



DRAGON

ENVIRONMENTAL PRODUCT DECLARATION

according to: ISO 14025:2010, EN 50693:2019

Program Operator:	EPDIItaly
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Product name:
DRAGON

Product family:
DRAGON

Model:
DRAGON 2AC12 XXX-X YYZZ.200-1M
DRAGON 2AC12 XXX-X YYZZ.400-4M

Manufacturing plant:
AEC Illuminazione SRL
Via A. Righi, n.4 Subbiano (AR) 52010
Via E. Fermi, n.93 Subbiano (AR) 52010



GENERAL INFORMATION

EPD owner:	AEC Illuminazione S.r.l. Headquarters: Via A. Righi, 4 – Z.I. Castelnuovo – 52010 – Subbiano, Arezzo (IT)
Production site:	Headquarters: Via A. Righi, 4 – Z.I. Castelnuovo – 52010 – Subbiano, Arezzo (IT) Pole Division: Via E. Fermi, 93 – Z.I. Castelnuovo – 52010 – Subbiano, Arezzo (IT)
Contact for information on EPD:	assistentatecnica@aecilluminazione.it
Program Operator:	EPDItaly (www.epditaly.it) via Gaetano De Castillia n° 10 - 20124 Milano, Italia
Scope of application:	Outdoor lighting
Product reference standards:	EN 60598-1, EN 60598-2-3, EN 62471, EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3
CPC code:	465 “Electric filament or discharge lamps; arc lamps; lighting equipment; parts thereof”.
PCR:	CORE PCR – EPDItaly007 – “Electronic and electrical products and systems” – REV. 3.1 – 12/11/2024. Sub PCR – EPDItaly020 – “Electronic and electrical products and systems public lighting equipment” – Rev.2 – 03/10/2024”
EPDItaly Regulation:	Regolamento EPDItaly 6.0 version of 30/10/2023, available at www.epditaly.it
Project report LCA:	M-LCA-004 LCA-Tool - Report LCA_AEC Illuminazione
Statement independent verification:	Independent verification of the declaration and data performed according to ISO 14025:2010. ☐ Internal ☒ External Third party verification performed by: ICMQ S.p.A., via Gaetano De Castillia n° 10 - 20124 Milan, Italy. Accredited by Accredia.
Statement comparability:	Environmental Declarations published within the same product category, but from different programmes, may not be comparable.
Statement responsibility:	AEC Illuminazione S.r.l. releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration shall be responsible for the supporting information and evidence; EPDItaly accepts no responsibility for the information, data and results provided by the EPD Owner for the life cycle assessment.
Technical support:	Greenwich Srl Via Presolana 2/4 - 24030 - Medolago, Bergamo, Italia Contacts: info@greenwichsrl.it Web site: https://greenwichsrl.it

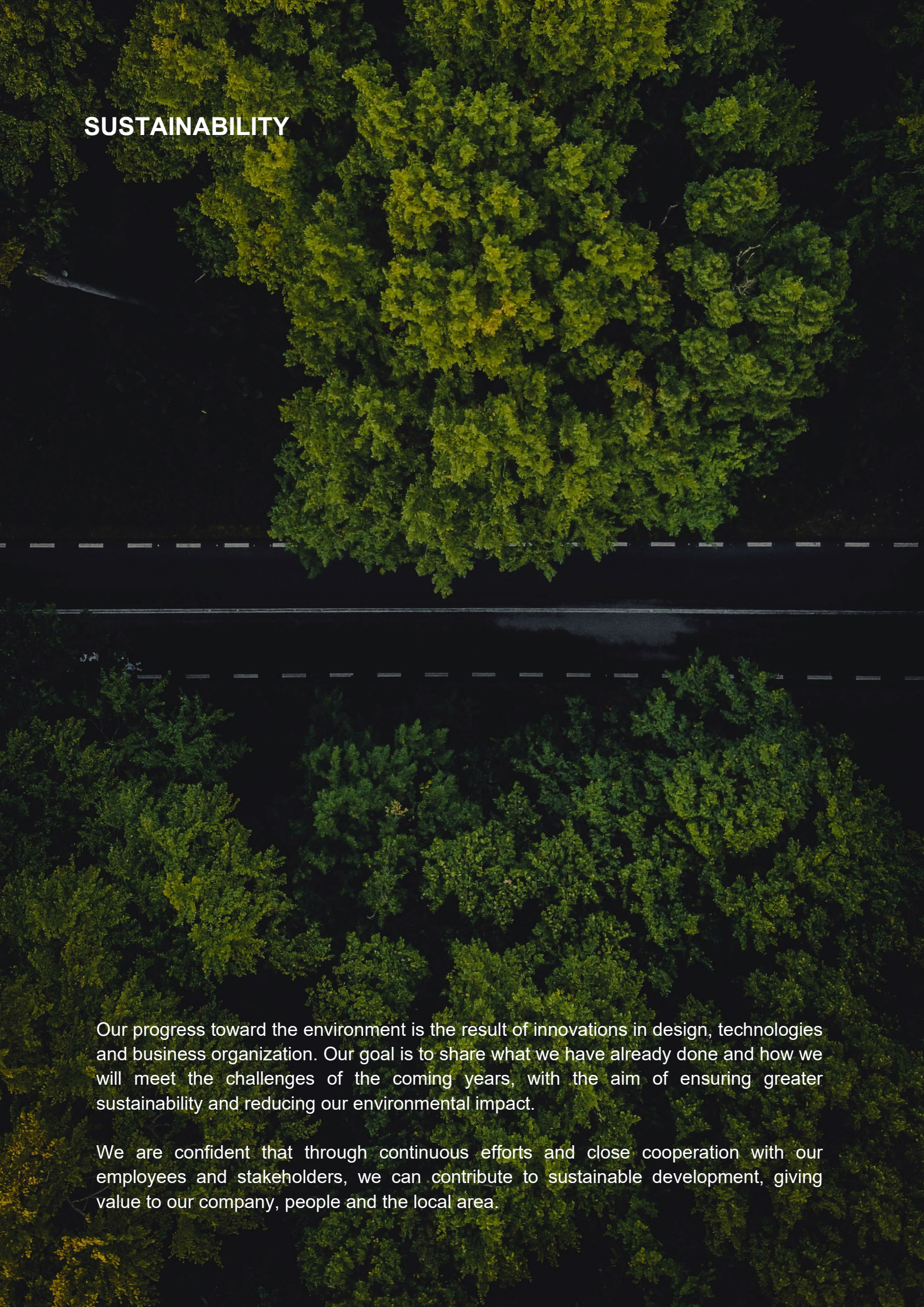
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THE COMPANY



AEC Illuminazione is a luminaire manufacturer with an approach based on a combination of product quality and environmental responsibility. Today the company is an important example of Italian industrial excellence, known and appreciated all over the world. The company's awareness is such that its every effort is aimed at reducing its impacts towards the environment. This commitment translates into designing increasingly efficient and sustainable products, which therefore go to minimize energy consumption and resource use, promoting new technologies to protect the environment.

An aerial photograph of a two-lane asphalt road with white dashed center and edge lines, stretching horizontally across the middle of the frame. The road is flanked by dense, lush green forests. The trees are vibrant green, suggesting a healthy, mature forest. The lighting is soft, creating a serene and natural atmosphere.

SUSTAINABILITY

Our progress toward the environment is the result of innovations in design, technologies and business organization. Our goal is to share what we have already done and how we will meet the challenges of the coming years, with the aim of ensuring greater sustainability and reducing our environmental impact.

We are confident that through continuous efforts and close cooperation with our employees and stakeholders, we can contribute to sustainable development, giving value to our company, people and the local area.

EPD SCOPE AND TYPE

This Environmental Product Declaration is of the 'from cradle to grave' type and analyses all phases of the product life cycle, from the extraction of raw materials to the decommissioning and disposal of the product once it has reached the end of its life. As dictated by the PCR itself, the UPSTREAM phases of procurement (A1) and transport of raw materials (A2), the CORE phase of internal production (A3), the DOWNSTREAM phases of distribution (A4 - A5), use (B1 - B7), end-of-life of the product (C1-C4) and the resource recovery phase (D) were considered for the evaluation.

Production Stage			Distribution Stage	Use Stage								End-of-life Stage				Resource recovery Stage
Upstream Module	Core Module	Downstream Module														
Raw material procurement	Raw material transport	Production	Transport	Installation	Use	Maintenance	Ripair	Replacement	Rehabilitation	Energy use	Water use	Disassembly	Transport	Recycling process	Disposal process	Reuse, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Legend: X = included in the LCA, MND = the module is not included in the LCA and is not declared.

LCA GENERAL INFORMATIONS

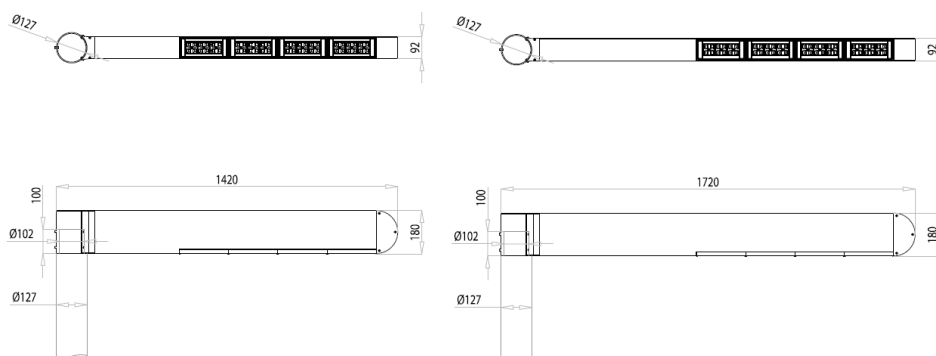
EPD type	Product EPD
System boundaries	From Cradle to grave and benefits beyond product life cycle.
Declared unit	The declared unit taken into consideration is a single street luminaire belonging to the DRAGON series respectively, operating during a reference life of 40,000 operating hours in accordance with Sub PCR 020 "Electronic and electrical products and systems - Home appliances".
Temporal validity	The reference period is the calendar year 2024.
Geographical validity	The performances have been calculated with reference to the main plant of AEC Illuminazione S.r.l. in via A. Righi, n.4 Subbiano, Arezzo - 52010 (IT) and the Pole Division branch in Via E. Fermi, 93 - Z.I. Castelnuovo - 52010 - Subbiano, Arezzo (IT). The reference market is the global one.
Database used	Ecoinvent 3.9.1
LCA software	SimaPro 9.5.0.1
LCA Tool	M-LCA-018-Tool AEC_01, 16/12/24
Exclusion criteria	They were excluded from the following study: ▪ employee travel. ▪ the packaging of the auxiliary material. ▪ replacement parts for machinery used during routine and extraordinary maintenance.
Data quality	All data related to the company's CORE activities and therefore falling under A3, were derived directly from the company's databases and are therefore site-specific. The UPSTREAM data, linked to phases A1 and A2 (for which the standard envisages the use of generic data), the data relating to weight, quantity, raw materials, and waste are derived from the company's databases or from reprocessing supplied directly and summarised in a 'Data Collection Checklist' and are therefore to be understood as site-specific.
Generic data	Criteria were applied throughout the analysis: ▪ geographical equivalence, considering similar Italian or at most European systems. ▪ technological equivalence, considering comparable technological systems through literature research. ▪ equivalence with respect to system boundaries, considering systems that take similar inputs, outputs and stages. Site-specific data refer to the year 2024, while for generic data, information between 2010 and 2020 was considered.
Cut-off rules	As stipulated in EN 15804:2012 + A2:2019, the cut-off criterion must be a maximum of: ▪ 1% on the use of primary energy from renewable and non-renewable sources, and 1% of the total mass of each process unit. ▪ 5% on the total flows for each unit (both in terms of energy and mass). The following inputs were cut-off in this study: ▪ Galvanising treatment carried out on hardware, small parts and bolts.
Data validation	The check of the validity and correctness of the specific data used for the CORE phases (phases A2 and A3) supplied by AEC Illuminazione S.r.l. was carried out through the punctual verification of the mass balances and the plant authorisation documentation, as well as the critical consultation of other EPD studies produced in compliance with the reference PCR. About the generic data used for the UPSTRESAM (A1) and DOWNSTREAM (C1, C2, C3, C4) phases, on the other hand, reference was made to the validation models required in Annex E of standard EN 15804:2012 + A2:2019.

PRODUCT DESCRIPTION

CHARACTERISTICS

DRAGON series

DIMENSIONS



PRODUCT DESCRIPTION

The luminaires in the DRAGON series consist of:
Aluminium body, LED modules, driver LED, supply cables, connectors, SPD (optional), screws and everything else needed for correct connection and installation.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

Luminaire:	Power:	Weight:
DRAGON 2AC12 XXX-X YYZZ.200-1M	15.4 W	15.9 kg
DRAGON 2AC12 XXX-X YYZZ.400-4M	119 W	20.5 kg
Rated voltage: 220÷240V.		
Rated frequency: 50/60Hz.		
200 ÷ 450: LED current range (mA).		

LED MODULE

1M ÷ 4M: number of LED modules.

AVAILABLE OPTICS (YYY-Y)

SL05 SL07	Asymmetrical optic for street, urban and green area lighting.	SL05-C SL07-C	Asymmetrical optics with high visual comfort for street, urban and green area lighting.
SLE-M SLE-S	Asymmetrical optic for suburban street lighting.	SLE-M-C SLE-S-C	Asymmetrical optic with high visual comfort for extra-urban street lighting.
SLU-S	Asymmetrical optic for street, urban and cycle/pedestrian lighting.	SLU-M-C SLU-S-C	Asymmetrical optic with high visual comfort for street, urban and cycle/pedestrian lighting.

N.B. other optics available on request.

COLOUR TEMPERATURE

CRI (**WW**): 70 = CRI70 , 80 = CRI80, 90 = CRI90
CCT (**ZZ**): 18 = 1800K, 22 = 2200K, 27 = 2700K, 30 = 3000K, 40 = 4000K, 57 = 5700K

INSULATIONS CLASS



CONTROL SYSTEM

F DA DAC FLC  ZHAGA

CERTIFICAZIONS



MATERIC TABLES

DRAGON 2AC12 XXX-X YYZZ.200-1M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	1,3%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,3%
Optical modules	PMMA	0,3%
Luminaire body	Aluminium	79,3%
Optical box	Aluminium	2,3%
Wiring plate	Steel	1,2%
Gasket	Silicon	0,2%
Plastic fixing/support accessories	PA	0,3%
Steel fixing/support accessories	Stainless steel/Galvanised steel	4,5%
Aluminium fixing/support accessories	Aluminium	5,8%
Cable gland	PA	0,1%
Internal wiring	Copper - FEP	0,2%
Supply cable	Copper - FEP	1,9%
Screws	Stainless steel/Galvanised steel	0,8%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	1,4%

DRAGON 2AC12 XXX-X YYZZ.400-4M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	3,6%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	1,0%
Optical modules	PMMA	0,8%
SPD	WEEE compliant electronic device	0,2%
Luminaire body	Aluminium	68,8%
Optical box	Aluminium	7,2%
Wiring plate	Steel	0,9%
Telecontrol device	WEEE compliant electronic device	0,3%
Gasket	Silicon	0,5%
Plastic fixing/support accessories	PA	0,8%
Steel fixing/support accessories	Stainless steel/Galvanised steel	3,6%
Aluminium fixing/support accessories	Aluminium	4,5%
Cable gland	PA	0,2%
Internal wiring	Copper - FEP	0,6%
Supply cable	Copper - FEP	1,7%
Screws	Stainless steel/Galvanised steel	0,9%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	4,3%

N.B. The components indicated in the material balance table and their weight percentages may be subject to change if configurations other than those indicated are considered.

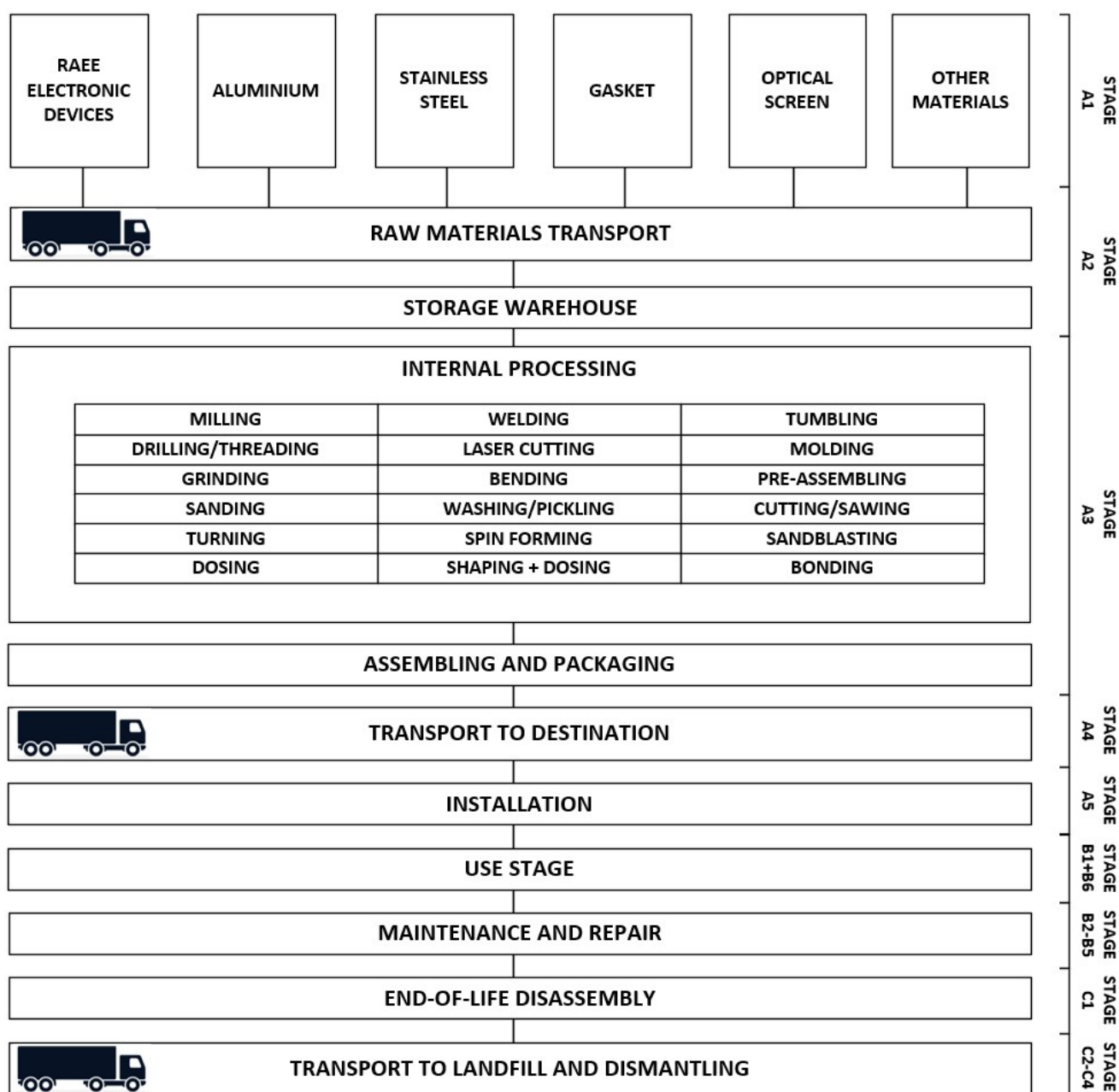
DESCRIPTION OF THE PRODUCTION PROCESS

The reality of AEC Illuminazione S.r.l. is highly technological thanks to the investments made in recent years in brand new machinery, collaborative robots, automated plants, and digital data transmission technologies, guaranteeing greater production efficiency and industrial competitiveness.

The design and production processes take place within the company headquarters and begin with the receipt of raw materials (metals) and semi-finished products (electrical and electronic components, glass, and crystal), which undergo quality control before being stored in the automated warehouse.

The production of an appliance is made up of various internal and external phases at subcontractors, in particular, the internal phases include:

- Production processes of cast iron components.
- Production processes of steel and aluminium components.
- Pre-assembly of components and assembly of the finished product.
- Testing: safety and functionality tests of the luminaire.
- Finished product packaging.



SCENARIOS

MODULES

Production Stage

Distribution Stage

Installation Stage

Use Stage

End-of-life Stage

Resource recovery Stage

SCENARIOS USED

A2.Transport of raw materials. For the component transport phase, the distances and relative quantities transported from the production site to the AEC Illuminazione S.r.l. factory were considered. For the calculation of distances by road, the distance between the company headquarters and the address of the various suppliers was used. For air and sea routes, the Ecotransit website (<https://www.ecotransit.org/en/>) was used instead.

A4.Transport. For the distribution phase, a distance of **832 km** by road and **1271 km** by ship was considered based on a weighted average of the countries of installation during the reference year.

A5.Installation process. For the installation of the luminaires, the use of a diesel lifting platform was considered for a time of 20 min, considering both the movement of the vehicle and the actual installation time of the luminaire. For fixing the luminaire to the pole, on the other hand, the use of an electric screwdriver was considered. During the installation phase, the disposal of the final packaging materials is considered by identifying a disposal scenario in European and non-European territory, based on the weighted average of the devices sold by AEC during the reference year.

B1.Use. This phase has already been accounted for in B6.

B2.Maintenance. No ordinary maintenance of the product by the company was considered during its useful life.

B3.Repair. Routine repairs of the product during its useful life are not considered. The operations relating to the LED power supply were accounted for in phase B4.

B4.Replacement. It's planned to replace LED driver at a rate of 4% based on the respective failure rates defined in the data sheets.

B5.Rehabilitation. Rehabilitation operations of the product or its components by the company during its useful life are not considered.

B6.Energy used. During the use phase the devices are powered by low voltage electricity. As indicated in the reference PCR 020 Sub-category, a Reference Life Service (RLS) of 40,000h and the nominal power of the appliance are considered. The energy mix considered for the consumption analysis is a weighted average of the countries of installation for the reference year, with an effective value equal to **0.432 kgCO₂/kWh**. The input data used comes from the Ecoinvent 3.9.1 database.

B7.Water used. No water consumption is expected from the product during its lifetime.

C1.Disassembly. For the disassembly phase, the same impacts were considered as for the installation phase (operation of the diesel lifting platform and electric screwdriver).

C2.Transport. For the transport phase of the equipment to specialised treatment plants, reference was made to a precautionary default average distance of 100 km.

C3.Recycling Processes. For all information related to the treatment process of end-of-life appliances, reference has been made to Table G.4 in Annex G of EN 50693:2019.

C4.Disposal processes. For disposal processes, as for the previous paragraph, reference has been made to the same Annex G of EN 50693:2019.

D. Re-use, recovery, recycling potential. They were considered the C3 phase waste flows sent for recycling as recovered materials matter.

DRAGON RESULTS

The following tables summarize the total environmental impacts calculated through AEC Illuminazione proprietary LCA-Tool for the DRAGON street luminaire.

Size: **DRAGON 2AC12 XXX-X YYZZ.200-1M**

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	9,94E+01	4,98E+00	3,30E+00	1,55E+00	2,53E+02	2,92E+00	-6,64E+00
GWP-Biogenic	kg CO2 eq.	2,16E+00	-1,64E+00	2,72E-03	1,10E-03	1,24E+01	1,99E-01	-1,95E-02
GWP-Land use	kg CO2 eq.	1,75E-01	5,25E-02	1,69E-03	3,11E-04	3,72E-01	1,04E-03	-1,44E-01
GWP Total	kg CO2 eq.	1,02E+02	3,40E+00	3,31E+00	1,56E+00	2,66E+02	3,12E+00	-6,81E+00
ODP	kg CFC 11 eq.	2,24E-06	1,11E-07	7,06E-08	2,45E-08	4,86E-06	3,90E-08	-1,87E-07
AP	mol H+ eq.	8,16E-01	1,90E-02	2,02E-02	7,36E-03	1,37E+00	1,20E-02	-1,11E-01
EP-Freshwater	kg P eq.	5,00E-02	1,91E-03	2,23E-04	6,94E-05	1,23E-01	2,88E-04	-9,60E-03
EP-Marine	kg N eq.	1,04E-01	9,84E-03	6,70E-03	3,12E-03	2,03E-01	4,99E-03	-8,94E-03
EP-Terrestrial	mol N eq.	1,13E+00	5,82E-02	7,23E-02	3,37E-02	2,09E+00	4,79E-02	-9,96E-02
POCP	kg NMVOC eq.	3,98E-01	7,94E-02	2,41E-02	1,11E-02	7,69E-01	1,58E-02	-3,61E-02
ADPE ⁽²⁾	kg Sb eq.	7,17E-03	2,47E-05	1,01E-05	1,51E-06	2,70E-03	6,97E-06	-8,82E-04
ADPF ⁽²⁾	MJ	1,24E+03	5,47E+01	4,66E+01	2,05E+01	4,25E+03	3,11E+01	-9,88E+01
WDP ⁽²⁾	m³	4,81E+01	1,78E+00	1,84E-01	6,46E-02	9,60E+01	3,98E-01	-7,03E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	6,14E-06	2,84E-07	1,61E-01	1,31E-07	2,36E-02	1,19E-01	-5,32E-01
IRP ⁽¹⁾	kBq U235 eq.	7,95E+00	3,68E-01	5,97E-02	1,44E-02	6,15E+01	7,51E-02	-1,62E+00
ETP-FW ⁽²⁾	CTUe	1,24E+03	5,57E+02	2,30E+01	1,00E+01	8,02E+02	9,94E+01	-9,39E+01
HTP-NC ⁽²⁾	CTUh	4,68E-06	3,14E-07	2,13E+00	1,04E+00	1,44E-02	1,18E+01	-2,19E+00
HTP-C ⁽²⁾	CTUh	2,20E-07	1,93E-04	1,50E-09	1,53E-09	1,02E-07	2,33E-09	-2,48E-08
SQP ⁽²⁾	Pt	5,69E+02	2,10E+02	2,61E+01	2,96E+00	9,68E+02	2,15E+01	-2,55E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

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Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	2,44E+02	-5,24E+00	6,97E-01	2,05E-01	1,14E+03	9,76E-01	-4,00E+01
PERM	MJ	2,25E+00	4,75E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,46E+02	4,23E+01	6,97E-01	2,05E-01	1,14E+03	9,76E-01	-4,00E+01
PENRE	MJ	1,22E+03	4,33E+00	4,66E+01	2,05E+01	4,25E+03	3,11E+01	-9,88E+01
PENRM	MJ	1,93E+01	4,57E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,24E+03	8,90E+00	4,66E+01	2,05E+01	4,25E+03	3,11E+01	-9,88E+01
SM	kg	1,19E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,54E+00	5,40E-02	6,45E-03	2,22E-03	4,20E+00	1,28E-02	-2,67E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	1,09E-01	2,11E-04	2,92E-04	1,36E-04	1,31E-02	1,81E-04	6,20E-03
NHWD	kg	1,56E+01	9,94E-01	2,13E+00	1,04E+00	1,97E+01	1,18E+01	0,00E+00
RWD	kg	2,02E-03	9,34E-05	1,45E-05	3,42E-06	1,58E-02	1,86E-05	-4,29E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	2,31E+00	0,00E+00	2,78E+00	0,00E+00	1,09E+01	1,55E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,75E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

Size: DRAGON 2AC12 XXX-X YYZZ.400-4M

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	1,27E+02	5,50E+00	4,06E+00	1,55E+00	1,96E+03	4,40E+00	-8,69E+00
GWP-Biogenic	kg CO2 eq.	2,56E+00	-1,62E+00	3,35E-03	1,10E-03	9,55E+01	2,36E-01	-2,49E-02
GWP-Land use	kg CO2 eq.	2,31E-01	5,26E-02	2,07E-03	3,11E-04	2,88E+00	1,26E-03	-1,79E-01
GWP Total	kg CO2 eq.	1,30E+02	3,94E+00	4,07E+00	1,56E+00	2,06E+03	4,64E+00	-8,89E+00
ODP	kg CFC 11 eq.	6,51E-06	1,14E-07	8,69E-08	2,45E-08	3,76E-05	4,47E-08	-2,40E-07
AP	mol H+ eq.	1,07E+00	1,98E-02	2,48E-02	7,36E-03	1,06E+01	1,35E-02	-1,57E-01
EP-Freshwater	kg P eq.	6,53E-02	1,95E-03	2,75E-04	6,94E-05	9,48E-01	3,44E-04	-1,32E-02
EP-Marine	kg N eq.	1,34E-01	1,00E-02	8,24E-03	3,12E-03	1,57E+00	6,56E-03	-1,24E-02
EP-Terrestrial	mol N eq.	1,47E+00	5,99E-02	8,89E-02	3,37E-02	1,61E+01	5,33E-02	-1,41E-01
POCP	kg NMVOC eq.	5,15E-01	9,75E-02	2,97E-02	1,11E-02	5,94E+00	1,75E-02	-4,94E-02
ADPE ⁽²⁾	kg Sb eq.	9,42E-03	2,82E-05	1,24E-05	1,51E-06	2,04E-02	8,33E-06	-1,30E-03
ADPF ⁽²⁾	MJ	1,61E+03	5,72E+01	5,74E+01	2,05E+01	3,28E+04	3,46E+01	-1,28E+02
WDP ⁽²⁾	m³	6,23E+01	1,80E+00	2,27E-01	6,46E-02	7,42E+02	5,52E-01	-1,16E+00

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	7,85E-06	3,00E-07	1,98E-01	1,31E-07	2,70E-02	1,47E-01	-7,10E-01
IRP ⁽¹⁾	kBq U235 eq.	1,00E+01	3,76E-01	7,35E-02	1,44E-02	4,75E+02	8,93E-02	-2,04E+00
ETP-FW ⁽²⁾	CTUe	1,62E+03	7,07E+02	2,83E+01	1,00E+01	6,17E+03	1,20E+02	-1,40E+02
HTP-NC ⁽²⁾	CTUh	6,38E-06	3,94E-07	2,63E+00	1,04E+00	2,59E-02	1,48E+01	-2,79E+00
HTP-C ⁽²⁾	CTUh	2,76E-07	2,48E-04	1,85E-09	1,53E-09	7,87E-07	2,62E-09	-3,40E-08
SQP ⁽²⁾	Pt	7,21E+02	2,11E+02	3,22E+01	2,96E+00	7,48E+03	2,60E+01	-3,74E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

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Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	3,07E+02	-5,13E+00	8,58E-01	2,05E-01	8,78E+03	1,16E+00	-5,04E+01
PERM	MJ	2,89E+00	4,75E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,10E+02	4,24E+01	8,58E-01	2,05E-01	8,78E+03	1,16E+00	-5,04E+01
PENRE	MJ	1,57E+03	5,96E+00	5,74E+01	2,05E+01	3,28E+04	3,46E+01	-1,28E+02
PENRM	MJ	4,01E+01	5,46E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,61E+03	1,14E+01	5,74E+01	2,05E+01	3,28E+04	3,46E+01	-1,28E+02
SM	kg	1,43E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,98E+00	5,46E-02	7,94E-03	2,22E-03	3,24E+01	1,76E-02	-3,39E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	1,32E-01	2,17E-04	3,60E-04	1,36E-04	1,01E-01	1,99E-04	7,75E-03
NHWD	kg	1,98E+01	1,03E+00	2,63E+00	1,04E+00	1,52E+02	1,48E+01	0,00E+00
RWD	kg	2,54E-03	9,54E-05	1,78E-05	3,42E-06	1,22E-01	2,21E-05	-5,41E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	2,97E+00	0,00E+00	2,78E+00	0,00E+00	1,33E+01	2,28E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,56E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

SUMMARY TABLES

Total CO₂ equivalent production of the luminaire

Model	Size	GWP Total A1-A3 [kgCO ₂ eq]	GWP Total A1-C4 [kgCO ₂ eq]
DRAGON	DRAGON 2AC12 XXX-X YYZZ.200-1M	1,05E+02	3,79E+02*
	DRAGON 2AC12 XXX-X YYZZ.400-4M	1,34E+02	2,20E+03*

* Results for the GWP Total indicator refer to the functional units analysed and may be subject to change if configurations other than those indicated are considered.

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