flows does not exceed 5 % of mass, energy or environmental relevance.

Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment.

Transport processes for the packaging materials have also been neglected.

3.5 Background data

The background data has been taken from the latest available *Sphera LCA FE* (GaBi) database MLC CUP 2024.1 (Sphera Managed Lifecycle Content (MLC)). The requirements for data quality and background data correspond to the specifications of *IBU Part A*.

3.6 Data quality

The level and criteria of the global guidelines of the United Nations for the development of life cycle assessment databases (UN Environment Global Guidance on LCA database development) were applied.

3.7 Period under review

The collection of the foreground data refers to the year 2023 (12 months).

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

3.9 Allocation

The overall production of Salto comprises further products besides the products considered in this study. Data for thermal and electrical energy as well as packaging refer to the declared product. During data collection, the allocation is done via pieces produced (yearly total produced products).
Production waste is not considered in this study.
For all EoL waste streams, 100 % scenarios were accounted for, applying the following logic to determine the respective treatment process:
Metals: material recycling
Substances with calorific value: thermal treatment Substances without calorific value: landfill

For metals, European scenarios were used to calculate benefits where available. If European scenarios were not available (e.g., steel, copper), global average data were used. After collection in the end-of-life stage, the needed external scrap is fed back into the production. The recycling potential is then calculated considering the net scrap and the value of scrap methodology. Of the metals used, only steel and stainless steel have recycled content.
In the end-of-life phase, the input parameters of the production phase are used to calculate the waste streams. A function ensures that all inputs also undergo EoL treatment.

All applied incineration processes are displayed via a partial stream consideration for the combustion process, according to the specific composition of the incinerated material. For the waste incineration plant, an R1-value of 0.6 is assumed.

Environmental burden of the incineration of packaging and the product in the End-of-Life scenario are assigned to the system (A5 or C3); resulting benefits for thermal and electrical energy are declared in module D.

Paper/corrugated board is used as packaging material and this usually includes a mix of recycled and virgin fibres. When modelling the production of paper, the scrap paper that is used in this process has been assumed to be burden-free.

Cardboard packaging is incinerated as waste treatment and a cut-off approach at end of life has been applied, i.e., the input of waste paper is considered without environmental burden, resulting waste paper is not credited (no energy benefits). The C-balance is balanced.

3.10 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. The background data has been taken from the latest available *Sphera LCA FE* (GaBi) database MLC CUP 2023.1 (Sphera Managed Lifecycle Content (MLC)).

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The calculation of the biogenic carbon content is based on the assumption, that the absolutely dry wood/paper/cardboard mass consists of 50 % biogenic carbon. Aside from the packaging, the product's life cycle does not have any other sources of biogenic carbon content.

Information on describing the biogenic Carbon Content at factory gate

Amount of carton in the packaging: 0.287 kg
Amount of wood in the packaging: 0.142 kg

Name	Value	Unit
Biogenic carbon content in accompanying packaging	0.207	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

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

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Paper packaging)	0.287	kg
Output substances following waste treatment (Plastic packaging)	0.024	kg
Output substances following waste treatment (wood packaging)	0.142	kg

The RSL of the actual product will always depend on its use according to the stated conditions.

Reference service life

Name	Value	Unit
Reference service life (according to ISO 15684)	15	a

Operational Energy use (B6)

Salto Systems' proximity locks are powered using batteries, they are not connected to mains electricity. These batteries are provided by Salto Systems to the supplier as part of the product (production of the batteries considered under B6). During the operation of the escutcheon, the only energy consumption is from the batteries themselves. These must be exchanged four times over the declared RSL.

Name	Value	Unit
Power supply batteries - VDC	6	V
Current requirements, Peak opening	0.114	A
Current requirements, Standby	0.000014	A
Power Consumption NSC - w/IPM	0.150 standby	mW
Peak Power Draw during card read	0.255 / 0.177	W

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type steel, stainless steel, aluminium, plastic, copper and other metals, as well as electronics	0.42	kg
Collected as mixed construction waste	0.038	kg
Recycling steel	0.197	kg
Recycling stainless steel	0.045	kg
Recycling electronic and metals	0.005	kg
Recycling light copper	0.155	kg

Distance from user to EoL site (C2) 50 km.

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5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	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	MND	X	MND	MND	MNR	MNR	MNR	X	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece Neo cylinder

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	4.2E+00	7.16E-01	9.93E-01	0	2.57E-03	1.49E-01	5.84E-04	-7.18E-01
GWP-fossil	kg CO_2 eq	4.81E+00	9.17E-02	9.92E-01	0	2.52E-03	1.48E-01	5.66E-04	-7.18E-01
GWP-biogenic	kg CO_2 eq	-6.18E-01	6.24E-01	4.97E-04	0	6.08E-06	8.86E-04	1.5E-05	-3.26E-04
GWP-luluc	kg CO_2 eq	6.52E-03	9.21E-06	3.76E-04	0	4.28E-05	1.84E-05	3.4E-06	-4.31E-04
ODP	kg CFC11 eq	5.91E-11	8.7E-14	2.8E-12	0	3.75E-16	2.25E-12	1.53E-15	-1.62E-13
AP	mol H^+ eq	2.67E-02	1.6E-04	9.43E-03	0	2.72E-05	2E-04	4.02E-06	-3.01E-03
EP-freshwater	kg P eq	2.23E-05	2.38E-08	7.6E-07	0	1.09E-08	4.14E-07	1.29E-09	-6.61E-07
EP-marine	kg N eq	4.01E-03	5.47E-05	1.25E-03	0	1.38E-05	5.02E-05	1.03E-06	-6.39E-04
EP-terrestrial	mol N eq	4.28E-02	7.18E-04	1.35E-02	0	1.52E-04	5.45E-04	1.14E-05	-7E-03
POCP	kg NMVOC eq	1.24E-02	1.47E-04	3.94E-03	0	2.63E-05	1.33E-04	3.17E-06	-1.93E-03
ADPE	kg Sb eq	9.36E-04	9.2E-10	4.75E-05	0	2.22E-10	1.86E-08	3.67E-11	-2.52E-04
ADPF	MJ	6.91E+01	1.94E-01	1.22E+01	0	3.35E-02	2.1E+00	7.46E-03	-7.82E+00
WDP	m^3 world eq deprived	1.45E+00	8.32E-02	1.68E-01	0	3.94E-05	3.22E-02	6.48E-05	-1.49E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece Neo cylinder

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
PERE	MJ	2.7E+01	7.73E+00	1.65E+00	0	2.89E-03	1.5E+00	1.3E-03	-9.69E-01
PERM	MJ	7.67E+00	-7.67E+00	0	0	0	0	0	0
PERT	MJ	3.47E+01	6E-02	1.65E+00	0	2.89E-03	1.5E+00	1.3E-03	-9.69E-01
PENRE	MJ	6.75E+01	1.27E+00	1.22E+01	0	3.35E-02	2.66E+00	7.46E-03	-7.82E+00
PENRM	MJ	1.65E+00	-1.08E+00	0	0	0	-5.69E-01	0	0
PENRT	MJ	6.92E+01	1.9E-01	1.22E+01	0	3.35E-02	2.09E+00	7.46E-03	-7.82E+00
SM	kg	2.06E-01	0	0	0	0	0	0	1.97E-01
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	3.66E-02	1.96E-03	4.73E-03	0	3.22E-06	1.26E-03	1.98E-06	-9.73E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece Neo cylinder

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
HWD	kg	1.27E-06	1.12E-10	3.72E-08	0	1.28E-12	0	1.86E-12	-1.39E-05
NHWD	kg	2.26E-01	1.87E-02	1.65E-01	0	5.48E-06	7.36E-03	3.78E-02	9.19E-03
RWD	kg	3.2E-03	9.96E-06	2.3E-04	0	6.11E-08	3.32E-04	7.84E-08	-1.45E-04
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	5.08E-03	0	0	0	0	3.98E-01	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	4.88E-01	0	0	0	7.72E-02	0	0
EET	MJ	0	8.75E-01	0	0	0	1.76E-01	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece Neo cylinder

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
PM	Disease incidence	3.14E-07	9.36E-10	7.71E-08	0	2.66E-10	1.71E-09	5.04E-11	-4.11E-08
IR	kBq U235 eq	3.5E-01	1.57E-03	2.48E-02	0	8.86E-06	5.46E-02	9.07E-06	-2.42E-02
ETP-fw	CTUe	3.06E+01	8.56E-02	2.16E+00	0	2.49E-02	6.1E-01	4.3E-03	-2.85E+00
HTP-c	CTUh	1.07E-07	6.28E-12	1.29E-07	0	5.08E-13	3.46E-11	1.02E-13	-2.48E-09
HTP-nc	CTUh	5.74E-08	2.04E-10	4.4E-09	0	2.26E-11	5.81E-10	3.92E-12	-1.2E-09
SQP	SQP	5.65E+01	5.99E-02	2.64E+00	0	1.65E-02	8.8E-01	2.06E-03	-2.8E-01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

It is visible that the manufacturing phase dominates the product system. In addition, the packaging treatment in module A5 has visible environmental impacts. The use phase of the declared product also has a relevant impact in the product's life cycle as shown in module B6. Finally, EoL treatments have a low burden in modules C2, C3 and C4 while it leads to benefits in module D. Module C1 does not have any impact since the product is manually disassembled.
The trends observed for GWP, where the manufacturing stage, primarily the production stage (A1-A3) dominates the impact of the declared product, are also valid for all other impact indicators, except GWP biogenic. The use phase is similarly relevant in all categories, except GWP biogenic, GWP luluc, ODP, EPf and ADP element. Module D is slightly visible in all categories in a similar order of magnitude as for GWP, except for GWP biogenic and ODP.
Electric and electronic components is the main contributor in most impact categories of the LCA, except for GWP biogenic, ODP and ADP element.
In the impact categories GWP total, GWP fossil, GWP luluc, ODP, AP, EPm; EPt, POCP, ADP elements, ADP fossils, and Water use, electric and electronic components contribute between 22 % and 56 %. In EPf the relative impact is up to 77 %. In all categories, for the knob printing wiring board, the highest contribution comes from the integrated circuits (ICs) and the unpopulated printed circuit board (PCB) used to model the Antenna Circuit and the printed circuit board assembly of the knob, similarly for the motor, the highest contribution comes from the ICs and connectors.
In addition to the electric and electronic components, the mechanical components in the product contribute between 0.2 %-13 % in all impact categories except ADP elements, where they contribute up to 47 %. The impact proportions of each type of metal are similar in all impact categories except in ADP elements, where the main contributor is zamak (zinc-based part) with 47 % contribution to the total, which is mainly due to upstream elements such as lead and silver of the component made of zamak. This is followed in ADP by the electric and electronic components (22 %) mainly due to precious metal elements in the upstream such as gold.
For biogenic global warming potential, the main contributors are the cardboard packaging and wood pallets, where the absorption of atmospheric carbon dioxide during plant growth is also shown. In other impact categories, packaging shows relatively low contributions (below 5 %).
For the depletion potential of the stratospheric ozone layer (ODP), 54 % of the impact comes from electricity and 30 % comes from electric and electronic components. However, because of the phase-out of ODP-relevant substances is due to be completed by 2030, the indicator still includes background data with very few and minor residues that make a further and meaningful interpretation of this indicator difficult, but it has been included for reasons of completeness.
The use phase, consisting mainly of battery usage and disposal, shows relatively low contribution in the impact categories studied. It contributes 5 %-24 % in all categories except GWP biogenic, GWP luluc, ODP, ADP elements, and EPf, where upstream elements do not play a role for this dataset.
In short, in the manufacturing stage, electric and electronic components together with zamak and electricity used for processing are the main hotspots in all categories, except for GWP biogenic, which is mainly derived from packaging. The remaining mechanical components, taking up 64 wt% of the product weight, only contribute to a relatively negligible impact. The use phase contributes the most after the manufacturing stage in all impact categories.

7. Requisite evidence

There are no negative impacts on the environment or human health during the use phase of the product.

8. References

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