ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	SALTO SYSTEMS S.L.
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SAL-20240292-IBC1-EN
Issue date	12/12/2024
Valid to	11/12/2029

XS4 Original+ (narrow body version)

SALTO Systems

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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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-20240292-IBC1-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

12/12/2024

Valid to

11/12/2029

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

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

XS4 Original+ (narrow body version)

Owner of the declaration

SALTO SYSTEMS S.L.
Arkotz 9, Polígono Lanbarren .
20180 Oiartzun - Gipuzkoa
Spain

Declared product / declared unit

The declared unit consists of 1 piece of XS4 Original+ (narrow body version).

Scope:

This declaration is based on LCA data for SALTO's XS4 Original+ narrow body version for European and Scandinavian versions, not including the mortise lock.
Final assembly takes place in SALTO manufacturing facilities in Oiartzun (Spain), 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)

2. Product

2.1 Product description/Product definition

The Salto Systems XS4 Original+ (narrow body version) is a proximity lock series that provides tailor-made wire-free access control.

The reader circuit includes a proximity reading module that uses an infrared sector to detect when an object is near the circuit, and tries to find a proximity device (card, tag, fob, mobile, etc.). If it finds one, it sends the information of the card to the control circuit and the control unit either grants or denies access – opening the door, or keeping it closed.

The reader can communicate in several forms: RFID Based Scalable Technologies, Bluetooth low energy (BLE) or JustIn Mobile Solutions, and the credentials formats can be: cards, tags, fobs, smartphones.
This EPD covers the European and Scandinavian version of the SALTO XS4 Original+ (narrow body version) escutcheon. The only difference between these two versions is where the handle is placed. For European escutcheons it is in the middle, for Scandinavian ones on the bottom. The worst-case scenario has been used for each parameter when making the corresponding calculations.

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 XS4 Original+ (narrow body version) electronic escutcheon sets need no hard wiring and provide a totally wire-free networked electronic locking solution with a range of features.

The XS4 Original+ (narrow body version) escutcheon range is specially designed to fit on most standard doors and work with the majority of Scandinavian, European and American National Standards Institute (ANSI) mortise locks and tubular latches.

The Salto Systems XS4 Original+ escutcheon (narrow body version) can be installed indoors or outdoors (*), wherever individual access control is needed, e.g. office and government buildings, healthcare, sports facilities, public institutions, education, hospitality, and airports.
(*) A specific IP55 version is designed for outdoor installation (the internal part is IP44).
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 motivations for obtaining EPDs are varied:
1. Customer requirements.
2. To know the points of greatest impact of our products to be able to establish improvements and reduce the environmental footprint.
3. To justify the application of the 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.

2.3 Technical Data

The technical properties of XS4 Original+ (narrow body version) are detailed in this table.

Technical data

Name	Value	Unit
Power supply (batteries - VDC)	4.5	V
Current Requirements ...Peak opening	0.4	A
Current Requirements ...Standby	0.00007	A
Operating Temperature	-35 - 60	°C
Operating Humidity up to	80	%
Transmit Frequency	13560	kHz
Power Consumption NSC - w/IPM	0.3/ 0.23 standby	mW
Peak Power Draw during card read	0.4	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.
UNE-EN 179:2009 certified.
Performance data of the product with respect to its characteristics in accordance with relevant technical provisions which can be applied are mentioned above.

2.4 Delivery status

Units are packed individually in cardboard boxes together with specifications, a mounting scheme and batteries.
Cardboard packaging dimensions are: 310 mm x 235 mm x 58 mm.

2.5 Base materials/Ancillary materials

Materials

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

Name	Value	Unit
Steel	45.0	%
Stainless steel	37.5	%
Batteries (Other)	2.1	%
Brass, bronze	0.3	%
Electronic	2.4	%
Zinc	9.8	%
Plastics	2.8	%

This product/article/at least one partial article 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 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

XS4 Original+ (narrow body version) escutcheons are fully designed and assembled in SALTO Systems' facilities in Oiartzun, Spain.
Most of the components included in the device are produced in Spain by different companies except for the handles (made in China) and the motor.
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 people 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.

RoHs2 compliance.

Pursuant to the legal requirements established by the European Union with respect to restrictions on the use of certain dangerous substances in electrical or electronic appliances, SALTO Systems S.L. guarantees that all its products comply with *EU Directive 2015/863* (ROHs 3) and that, according to *EN 50581:2012*, these products contain Pb (Plumbum), Cr VI (chromium-6), PBB (polybrominated biphenyl), PBDE (polybrominated diphenyl ether), DEHP (diethylexyl phthalate), BBP (benzyl butyl phthalate), DBP (dibutyl phthalate) and DIBP in concentrations below 0.1% by weight and Cd (cadmium) and Hg (mercury) in concentrations below 0.01% by weight in all homogeneous materials.

Environmental protection.

SALTO Systems' 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 Systems 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. All wastes generated are controlled, minimized when possible and recycled.

2.8 Product processing/Installation

The installation of XS4 Original+ (narrow body version) escutcheon 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.

The amount of packaging material per product is 0.486 kg of cardboard/paper (99.50 %) and 0.075 kg of plastic (0.5 %). The total weight of the packaging is 0.561 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

The XS4 Original+ narrow version is certified according to both EN16867 and DIN18273 for 400.000 cycles (Service Life of 400.000 openings). Under normal conditions and depending on cycle frequency, door weight etc., this means an approximate duration of 15 years and 4 battery changes.

2.13 Extraordinary effects

Fire

The Fire resistance is /EN 1634-1/ Ei30 and Ei160 compliant.
The product is solid particle resistant, 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 dust and water IP54 on the outer escutcheons and IP44 on the inner escutcheons.

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 (/WEEE Directive 2012/19/EU/).*

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

According to /European
Waste Catalogue and Hazardous Waste list/ (EWC), 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, brass*
- *EWC/ 17 04 11 cables*
- *EWC/ 17 04 04 zinc*
- *EWC/ 17 02 03 plastic*

2.16 Further information

Additional information about SALTO Systems' XS4 Original+ (narrow body version) escutcheon can be found in:

SALTO Systems HQ, Spain

salto
INSPIRED ACCESS
Arkotz 9, Polígono Lanbarren
20180 Oiartzun – Gipuzkoa - Spain
Tel.: +34 943 344 550
E-mail: info@saltosystems.com
http://www.saltosystems.com

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit refers to 1 piece of SALTO XS4 Original+ (narrow body version) escutcheons as specified in *IBU PCR PART B* requirements on the EPD for Building Hardware products.

Declared unit

Name	Value	Unit
Declared unit for readers	1	pce.
Mass (total system)	1.63	kg
Conversion factor to 1 kg	0.613	-
Mass reference	1.63	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 life-time. XS4 Original+ (narrow body version) is powered using batteries and is not connected to mains electricity. Modules B1 to B5 and B7 are considered non-relevant for the smart lock and therefore not declared.

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, mainly from Spain, a worst-case distance of 590 km has been used (module A2). Some steel components come from Asia so a distance of 11.000 km by truck and 10.500 km by plane has been used.

In the end-of-life phase, a 100% collection rate is assumed for the recycling scenarios.
For the environmental impact in A3, the use of green electricity was calculated taking into account the residual electricity mix for the remaining electricity. The proportion of the electricity demand covered by green electricity in the total electricity demand is 100%.

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 2023.1* (*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 2022 (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 Systems 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 C4); 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. Sphera's Managed LCA Content database serves as background database for the calculation.

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 43 % 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: 0.486 kg

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.21	kg C

Note: 1 kg of biogenic carbon content 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)	0.486	kg
Output substances following waste treatment (Plastic packaging)	0.0752	kg

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 4 times over the declared RSL.

Name	Value	Unit
Power supply (batteries - VDC)	4.5	V
Current Requirements Peak opening	0.4	A
Current Requirements Standby	0.00007	A
Power Consumption NSC - w/IPM	0.3/0.23 standby	mW
Peak Power Draw during card read	0.4	W

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

Reference service life

Name	Value	Unit
RSL (according to EN16867 and DIN18273 for 400.000 cycles, 400.000 openings)	15	year

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type steel, stainless steel, aluminum, plastic, copper and other metals, as well as electronics	1.62	kg
Collected as mixed construction waste	0.043	kg
Recycling steel	0.917	kg
Recycling stainless steel	0.624	kg
Landfilling	0.043	kg
Recycling electronic and metals	0.0368	kg

Distance from user to EoL site (C2) 100 km.At EoL, materials in the product are separated as far as possible for individual treatment after deinstallation, which only requires manual removal of screws (No loads in C1).

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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 XS4 Original+ narrow body version

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	9.59E+00	9.24E-01	1.57E+00	0	8.9E-03	1.39E-01	6.53E-04	-3.85E+00
GWP-fossil	kg CO_2 eq	1.02E+01	2.52E-01	1.56E+00	0	8.79E-03	1.39E-01	6.51E-04	-3.85E+00
GWP-biogenic	kg CO_2 eq	-6.5E-01	6.71E-01	1.01E-03	0	2.62E-05	5.41E-05	5.08E-08	1.06E-02
GWP-luluc	kg CO_2 eq	7.22E-03	4.05E-06	3.55E-04	0	8.22E-05	3.12E-06	2.02E-06	-5.97E-03
ODP	kg CFC11 eq	6.79E-11	9.55E-14	3.85E-12	0	1.15E-15	1.08E-13	1.65E-15	3.21E-12
AP	mol H^+ eq	4.87E-02	2.13E-04	1.47E-02	0	9.75E-05	4.03E-05	4.61E-06	-1.88E-02
EP-freshwater	kg P eq	3.15E-05	2.9E-08	1.17E-06	0	3.24E-08	2.6E-08	1.31E-09	-3.41E-06
EP-marine	kg N eq	9.19E-03	7.4E-05	1.95E-03	0	4.92E-05	1.26E-05	1.19E-06	-2.92E-03
EP-terrestrial	mol N eq	9.94E-02	9.72E-04	2.12E-02	0	5.43E-04	1.83E-04	1.31E-05	-3.17E-02
POCP	kg NMVOC eq	2.78E-02	1.97E-04	6.03E-03	0	9.25E-05	3.33E-05	3.6E-06	-9.17E-03
ADPE	kg Sb eq	1.18E-03	8.73E-10	7.48E-05	0	5.84E-10	8.27E-10	3E-11	-2.14E-04
ADPF	MJ	1.35E+02	2.45E-01	1.93E+01	0	1.21E-01	1.45E-01	8.66E-03	-4.01E+01
WDP	m^3 world eq deprived	1.93E+00	1.07E-01	2.55E-01	0	1.07E-04	1.61E-02	7.14E-05	-9.16E-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 XS4 Original+ narrow body version

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
PERE	MJ	2.79E+01	8.81E+00	2.4E+00	0	8.8E-03	6.54E-02	1.41E-03	-3.75E+00
PERM	MJ	8.75E+00	-8.75E+00	0	0	0	0	0	0
PERT	MJ	3.67E+01	5.96E-02	2.4E+00	0	8.8E-03	6.54E-02	1.41E-03	-3.75E+00
PENRE	MJ	1.31E+02	3.7E+00	1.93E+01	0	1.21E-01	1.55E+00	8.67E-03	-4.03E+01
PENRM	MJ	4.86E+00	-3.46E+00	0	0	0	-1.4E+00	0	0
PENRT	MJ	1.35E+02	2.45E-01	1.93E+01	0	1.21E-01	1.45E-01	8.67E-03	-4.03E+01
SM	kg	4.62E-01	0	0	0	0	0	0	1.15E+00
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	5.19E-02	2.52E-03	7.27E-03	0	9.64E-06	4.01E-04	2.19E-06	-3.97E-02

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 XS4 Original+ narrow body version

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
HWD	kg	1.72E-06	7.5E-12	5.52E-08	0	3.76E-13	0	1.89E-13	-2.17E-04
NHWD	kg	4.61E-01	2.26E-02	2.59E-01	0	1.85E-05	1.9E-02	4.33E-02	-1.33E-02
RWD	kg	4.27E-03	1.32E-05	4.21E-04	0	2.27E-07	1.39E-05	9.88E-08	-1.77E-04
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	5.94E-02	0	0	0	0	1.54E+00	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	5.02E-01	0	0	0	2.19E-01	0	0
EET	MJ	0	8.93E-01	0	0	0	4.9E-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 XS4 Original+ narrow body version

Parameter	Unit	A1-A3	A5	B6	C1	C2	C3	C4	D
PM	Disease incidence	5.96E-07	1.17E-09	1.21E-07	0	9.22E-10	4.37E-10	5.67E-11	-3.38E-07
IR	kBq U235 eq	4.54E-01	2.1E-03	4.61E-02	0	3.39E-05	2.18E-03	1.14E-05	-3.06E-02
ETP-fw	CTUe	6.38E+01	1.15E-01	4.15E+00	0	8.59E-02	6.34E-02	4.73E-03	-1.81E+01
HTP-c	CTUh	9.34E-07	7.2E-12	4.02E-10	0	1.78E-12	4.12E-12	7.27E-13	-3.15E-08
HTP-nc	CTUh	1.7E-07	2.74E-10	1.41E-08	0	1.09E-10	2.72E-10	8E-11	-2.8E-08
SQP	SQP	2.16E+01	7.19E-02	4.11E+00	0	5.05E-02	4.97E-02	2.1E-03	-3.04E+00

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

This EPD was created using a software tool.

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 on the product's life cycle as shown in module B6. Finally, recycling at EoL has a low burden in modules C2, C3 and C4 while it leads to credits in module D.

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. The use phase is similarly relevant in all categories, except GWP biogenic, GWP luluc and EPf. Module D is slightly visible in all categories in a similar order of magnitude as for GWP.

The contributions in most impact categories of the LCA are similarly split between electric and electronic components, stainless steel and the use stage.

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 10 % and 30 %. In EPf the relative impact is almost 50 %. In all categories, for the Control and Motor Control boards, the highest contribution comes from the integrated circuits (ICs) and the unpopulated printed circuit board (PCB) datasets used to model the control circuit of some subassemblies of the electronic components, while for the Battery Holder, Handle Detector and Interconnections Boards, the highest contribution comes from the unpopulated PCBs and connectors.
In addition to the electric and electronic components, the mechanical components in the product contribute between 15 %-35 % in all impact categories except ADP elements, where they contribute 56 %. This is mainly due to stainless steel components, which contribute 10-25 % in all impact categories except in ADP elements, where the main contributor is zamak (zinc-based part) with 50 % contribution to the total.

Accordingly, plastics, steel, and other metals have very low contribution (<5 %) to the total in all categories.

The exception in ADP elements is due to upstream elements such as lead and silver of the component made of zamak. This is followed by the electric and electronic components mainly due to precious metal elements in the upstream such as gold. In this indicator, stainless steel parts only contribute around 6% to the total.
As mentioned, the use phase also shows relevant contribution in the impact categories studied, mainly due to the batteries. These contribute 10 %-25 % in all categories except GWP biogenic, GWP luluc and EPf where upstream elements do not play a role for this dataset.

For biogenic global warming potential, the main contributor is the cardboard packaging, where the absorption of atmospheric carbon dioxide during plant growth is also shown. In other impact categories, packaging shows relatively low contributions (below 10 %).

In short, in the manufacturing stage, electric and electronic components together with stainless steel parts are the main hotspots in all categories, except GWP biogenic and ADP elements. The use stage contributes the most after the manufacturing stage in all impact categories.

For the depletion potential of the stratospheric ozone layer (ODP), the impact is split similarly among the electric and electronic components (27 %), the batteries (12 %) and the process electricity (33 %). 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.

7. Requisite evidence

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

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Publisher

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

Sphera Solutions GmbH
Hauptstraße 111- 113
70771 Leinfelden-Echterdingen
Germany

+49 711 341817-0
info@sphera.com
www.sphera.com

Owner of the Declaration

SALTO SYSTEMS S.L.
Arkotz 9, Polígono Lanbarren .
20180 Oiartzun - Gipuzkoa
Spain

+34 943 344 550
info@saltosystems.com
www.saltosystems.com