

UAB Carlo Gavazzi Industri Kaunas

LCA impact declaration

Product: name:

LEYON-SAFE-E

Site Plant:

UAB Carlo Gavazzi Industri Kaunas
Raudondvario pl. 101 LT-47184
Kaunas (Lithuania)

in compliance with ISO 14040-14044 and EN 50693



Environmental Product Declaration

LEYON-SAFE-E



General information

EPD Owner	UAB Carlo Gavazzi Industri Kaunas, Raudondvario pl. 101 LT-47184 – Kaunas (Lithuania) www.gavazzi-automation.com info@gavazzi.lt
Reference production site(s)	Kaunas plant: Raudondvario pl. 101 LT-47184 – Kaunas (Lithuania)
Scope of application	This document refers to the device of the SENSORS family.
CPC Code	4621 "Electricity distribution or control apparatus"
Company contact	Ernestas Greicius, Factory Manager.
Technical support	 Aequilibria Srl - SB P.le della Stazione, 8 35131 – Padova (PD) - ITALIA
Comparability	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of similar products may not be comparable if they do not comply with the relevant Technical Standard.
Reference documents	The EN 50693:2019 standard is the framework reference for PCR "Electronic and electrical products and systems" (PCR EPDItaly007).
PCR – Product Category Rules	Core-PCR: EPDITALY007 "Electronic and electrical product and systems" Rev. 3 of 13/01/2023

Table 1. General information of EPD

LCA impact declaration

LEYON-SAFE-E



Foreword

This document represents the EPD study conducted for the **LEYON-SAFE-E** device manufactured by UAB Carlo Gavazzi Industri Kaunas, in accordance with ISO 14040-14044

and aimed at providing a tool for the development, verification and publication of Environmental Product Declarations.

The study was carried out in accordance with PCR EPDItaly007 (PCR for electronic and electrical products and systems), which identifies and documents the objective and scope of LCA-based information for the product category, the rules for producing additional environmental information, the life cycle stages to be included, the parameters to be addressed, and the manner in which the parameters are to be collected and communicated in a report.



Producer information and environmental policy

UAB CARLO GAVAZZI INDUSTRI KAUNAS stays at the forefront in sensor manufacturing in Lithuania.

It belongs to CARLO GAVAZZI ACBU GROUP, one of the leading companies in the world, which is active in the manufacture and design of sensors and automation.

To ensure the leading role, prosperity, and growth of UAB CARLO GAVAZZI INDUSTRI KAUNAS, it is necessary to follow this quality policy, which underpins future activities of the company. To implement this objective, products that fully satisfy customer demands should be supplied to the market, and manufacture of the new products, including sensors for use in potentially explosive atmospheres, should be mastered.

This policy shall be followed to achieve the objectives and in accordance with the principles:

- to create a quality and environmental management system complying with the requirements of international standards ISO 9001 and ISO 14001 and to continuously improve it.
- priority for quality in all areas of the company's activities.
- to ensure that market is supplied with reliable and safe products, including sensors for use in potentially explosive atmospheres, which fully comply with the requirements of legal acts and regulations in the markets served as well as the requirements of the company's customer and user, including Directive 2014/34 EU.
- to create a work environment that would encourage the staff to improve its qualification and engage into the implementation of objectives and tasks of the quality policy.

LCA impact declaration

LEYON-SAFE-E

- do not make any decisions that could adversely affect the quality of the products supplied, including their safety, at any stage of their handling in the company, or when it is used by end user.
- to appreciate the staff's proposals on the improvement of the company's performance to enhance its organization and flexibility.
- to follow the principles of sustainable development and pollution prevention.
- to improve waste management in the company.
- economical and rational use of natural and energy resources.
- to raise the quality and environmental objectives of the policy and allocate the necessary resources for its achievement.

The company management invites all employees to concentrate their efforts around this quality and environmental policy.

Product Information

The product under analysis is device **LEYON-SAFE-E** belonging to the SENSORS family, nominal consumption 20 W, weight 1454,94465 g (1,45494465 kg) including packaging and manual.

The adopted functional unit was defined, based on the reference PCR, as **a device, characterized by its own operating power at 0,02k W for a life time (RSL - Reference Service Life") of 10 years including its packaging, and operating throughout its useful life.**

These are electrical energy measurement devices, performance class 1, indirect measurement, and comply with the following international regulations:

Electromagnetic Compatibility Directive, RoHS Directive.

Product assembly and testing are carried out at the UAB Carlo Gavazzi Industri Kaunas production site.

Regarding the use phase, the product does not require periodic maintenance, is considered to be active throughout its estimated useful life of 10 years, with a nominal consumption of 0,02 kW at a voltage of 24 VDC

The finished device is then sent to the various Gavazzi distribution centers or, in some cases, directly to a specific customer.

LCA impact declaration

LEYON-SAFE-E

Product family	SENSORS	
Product identification number	LEYON-SAFE-E	
Technical Data	Power: 20 W Weight: 1,20657 kg (excluding packaging) Service Life Time (RLS): 10 years	
Packaging	Weight: 0,2363 kg 236,33 g Material: Paper	

Table 2. Product related information LEYON-SAFE-E

➡ **Materials and constituents of the product**

The declaration of materials is made in accordance with EN IEC 62474.

The products comply with substance restrictions in the EU RoHS directive (2011/65/EU).

The product does not contain batteries and any recycled material content in the device is unknown.

Below is the total mass of the product (including packaging) and the weight percentages of each individual raw material to the total product.

Total mass of the device	1,4429 kg (including packaging)
--------------------------	--

Raw Material Category	SCLAM specification	SCLAM description	% of total weight	%category to total weight
PCB	PCB-XX	Printed circuit boards semplici (fino a due strati)	0,35%	5,72%
	PCB-XX	Printed circuit boards semplici (fino a due strati)	0,36%	
	PCB-XX	Printed circuit boards semplici (fino a due strati)	4,87%	
	PCB-XX	Printed circuit boards semplici (fino a due strati)	0,02%	
	PCB-XX	Printed circuit boards semplici (fino a due strati)	0,12%	
Electronic components	CCERS	SMD - Ceramic capacitors	0,002%	2,666%
	CCERS	SMD - Ceramic capacitors	0,005%	
	CCERS	SMD - Ceramic capacitors	0,080%	
	CCERS	SMD - Ceramic capacitors	0,035%	
	CCERS	SMD - Ceramic capacitors	1,428%	
	CCERS	SMD - Ceramic capacitors	0,008%	
	CCERS	SMD - Ceramic capacitors	0,030%	
	CCERS	SMD - Ceramic capacitors	0,001%	
	CCERS	SMD - Ceramic capacitors	0,014%	
	CCERS	SMD - Ceramic capacitors	0,002%	

CCERS	SMD - Ceramic capacitors	0,004%
CCERS	SMD - Ceramic capacitors	0,003%
CCERS	SMD - Ceramic capacitors	0,002%
CCERS	SMD - Ceramic capacitors	0,012%
CCERS	SMD - Ceramic capacitors	0,013%
CCERS	SMD - Ceramic capacitors	0,011%
CCERS	SMD - Ceramic capacitors	0,000%
CCERS	SMD - Ceramic capacitors	0,004%
CCERS	SMD - Ceramic capacitors	0,000%
CCERS	SMD - Ceramic capacitors	0,000%
CCERS	SMD - Ceramic capacitors	0,008%
CCERS	SMD - Ceramic capacitors	0,000%
CCERS	SMD - Ceramic capacitors	0,001%
CCERS	SMD - Ceramic capacitors	0,002%
CCERS	SMD - Ceramic capacitors	0,019%
CCERS	SMD - Ceramic capacitors	0,031%
CCERS	SMD - Ceramic capacitors	0,000%
CCERS	SMD - Ceramic capacitors	0,002%

CCERS	SMD - Ceramic capacitors	0,000%
CCERS	SMD - Ceramic capacitors	0,001%
CCERS	SMD - Ceramic capacitors	0,000%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,001%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,012%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,003%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,001%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,002%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,094%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,004%
DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0,002%
ICSMD	SMD - Integrated circuits	0,007%
ICSMD	SMD - Integrated circuits	0,056%
ICSMD	SMD - Integrated circuits	0,007%
ICSMD	SMD - Integrated circuits	0,095%
ICSMD	SMD - Integrated circuits	0,007%
ICSMD	SMD - Integrated circuits	0,007%
ICSMD	SMD - Integrated circuits	0,021%

ICSMD	SMD - Integrated circuits	0,007%
ICSMD	SMD - Integrated circuits	0,007%
ICSMD	SMD - Integrated circuits	0,143%
ICSMD	SMD - Integrated circuits	0,002%
ICSMD	SMD - Integrated circuits	0,006%
ICSMD	SMD - Integrated circuits	0,005%
ICSMD	SMD - Integrated circuits	0,003%
ICSMD	SMD - Integrated circuits	0,000%
ICSMD	SMD - Integrated circuits	0,015%
ICSMD	SMD - Integrated circuits	0,003%
ICSMD	SMD - Integrated circuits	0,000%
INDCS	SMD - Inductors	0,005%
INDCS	SMD - Inductors	0,001%
INDCS	SMD - Inductors	0,017%
INDCS	SMD - Inductors	0,001%
INDCS	SMD - Inductors	0,001%
INDCS	SMD - Inductors	0,015%
INDCS	SMD - Inductors	0,010%

MICRO	Microprocessors	0,146%
MICRO	Microprocessors	0,007%
QUSMD	SMD - Quartzes and crystal resonators	0,004%
QUSMD	SMD - Quartzes and crystal resonators	0,005%
RELAY	Relays and reed contacts	0,007%
RESMD	SMD Resistors	0,005%
RESMD	SMD Resistors	0,002%
RESMD	SMD Resistors	0,002%
RESMD	SMD Resistors	0,003%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,003%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,000%

RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,002%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,005%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,002%
RESMD	SMD Resistors	0,014%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,012%
RESMD	SMD Resistors	0,004%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,000%

RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,000%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,008%
RESMD	SMD Resistors	0,062%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,004%
RESMD	SMD Resistors	0,001%
RESMD	SMD Resistors	0,003%
RESMD	SMD Resistors	0,000%
SWSMD	SMD - Switches and tact switches	0,028%
SWSMD	SMD - Switches and tact switches	0,019%
SWSMD	SMD - Switches and tact switches	0,010%
TRPTH	PTH - Transistors and mosfets	0,001%
TRSMD	SMD - Transistors and mosfets	0,003%

SCLAM product specification	TRSMO	SMD - Transistors and mosfets	0,001%	0,983%
	TRSMO	SMD - Transistors and mosfets	0,006%	
	3RDPT	Sensors, products	0,132%	
	CNTRS	Connectors	0,078%	
	CNTRS	Connectors	0,101%	
	CNTRS	Connectors	0,225%	
	CNTRS	Connectors	0,021%	
	CNTRS	Connectors	0,045%	
	COILS	Coils, ferrites	0,125%	
	FUSES	Fuses (=FUSES GC ITALIA)	0,021%	
	LEDXX	Leds - no infrared	0,004%	
	LEDXX	Leds - no infrared	0,001%	
	OPEL	Opto elements	0,035%	
	OPEL	Opto elements	0,109%	
	OPTOX	Optocouplers	0,026%	
	OPTOX	Optocouplers	0,025%	
	OPTOX	Optocouplers	0,025%	

	OPTOX	Optocouplers	0,011%	
Cable	CABLE	Cables, sleeves and wirings PUR	35,78%	35,78%
Small metallic parts	MECUS	Custom metal parts	1,386%	29,361%
	MECUS	Custom metal parts	1,684%	
	MECUS	Custom metal parts	0,024%	
	MECUS	Custom metal parts	0,021%	
	MECUS	Custom metal parts	24,950%	
	MESTD	Standard metal parts (screws,n	0,080%	
	MESTD	Standard metal parts (screws,n	0,227%	
	MESTD	Standard metal parts (screws,n	0,333%	
	MESTD	Standard metal parts (screws,n	0,349%	
	MESTD	Standard metal parts (screws,n	0,018%	
	MESTD	Standard metal parts (screws,n	0,123%	
	MESTD	Standard metal parts (screws,n	0,166%	
Plastics	PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,201%	9,946%

PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,001%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	2,157%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,002%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,036%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,006%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,006%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,211%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,452%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	1,080%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	1,735%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,347%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,693%
PLCUS	Custom plastic parts (Abs, Nylon, PBT, Polycarbonate, PSU, PEEK)	0,115%
PLSTD	Standard plastic parts ABS	0,118%
PLSTD	Standard plastic parts ABS	0,031%
PLSTD	Standard plastic parts ABS	0,009%
PLSTD	Standard plastic parts ABS	0,121%
PLSTD	Standard plastic parts ABS	0,370%

	PLSTD	Standard plastic parts ABS	1,774%	
	PLSTD	Standard plastic parts ABS	0,070%	
	PLSTD	Standard plastic parts ABS	0,347%	
	PLSTD	Standard plastic parts ABS	0,066%	
Plastic primary packaging	LAPAC	Packaging labels	0,045%	0,114%
	LAPAC	Packaging labels	0,069%	
Paper primary packaging	BOXES	Carton boxes	5,75%	16,27%
	BOXES	Carton boxes	9,70%	
	SHEET	Instruction sheets/ manuals	0,20%	
	SHEET	Instruction sheets/ manuals	0,61%	

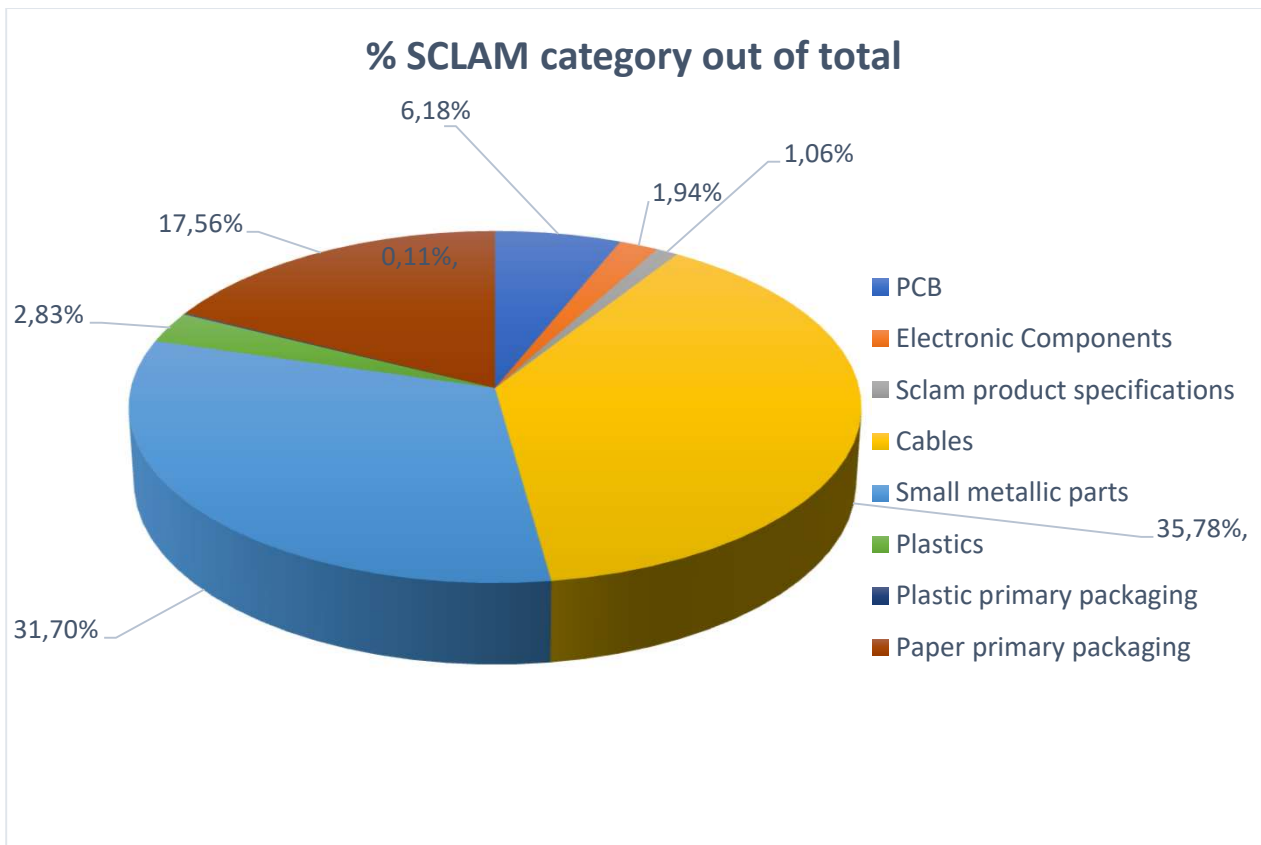


Figure 1. Material breakdown of the LEYON-SAFE-E device

LCA impact declaration

LEYON-SAFE-E

Information related to the study

System boundaries	The boundaries of the study system are “ cradle-to-grave ”.
Geographical validity	Global
Reference year data	2022
Reference tool	This EPD was generated using the results automatically generated by the Excel tool “LCA tool_data 2022_GAV Kaunas_rev1” of 16/02/2024

Table 4. Information related to the study

The assessment of all potential environmental impacts above is based on the entire life cycle of the product under analysis: production, distribution, installation, use and end of life.

The elements and processes considered for the assessment of impacts related to each phase are described below:

Production	• Product and packaging raw materials (primary and secondary), auxiliary materials and related transportation • production and processing processes (involving energy and water consumption, air emissions, waste generated by production) <i>Electricity Dataset elettricità: Electricity, medium voltage {LT} electricity, medium voltage, residual mix Cut-off (Ecoinvent 3.9)</i>																				
Distribution	• transportation from the Gavazzi plant to the latest distribution logistics platforms <table><tr><th colspan="3">FINISHED PRODUCT DISTRIBUTION (CoD)</th></tr><tr><th>Distribution center finished product</th><th>% distributed to the CoD</th><th>Further distribution at the continental level?</th></tr><tr><td>CG Kaunas-CdD Italy</td><td>25%</td><td>Yes</td></tr><tr><td>CG Kaunas-CdD USA</td><td>25%</td><td>Yes</td></tr><tr><td>CG Kaunas-CdD Canada</td><td>25%</td><td>Yes</td></tr><tr><td>CG Kaunas-CdD Singapore</td><td>25%</td><td>Yes</td></tr></table>			FINISHED PRODUCT DISTRIBUTION (CoD)			Distribution center finished product	% distributed to the CoD	Further distribution at the continental level?	CG Kaunas-CdD Italy	25%	Yes	CG Kaunas-CdD USA	25%	Yes	CG Kaunas-CdD Canada	25%	Yes	CG Kaunas-CdD Singapore	25%	Yes
FINISHED PRODUCT DISTRIBUTION (CoD)																					
Distribution center finished product	% distributed to the CoD	Further distribution at the continental level?																			
CG Kaunas-CdD Italy	25%	Yes																			
CG Kaunas-CdD USA	25%	Yes																			
CG Kaunas-CdD Canada	25%	Yes																			
CG Kaunas-CdD Singapore	25%	Yes																			

LCA impact declaration

LEYON-SAFE-E

	• transportation from Gavazzi's CdD to the specific customer (Company Name, Country) • disposal of secondary packaging
Installation	• End of life of primary packaging
Use and maintenance phase	• Product Category: Leyon Presence Sensor Type E • usage scenario: 10 years, service life, continuous operation at 100% rated load, rated power 20W
End of life	• Device End of Life Scenario (WEEE)

Table 5. Processes considered at various stages of the study

The LCA study was carried out according to UNI EN ISO 14040/14044 standards, following the guidelines of ISO EN 50693:2019.

The software used for impact assessment is SimaPro 9.5.1; Ecoinvent 3.9 database. The methods used to calculate impacts refer to the CML baseline and IPCC method for the climate change impact category.

Site-specific data were used for all of the following processes:

- production and transportation of device raw materials, auxiliary materials and packaging materials;
- manufacturing processes, plant energy consumption, air emissions and waste;
- weight, power of the device;
- transportation to the distribution center (last logistic platform).

Generic data were used for:

- recycling, energy recovery and disposal rates for primary and secondary packaging materials and WEEE (global data).

Default scenarios described in PCR 007 were used for:

- transportation to the point of sale: intercontinental and local transportation scenario;
- Lifetime (RLS) of the device: 10 years.

LCA impact declaration

LEYON-SAFE-E

Environmental impact assessment

The potential environmental impacts assessed through an LCA of the device are given in Table 6 below. **LEYON-SAFE-E**

Impacts were calculated using SimaPro Developer 9.5.1 software and the Ecoinvent 3.9 database.

ENVIRONMENTAL IMPACT			
Impact category	Unit of measurement	PRODUCTION phase	
		UPSTREAM module	CORE module
GWP TOT (Global Warming Potential)	kg CO ₂ eq	2,86E+01	8,10E+00
GWP - fossil	kg CO ₂ eq	2,83E+01	8,10E+00
GWP - biogenic	kg CO ₂ eq	2,60E-01	4,96E-03
GWP Luluc (GWP land use and land use change)	kg CO ₂ eq	6,24E-02	9,69E-04
Ozone layer depletion	kg CFC ₁₁ eq	1,49E-06	1,26E-07
Photochemical oxidation	kg NMVOC eq	1,84E-01	4,73E-02
Acidification	mol H ⁺ eq	5,85E-01	3,45E-02
Eutrophication, freshwater	kg P eq	5,37E-02	1,62E-04
Eutrophication, marine	Kg N eq	5,17E-02	1,39E-02
Eutrophication, terrestrial	mol N eq	6,12E-01	1,49E-01
Water use	m ³ depriv.	1,04E+01	2,06E-01
Resources use, fossils	MJ	3,70E+02	1,06E+02
Resources use, minerals and metals	kg Sb eq	1,20E-02	3,89E-06

LCA impact declaration

LEYON-SAFE-E

ENVIRONMENTAL IMPACT						
Impact category	Unit of measurement	DISTRIBUTION phase	INSTALLATION phase	Use and Maintenance Phase	END OF LIFE phase	TOTAL
		DOWNSTREAM module				
GWP TOT (Global Warming Potential)	kg CO ₂ eq	8,10E+00	1,72E-02	8,46E+02	4,04E-01	883,50
GWP - fossil	kg CO ₂ eq	8,10E+00	9,54E-03	8,23E+02	4,04E-01	860,33
GWP - biogenic	kg CO ₂ eq	4,96E-03	7,61E-03	1,63E+01	-9,54E-05	16,60
GWP Luluc (GWP land use and land use change)	kg CO ₂ eq	9,69E-04	1,89E-06	6,50E+00	2,25E-04	6,56
Ozone layer depletion	kg CFC11 eq	1,26E-07	9,35E-11	1,25E-05	1,09E-09	0,04
Photochemical oxidation	kg NMVOC eq	4,73E-02	3,39E-05	2,56E+00	4,83E-04	2,80
Acidification	mol H+eq	3,45E-02	2,48E-05	4,54E+00	5,42E-04	5,16
Eutrophication, freshwater	kg P eq	1,62E-04	7,47E-07	4,13E-01	3,32E-05	0,47
Eutrophication, marine	Kg N eq	1,39E-02	9,97E-06	7,37E-01	1,68E-04	0,84
Eutrophication, terrestrial	mol N eq	1,49E-01	1,02E-04	7,27E+00	1,64E-03	8,03
Water use	m3 depriv.	2,06E-01	1,37E-03	1,80E+02	1,76E-02	190,42
Resources use, fossils	MJ	1,06E+02	6,95E-02	1,32E+04	1,21E+00	13638,28
Resources use, minerals and metals	kg Sb eq	3,89E-06	1,26E-08	6,76E-03	6,23E-07	0,0187

Table 6. Results for various environmental impact categories for device LEYON-SAFE-E.

LCA impact declaration

LEYON-SAFE-E

ENVIRONMENTAL IMPACT			
Impact category	Unit of measurement	PRODUCTION phase	
		UPSTREAM module	CORE module
PENRE	MJ	3,90E+02	1,13E+02
PENRM	MJ	4,49E+00	0,00E+00
PENRT	MJ	3,99E+02	1,13E+02
PERE	MJ	4,53E+01	4,66E-01
PERM	MJ	3,94E+00	0,00E+00
PERT	MJ	4,92E+01	4,66E-01
FW (Net use of fresh water)	m ³	3,23E-01	7,34E-03
MS (Use of secondary materials)	Kg N eq	0,00E+00	0,00E+00
RSF (use of renewable secondary fuels)	MJ	0,00E+00	0,00E+00
NRSF (Use of non-renewable secondary fuels)	MJ	0,00E+00	0,00E+00

LCA impact declaration

LEYON-SAFE-E

ENVIRONMENTAL IMPACT						
Impact category	Unit of measurement	DISTRIBUTION phase	INSTALLATION phase	Use and Maintenance Phase	END OF LIFE phase	TOTAL
		DOWNSTREAM module				
PENRE	MJ	1,13E+02	7,39E-02	1,41E+04	1,29E+00	14561,24
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,49
PENRT	MJ	1,13E+02	7,39E-02	1,41E+04	1,29E+00	14570,22
PERE	MJ	4,66E-01	1,03E-03	3,69E+03	1,06E-01	3740,90
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,49
PERT	MJ	4,66E-01	1,03E-03	3,69E+03	1,06E-01	3745,37
FW (Net use of fresh water)	m ³	7,34E-03	4,06E-05	1,70E+01	6,79E-04	17,38
MS (use of secondary materials)	Kg N eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00
RSF (use of renewable secondary fuels)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00
NRSF (Use of non-renewable secondary fuels)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00

Legend: **PENRE** = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources as raw materials; **PENRT** = Total use of non-renewable primary energy resources; **PERE** = Use of renewable primary energy resources excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources as raw materials; **PERT** = Total use of renewable primary energy resources.

Table 7. Environmental impacts related to resource consumption for the LEYON-SAFE-E

LCA impact declaration

LEYON-SAFE-E

ENVIRONMENTAL IMPACT			
Impact category	Unit of measurement	PRODUCTION phase	
		UPSTREAM module	CORE module
Hazardous waste disposal (HWD)	kg	3,48E-02	1,62E-03
Non- hazardous waste disposal (NHWD)	kg	4,88E+00	7,31E-01
Radioactive waste disposal (RWD)	kg	7,96E-04	9,40E-06
Materials for energy recovery (MER)	kg	0,00E+00	1,85E-03
Materials for recycling kg (MFR)	kg	0,00E+00	0,00E+00
Components for reuse (CRU)	kg	0,00E+00	1,18E-02
ETE (exported thermal energy)	MJ	0,00E+00	5,27E-03
EEE (exported electricity energy)	MJ	0,00E+00	2,57E-03

LCA impact declaration

LEYON-SAFE-E

ENVIRONMENTAL IMPACT						
Impact category	Unit of measurement	DISTRIBUTION phase	INSTALLATION phase	Use and Maintenance Phase	END OF LIFE phase	TOTAL
		DOWNSTREAM module				
Hazardous waste disposal (HWD)	kg	1,62E-03	2,23E-03	5,74E-01	2,19E-02	6,59E-01
Non-hazardous waste disposal (NHWD)	kg	7,31E-01	1,11E-01	5,70E+01	4,02E-02	6,29E+01
Radioactive waste disposal (RWD)	kg	9,40E-06	1,52E-08	6,39E-02	2,00E-06	6,47E-02
Materials for energy recovery (MER)	kg	1,85E-03	1,01E-02	0,00E+00	0,00E+00	1,20E-02
Materials for recycling (MFR)	kg	0,00E+00	1,10E-01	0,00E+00	2,51E-01	6,69E-01
Components for reuse (CRU)	kg	1,18E-02	0,00E+00	0,00E+00	0,00E+00	1,18E-02
ETE (exported thermal energy)	MJ	5,27E-03	2,88E-02	0,00E+00	0,00E+00	3,41E-02
EEE (exported electricity energy)	MJ	2,57E-03	1,41E-02	0,00E+00	0,00E+00	1,66E-02

Table 8. Waste-related environmental impacts for the LEYON-SAFE-E.

LCA impact declaration

LEYON-SAFE-E

Reference

- ISO 14040:2021 Environmental management - Life cycle assessment - Principles and framework
- ISO 14044:2021 Environmental management - Life cycle assessment - Requirements and guidelines
- ISO 14020:2000 Environmental labels and declarations - General principles
- EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- Core-PCR: EPDITALY007 "Electronic and electrical products and systems" Rev. 3 of 13/01/2023.