

Cariboni Group SpA



ENVIRONMENTAL PRODUCT DECLARATION



PRODUCT NAME

KAIROS SMALL (cod. 01KE7D68031OQ40Z11)
KAIROS MEDIUM (cod. 01KE8E88032OQ48Z11)

PLANTS

Cariboni Group SpA, Via G. A Prato, 22 38068
Rovereto (TN), Italy

in accordance with ISO 14025 and EN 50693:2019

Program Operator	EPDIItaly
Publisher	EPDIItaly
Declaration numer	EPDCariboni-01
Registration number	EPDITALY0323
Issue date	2022/06/24
Valid to	2023/12/24

1. GENERAL INFORMATION

EPD owner:	Cariboni Group SpA
Manufacturing plant:	Via G. A Prato, 22 38068 Rovereto (TN), Italy
Product names:	KAIROS SMALL (cod. 01KE7D68031OQ40Z11) KAIROS MEDIUM (cod. 01KE8E88032OQ48Z11)
Scope of EPD:	The scope is to analyse the environmental impact from cradle to grave of the street fixtures with LED light sources consisting in two models: KAIROS SMALL (cod. 01KE7D68031OQ40Z11) and KAIROS MEDIUM (cod. 01KE8E88032OQ48Z11). Suitable for lighting junctions, high traffic density urban and extra urban roads, roundabouts, outdoor car parks, perimeter, large areas and pedestrian-cycle paths. Manufactured in Italy and distributed in Republic of Peru, western South America.
CPC of reference:	465 “Electric filament or discharge lamps; arc lamps; lighting equipment; parts thereof”
Liability and comparability statement	<ul style="list-style-type: none"> - EPDs relating to the same category of products but belonging to different programmes may not be comparable. - The EPD owner has the sole ownership, liability, and responsibility for the EPD - The database used is regarded as representative on the basis of a comparative study, which examined the data for a reference product of the EPD Owner
Standard and PCRs:	<ul style="list-style-type: none"> - EPD Italy Regulations, rev.5.2, 2022/02/16. - PCR- Product Category Rules -EPDItaly007-Electronic and electrical product and systems, rev.2.0, 2020/10/21. - Sub-PCR- -EPDItaly020-Electronic and electrical product and systems, Public lighting equipment, rev.1.0, 2021/06/07. - ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations. - EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems - EN 15804:2012+A1:2013+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
Program Operator:	EPDITALY, via Gaetano De Castillia 10, 20124 Milano, Italia www.epditaly.it
Third-party verification:	Independent third-party verification of the declaration and data, according to ISO 14025:2006: x Product EPD <input type="checkbox"/> sector EPD <input type="checkbox"/> EPD Tool Third-party verification by: x External <input type="checkbox"/> Internal Certification body: ICMQ Via Gaetano De Castillia, 10 - 20124 Milano, Italy www.icmq.it, Accredited by ACCREDIA, Italy
Company contact:	CARIBONI SpA, Alessio Rotini, a.rotini@caribonigroup.com
Technical support:	LCA-lab Srl – Spin-off ENEA Bologna, Italy, www.lca-lab.com, info@lca-lab.com
Partner:	PRAXIS CONSULTING SRL Zola Predosa, Bologna, Italy, www.praxiconsulting.it

2. THE COMPANY




The company was founded in 1908 by Osvaldo Cariboni, an expert in railway electrification. Later in 1965, the lighting sector began to develop and in 1993 Cariboni group acquired Fivep, an important player in the sector, born from the merger between Fidenza Vetraria, specialised in high quality fixtures for outdoor and urban lighting, Pollice Illuminazione, particularly strong in the production of high performance lighting fixtures and Soldi & Scati, leader in the production of road lighting fixtures for tunnels, the latter acquired by the group in 1994.

In 2000 Cariboni group was one of the first companies to believe in and invest in the production of LED fixtures and to increase its know-how, arriving in the following years with a series of products for outdoor urban, street, architectural and functional lighting, based on Italian know-how in terms of lighting, design, optics, electronics, material science and production technologies.

Cariboni group, in addition to its Italian production units in Osnago (LC) and Rovereto (TN), is present worldwide with its direct subsidiary Cariboni Lite France and a series of widely distributed sales intermediaries.

3. THE PRODUCT DESCRIPTION

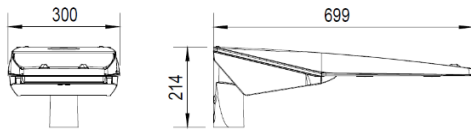
LED fitting for the lighting of roads and cycle-pedestrian paths of simple and functional design.

TECHNICAL DATA KAIROS SMALL	
	
PRODUCT CODE	01KE7D68031OQ40Z11
PRODUCT NAME	KAIROS-S EN MAN R3 LA-01 4K 44W 400 CL2 9007 Z18
SOURCE	POWER LED
POWER	44 W
COLOUR TEMPERATURE	4000K
COLOUR RENDERING INDEX (CRI)	70
TYPES OF OPTICS	LA-01
PHOTOBIOLOGICAL SAFETY CLASS	EXEMPT GROUP
ULOR	0%
DLOR	100%
NET WEIGHT (without packaging)	5.02 kg
LIGHT CONTROL AND MANAGEMENT SYSTEM	DRIVERS
TYPE AND MASS OF STRUCTURAL ELEMENTS	1 GALVANIZED STEEL POLE (8 m height; 3 mm thick; weight 84kg)
REFERENCE SERVICE LIFE	100,000 h
REFERENCE SERVICE LIFE USED IN ACCORDANCE WITH PCR	40,000 h
INSULATION CLASS	CL II
PROTECTION LEVEL	IP66
PROTECTION AGAINST IMPACT	IK08
POWER SUPPLY	400 mA

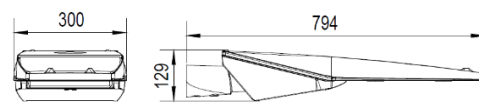
Tab. 1 – Technical data of Kairos Small

TECHNICAL DATA KAIROS MEDIUM

TESTA PALO - POST TOP



CON SBRACCIO - ON ARM



PRODUCT CODE	01KE8E88032OQ48Z11
PRODUCT NAME	KAIROS-M EN MAN R4 ME-01 4K 71W 480 CL2 9007 Z18
SOURCE	POWER LED
POWER	71 W
COLOUR TEMPERATURE	4000K
COLOUR RENDERING INDEX (CRI)	70
TYPES OF OPTICS	ME-01
PHOTOBIOLOGICAL SAFETY CLASS	EXEMPT GROUP
ULOR	0%
DLOR	100%
NET WEIGHT (without packaging)	7.83 kg
LIGHT CONTROL AND MANAGEMENT SYSTEM	DRIVERS
TYPE AND MASS OF STRUCTURAL ELEMENTS	1 GALVANIZED STEEL POLE (8 m height; 3 mm thick; weight 84kg)
REFERENCE SERVICE LIFE	100,000 h
REFERENCE SERVICE LIFE USED IN ACCORDANCE WITH PCR	40,000 h
INSULATION CLASS	CL II
PROTECTION LEVEL	IP66
PROTECTION AGAINST IMPACT	IKo8
POWER SUPPLY	480 mA

Tab. 2 – Technical data of Kairos Medium

4. THE MATERIAL CONTENT DECLARATION

The Kairos's body (Small and Medium) is die cast aluminium alloy, the colour is Grey RAL9007 and the screen is tempered flat printed glass. In the table below the material content declaration is listed. The Kairos products do not contain dangerous substances of a high degree of concern (Substances of Very High Concern-SVHC) contemplated in the ECHA Candidate List (<https://echa.europa.eu/it/candidate-listtable>).

MATERIAL CONTENT DECLARATION					
	KAIROS SMALL		KAIROS MEDIUM		
Material of product IEC 62474 code	Weight	%	Weight	%	
M-120 aluminium	3.27	kg 56.65	4.84	kg	54.69
M-149 brass	0.0017	kg 0.03	0.0008	kg	0.01
M-121 copper	0.15	kg 2.55	0.35	kg	3.90
M-302 epoxy resin	0.0105	kg 0.18	0.022	kg	0.25
M-119 ferrite	0.19	kg 3.27	0.56	kg	6.36
M-161 glass	0.48	kg 8.39	0.88	kg	9.95
M-410 greases	0.0005	kg 0.01	0.0005	kg	0.01
led	0.002	kg 0.03	0.002	kg	0.02
M-208 polyammide	0.02	kg 0.28	0.02	kg	0.23
paint	0.13	kg 2.28	0.15	kg	1.70
M-251 PE	0.05	kg 0.84	0.05	kg	0.57
M-270 PMMA	0.09	kg 1.56	0.12	kg	1.36
M-254 polycarbonate	0.066	kg 1.14	0.155	kg	1.75
printed wiring boards	0.140	kg 2.43	0.182	kg	2.06
resistor	0.004	kg 0.06	0.004	kg	0.04
M-321 silicone	0.021	kg 0.36	0.033	kg	0.37
M-101 steel	0.401	kg 6.96	0.462	kg	5.22
Total weight of outdoor lighting product	5.02	kg	7.83	kg	
Packaging of product IEC 62474 code					
Material					
M-251 PE	0.027	kg 0.47	0.030	kg	0.33
M-341 cardboard	0.61	kg 10.51	0.818	kg	9.25
M-341 paper	0.01	kg 0.12	0.007	kg	0.08
M-340 wood	0.11	kg 1.88	0.16	kg	1.84
Total weight of packaging product	0.76	kg	1.02	kg	
Total weight of product with packaging	5.78	kg 100	8.84	kg 100	

Tab. 3 – Material content declaration of Kairos Small and Kairos Medium

5. SCOPE AND TYPE OF EPD

FUNCTIONAL UNIT AND REFERENCE FLOW:	The function of the lighting equipment is providing lighting that delivers an appropriate artificial luminous flux according to operating requirements. LCA study is based on the <i>EPDItaly020_SUB PCR EN 50693_Public Lighting</i> and so, it was adopted as functional unit a single luminaire operating during a reference service life (RSL) set as 40,000 working hours.
SYSTEM BOUNDARIES:	Cradle to grave (see tab.4 and fig.2)
GEOGRAPHICAL BOUNDARY:	Manufacture in Italy Distribution (by road 325km and by ship 12247km) from Italy to Republic of Peru, western South America.
TIME BOUNDARIES:	Year of the data is 2021
DATA BASE LCA:	Ecoinvent v.3.8
SOFTWARE:	Simapro v.9.3.0.3
IMPACT METHOD:	EN15804+A2 Method v.1.02
DATA QUALITY:	Primary data were collected for the quantities and material types of each component of product; of the packaging (primary, secondary and tertiary) of the finished product and of auxiliary materials; for energy and waste in the assembly and packaging phases at Cariboni and at the outsourcers (die-cast aluminium producer and two aluminium foundries, including intermediates transports). Representative secondary data were used for: the end of life of packaging (100% municipal landfill) and the end of life of the product after use (WEEE waste).
ALLOCATION RULES:	The allocation of input and output data are based on mass criteria. There aren't co-products.
THE MAIN ASSUMPTIONS ON DATA:	To calculate the distance between the component manufacturers and the Cariboni Group gate, the average distance of the Ecoinvent data set "Market/Global/RoW" was assumed; while, the actual distance between the distributors and the Cariboni Group gate, was calculated. For the painting phase of the aluminium components, the process <i>Powder coat, aluminium sheet</i> of Ecoinvent database was used. For the installation and de-installation stages, the model of Ecoinvent database <i>Machine operation, diesel, < 18.64 kW, steady-state</i> is assumed to represent the sky worker used, taking into account the time (hours) it is on. For end-of-life packaging (plastic, paper and wood) in Peru, it is conservatively assumed that 100% is sent to landfill for non-hazardous waste. For the end-of-life phase of the luminaries, the landfill treatment model of Ecoinvent database for each material, as a conservative approach, was used. For the structural elements (installation stage), not manufactured by Cariboni, it is considered a galvanized steel pole with weight 84kg/piece and with a medium RSL equal to 40 years.
EXCLUSIONS AND CUT-OFF:	According to Sub_PCR020 it is not included: The transportation and installation of capital goods (buildings, infrastructure, machinery, internal transport packaging); General operations (staff travel, marketing and communication actions); Production, use and disposal of the packaging of components and semi-finished intermediates. The maintenance stage it is equal to zero because there isn't material uses and energy consumptions.

The inclusions of the system boundaries are indicated in table and figure below.

MANUFACTURING STAGE		DISTRIBUTION STAGE	INSTALLATION STAGE	USE & MAINTENANCE STAGE	END OF LIFE STAGE (EoL) - De-Installation -		
UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE					
Component and production Packaging (primary, secondary and tertiary) production Transports of raw material, components and packaging External processes (outsourcers) and their transport	Product assembly and packaging	Distribution transports (by road and by ship) from Italy to Peru	Energy of installation product EoL of packaging Pole production	Energy during RSL product	Maintenance	Energy of de-installation product	EoL product

Tab. 4 – Life Cycle modules included

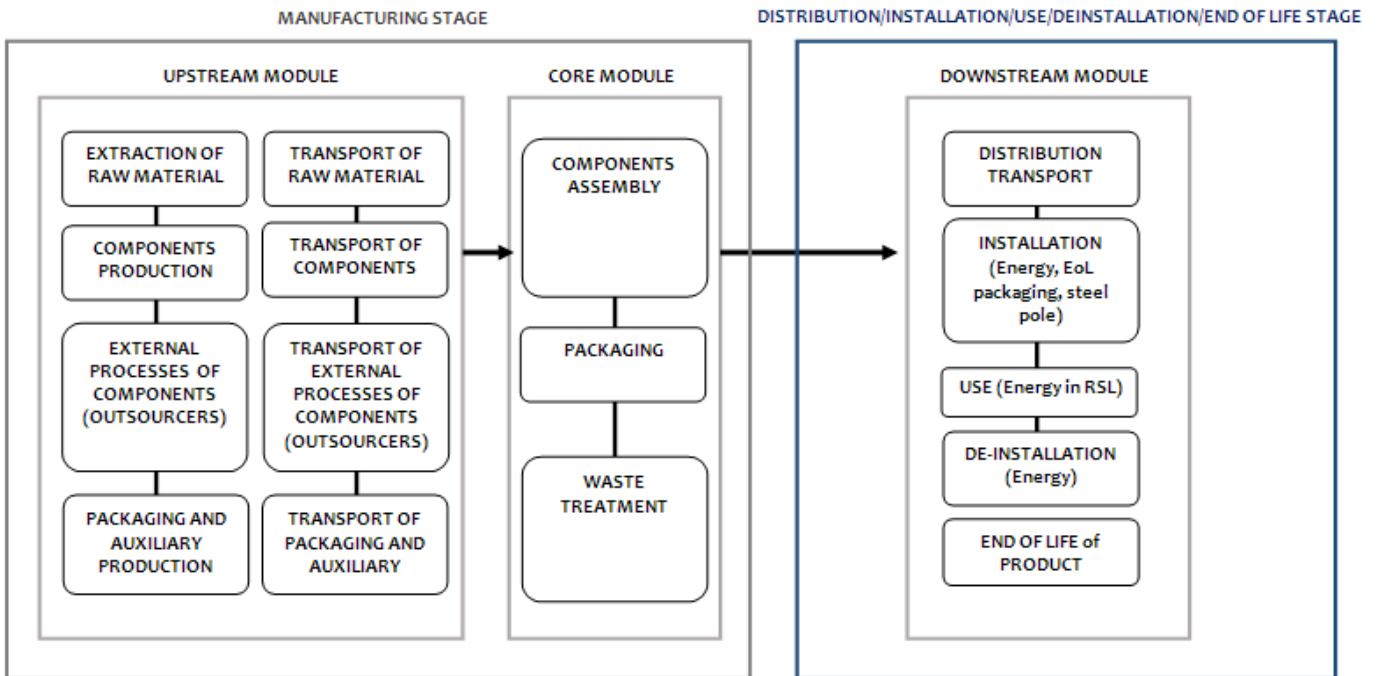


Fig.1 – System boundaries and process flow-chart of Kairos Life cycle

6. ENVIRONMENTAL IMPACT PER FUNCTIONAL UNIT


The environmental impact results are expressed for UF = 1 p, i.e. a luminaire during its RSL, and are separated for the three modules described above: upstream, core and downstream module.

Where 1.2E-01=0.12.


The table below shows the legends for the abbreviations of the impact categories.

Impact category	Abbreviation
Climate change- Total	GWP-total
Climate change- Fossil	GWP-fossil
Climate change- Biogenic	GWP-biogen.
Climate change- Land use and change in land use	GWP-luluc
Ozone depletion	ODP
Acidification	AP
Eutrophication of water	EP-freshw.
Photochemical ozone formation	POCP
Consumption of abiotic resources - minerals and materials	ADP-min.&met.
Consumption of abiotic resources - fossil resources	ADP fossil
Water consumption	WDP

Tab. 5 – Legend about environmental impact categories

LIFE CYCLE IMPACT ASSESSMENT OF KAIROS SMALL cod. 01KE7D680310Q40Z11								
			Manufacturing stage		Distribution stage	Installation stage	Use & Maintenance stage	De-installation & End-of-Life stage
Impact category	UM	Total	UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE			
GWP-total	kg CO ₂ eq	451.5	37.6	0.8	1.1	25.7	385.0	1.3
GWP-fossil	kg CO ₂ eq	448.8	37.3	0.8	1.1	24.4	384.0	1.3
GWP-biogen.	kg CO ₂ eq	2.3E+00	2.6E-01	1.7E-04	3.1E-04	1.2E+00	8.7E-01	5.1E-04
GWP-luluc	kg CO ₂ eq	1.1E-01	4.5E-02	6.1E-05	6.7E-04	2.2E-02	4.4E-02	2.1E-04
ODP	kg CFC11 eq	4.0E-05	3.4E-06	1.2E-07	2.2E-07	1.4E-06	3.5E-05	9.8E-08
AP	mol H ⁺ eq	1.4E+00	3.2E-01	1.7E-03	2.3E-02	1.1E-01	9.6E-01	3.6E-03
EP-freshw.	kg P eq	6.7E-02	2.9E-02	7.2E-05	5.2E-05	1.2E-02	2.6E-02	5.6E-05
POCP	kg NMVOC eq	1.0E+00	1.5E-01	1.1E-03	1.7E-02	1.1E-01	7.6E-01	4.3E-03
ADP-min.&met.	kg Sb eq	1.3E-02	6.7E-03	2.1E-06	2.7E-06	9.7E-04	5.8E-03	5.4E-07
ADP fossil	MJ	6.7E+03	4.8E+02	1.4E+01	1.5E+01	2.6E+02	6.0E+03	7.3E+00
WDP	m ³ depriv.	4.5E+03	1.5E+01	7.9E-02	3.5E-02	8.5E+00	4.5E+03	7.9E-02

Tab. 6 – Environmental Impact of 1p of Kairos Small (net weight: 5.02kg and power: 44W)

LIFE CYCLE IMPACT ASSESSMENT OF KAIROS MEDIUM cod. 01KE8E88032OQ48Z11								
			Manufacturing stage		Distribution stage	Installation stage	Use & Maintenance stage	De-installation & End-of-Life stage
Impact category	UM	Total	UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE			
GWP-total	kg CO ₂ eq	705.4	53.3	1.3	1.6	26.1	621.3	1.8
GWP-fossil	kg CO ₂ eq	701.5	52.8	1.3	1.6	24.4	619.6	1.8
GWP-biogen.	kg CO ₂ eq	3.4E+00	3.8E-01	2.7E-04	4.8E-04	1.6E+00	1.4E+00	7.4E-04
GWP-luluc	kg CO ₂ eq	1.6E-01	6.3E-02	9.5E-05	1.0E-03	2.2E-02	7.0E-02	3.0E-04
ODP	kg CFC ₁₁ eq	6.3E-05	4.6E-06	1.8E-07	3.4E-07	1.4E-06	5.6E-05	1.1E-07
AP	mol H ⁺ eq	2.2E+00	5.3E-01	2.7E-03	3.6E-02	1.1E-01	1.6E+00	4.2E-03
EP-freshw.	kg P eq	1.0E-01	4.5E-02	1.1E-04	8.0E-05	1.2E-02	4.3E-02	7.9E-05
POCP	kg NMVOC eq	1.6E+00	2.3E-01	1.7E-03	2.6E-02	1.1E-01	1.2E+00	4.8E-03
ADP-min.&met.	kg Sb eq	2.1E-02	1.1E-02	3.3E-06	4.2E-06	9.7E-04	9.4E-03	7.2E-07
ADP fossil	MJ	1.1E+04	6.6E+02	2.1E+01	2.2E+01	2.6E+02	9.6E+03	8.5E+00
WDP	m ³ depriv.	7.3E+03	2.2E+01	1.2E-01	5.3E-02	8.5E+00	7.3E+03	1.2E-01

Tab. 7 – Environmental Impact of 1p of Kairos Medium (net weight: 7.83kg and power: 71W)


7. PARAMETERS PER FUNCTIONAL UNIT

The environmental parameters describing resource use, output flows and waste production are expressed for UF = 1 p, i.e. a luminaire during its RSL, and are separated for the three modules described above: upstream, core and downstream module.


The table below shows the legends for the abbreviations of the parameters.

Parameters	Abbreviation
Non Renewable Primary Energy (energy carrier)	PENRE
Non Renewable Primary Energy (raw material)	PENRM
Total Non Renewable Primary Energy	PENRT
Renewable Primary Energy (energy carrier)	PERE
Renewable Primary Energy (raw material)	PERM
Total Renewable Primary Energy	PERT
Net use of fresh water	FW
Secondary material	SM
Renewable secondary fuels	RSF
Non-renewable secondary fuels	NRSF
Hazardous waste disposed	HWD
Non-hazardous waste disposed	NHWD
Radioactive waste disposed	RWD
Materials for energy recovery	MER
Material for recycling	MFR
Components for reuse	CRU
Exported energy, thermal	EE-T
Exported energy, electricity	EE-E

Tab. 8 – Legend about resource use, output flows and waste parameters

PARAMETERS OF RESOURCES, OUTPUT FLOWS AND WASTE OF KAIROS SMALL cod. 01KE7D68031OQ40Z11								
			Manufacturing stage		Distribution stage	Installation stage	Use & maintenance stage	De-installation & End-of-Life stage
			Parameter	UM	Total	UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE
PENRE	MJ	6,7E+03	4,9E+02	1,4E+01	1,5E+01	2,6E+02	6,0E+03	7,3E+00
PENRM	MJ	9,5E+00	9,5E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
PENRT	MJ	6,8E+03	5,0E+02	1,4E+01	1,5E+01	2,6E+02	6,0E+03	7,3E+00
PERE	MJ	5,2E+03	7,2E+01	5,3E-01	1,6E-01	1,4E+01	5,1E+03	1,5E-01
PERM	MJ	1,0E+01	1,0E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
PERT	MJ	5,2E+03	8,2E+01	5,3E-01	1,6E-01	1,4E+01	5,1E+03	1,5E-01
FW	m ³	1,8E+02	4,5E-01	2,1E-03	1,3E-03	2,4E-01	1,8E+02	2,4E-03
SM	kg	4,9E-01	4,9E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
RSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NRSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
HWD	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NHWD	kg	6,1E+00	2,9E-01	0,0E+00	0,0E+00	7,5E-01	0,0E+00	5,0E+00
RWD	kg	4,5E-03	1,4E-03	2,0E-05	9,9E-05	5,9E-04	2,4E-03	4,4E-05
MER	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
MFR	kg	3,5E-01	1,1E-01	2,4E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00
CRU	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
EE-T	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
EE-E	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Tab. 9 – Environmental Parameters of 1p of Kairos Small (net weight: 5.02kg and power: 44W)

PARAMETERS OF RESOURCES, OUTPUT FLOWS AND WASTE OF KAIROS MEDIUM cod. 01KE8E88032OQ48Z11								
			Manufacturing stage		Distribution stage	Installation stage	Use & maintenance stage	De-installation & End-of-Life stage
			Parameter	UM	Total	UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE
PENRE	MJ	1,1E+04	6,9E+02	2,1E+01	2,2E+01	2,6E+02	9,6E+03	8,5E+00
PENRM	MJ	1,5E+01	1,5E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
PENRT	MJ	1,1E+04	7,0E+02	2,1E+01	2,2E+01	2,6E+02	9,6E+03	8,5E+00
PERE	MJ	8,3E+03	1,0E+02	8,2E-01	2,4E-01	1,4E+01	8,2E+03	2,1E-01
PERM	MJ	1,4E+01	1,4E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
PERT	MJ	8,3E+03	1,2E+02	8,2E-01	2,4E-01	1,4E+01	8,2E+03	2,1E-01
FW	m ³	2,9E+02	6,6E-01	3,3E-03	1,9E-03	2,4E-01	2,9E+02	3,5E-03
SM	kg	6,6E-01	6,6E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
RSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NRSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
HWD	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NHWD	kg	9,3E+00	4,6E-01	0,0E+00	0,0E+00	1,0E+00	0,0E+00	7,8E+00
RWD	kg	6,6E-03	2,0E-03	3,1E-05	1,5E-04	5,9E-04	3,8E-03	4,9E-05
MER	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
MFR	kg	6,9E-01	3,2E-01	3,7E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00
CRU	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
EE-T	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
EE-E	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Tab. 10 – Environmental Parameters of 1p of Kairos Medium (net weight: 7.83kg and power: 71W)

8. REFERENCES

- ✓ AIB (Association of Issuing Bodies) "European Residual Mixes - Results of the calculation of Residual Mixes for the calendar year 2019" Version 1.1 del 2020-09-08
- ✓ EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- ✓ EN 15804:2012+A1:2013+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- ✓ EPD Italy Regulations, rev.5.2, 2022/02/16.
- ✓ LCA-lab srl, "Life Cycle Assessment Study Report di Apparecchi a LED per l'illuminazione di strade veicolari e piste ciclo-pedonali, Kairos Small e Kairos Medium, Cariboni SpA", RT-273, rev.02 del 22/06/2022.
- ✓ ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations.
- ✓ PCR- Product Category Rules -EPDItaly007-Electronic and electrical product and systems, rev.2.0, 2020/10/21.
- ✓ Sub-PCR- -EPDItaly020-Electronic and electrical product and systems, Public lighting equipment, rev.1.0, 2021/06/07.
- ✓ UNI EN ISO 14040:2021 Environmental management — Life cycle assessment — Principles and framework
- ✓ UNI EN ISO 14040:2021 Environmental management — Life cycle assessment — Requirements and guidelines
- ✓ www.ecoinvent.ch
- ✓ www.caribonigroup.com