Environmental Product Declaration

EPD of multiple products, based on a representative product in accordance with ISO 14025:2017 and EN 15804:2012+A2:2019/ AC:2021 for:

LITO | MINO | FRAME 60

from XAL GmbH

Included Products:
- **LITO 60** direct / indirect suspended (reference product)
- **LITO 60** direct / indirect suspended ESSENTIAL sensor
- **MINO 60** suspended
- **MINO 60** surface
- **FRAME 60** trim

Programme
The International EPD® System
www.environdec.com

Programme operator
EPD International AB

EPD registration number	EPD-IES-0023851:001
Publication date	2025-06-20
Valid until	2030-06-19

This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment. An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

General information

Programme information

Programme System	The International EPD®
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR)
PCR 2019:14 Construction products version 1.3.4, 2024-04-30
UN CPC code(s): 4653 (Ver. 2.1) Lighting Equipment

PCR review was conducted by
The Technical Committee of the International EPD® System

Life Cycle Assessment (LCA) accountability
XAL GmbH, Auer-Welsbach-Gasse 36, 8055 Graz, Austria

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via

☒ EPD verification by individual verifier

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Approved by
The International EPD® System

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804:2012+A2:2019/AC:2021, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/declared units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 and ISO 14025:2006.

Company information

Owner of the EPD

XAL GmbH
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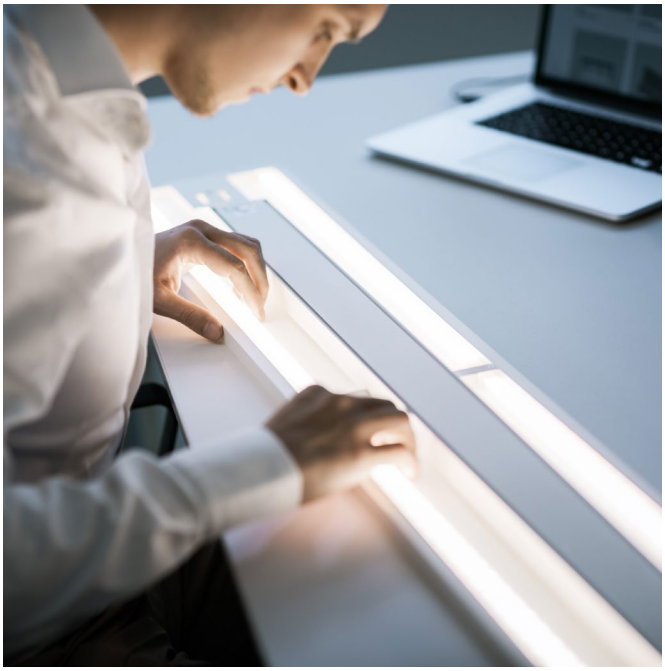


Description of the organisation

XAL is an internationally operating manufacturer of high-end luminaires and lighting solutions for shop, office, hotel and residential lighting. For 30 years, XAL has been working with lighting designers, architects and planners to develop custom luminaires of the highest technical standard, with a focus on style and aesthetics. While XAL mainly targets B2B costumers, we also provide our standard portfolio to B2C costumers.

With its headquarters in Graz, Austria, the XAL Group currently employs 1300 people worldwide and has 30 international subsidiaries. We are continuously working on further improving our products – whether in terms of durability, efficiency, the carbon footprint, or also with regard to the replaceability and reusability of components and materials.

Product-related or management system-related certifications

XAL is certified according to several management and CSR standards.

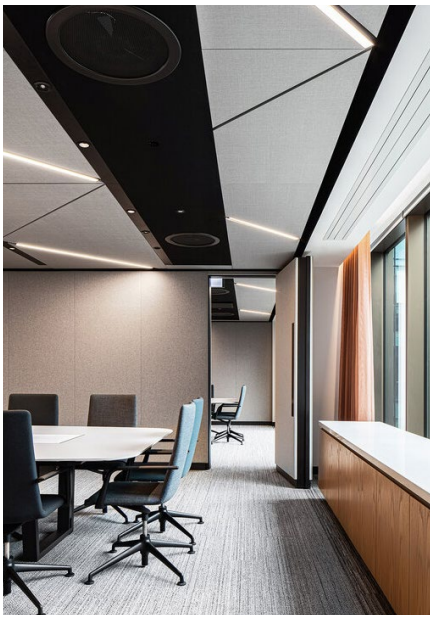
- **ISO 9001** – Quality management systems
- **ISO 14001** – Environmental management systems
- **ISO 45001** – Occupational health and safety management systems
- **Ecovadis** – regular evaluation of our corporate social responsibility based on objective criteria with a focus on the environment, labour and human rights, ethics and responsible procurement.
- **UN Global Compact initiative** – our interactions with each other and our stakeholders, our supply chain management and our resource strategies are guided by the principles of the UN Global compact.

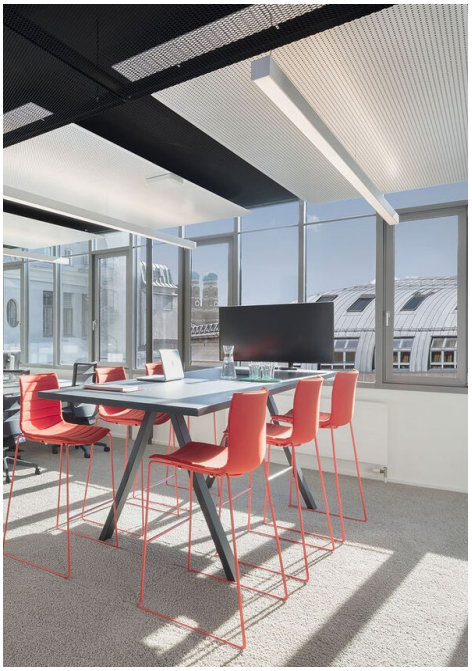
Name and location of production site(s)
The production sites are located in Murska Sobota (XAL Svetila d.o.o., Slovenia) and in Graz (XAL GmbH, Austria).

The production facilities operate in a complementary manner, with each product passing through both facilities.

More information
xal.com

Product information





Product name

LITO 60 direct / indirect suspended
(reference product)

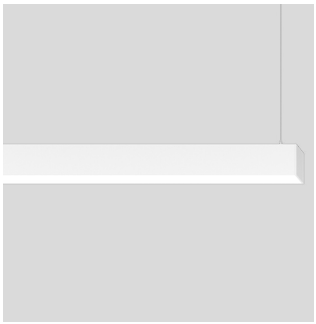
Product identification

Luminaire housing from extruded aluminium profile, angular design; no visible screws; surface powder coated; pendant fitting with cable suspension; available in 3 different sizes 1180 mm, 1480 mm, 2352 mm.

This EPD covers multiple products:

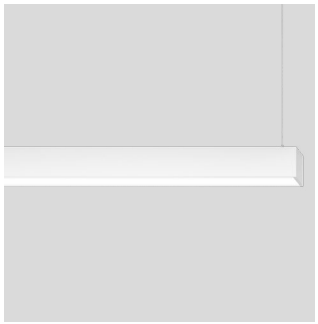
- **LITO 60** direct / indirect suspended (reference product)
- **LITO 60** direct / indirect suspended ESSENTIAL sensor
- **MINO 60** suspended
- **MINO 60** surface
- **FRAME 60** trim

This EPD covers five luminaires that have an almost similar structure.



LITO 60 d/i suspended
(reference product)
LITO 60 d/i suspended
ESSENTIAL sensor

MINO 60 surface



MINO 60 suspended

FRAME 60 trim

Product information

Product description

Luminaire housing from extruded aluminium profile, angular design; no visible screws; surface powder coated; pendant fitting with cable suspension; with integrated toolless suspension height adjustment; available in 3 different sizes 1180 mm, 1480 mm, 2352 mm; spring clip attachment to the luminaire; freely positionable; incl. transparent feed; light inset made from extruded profile for improved thermal management; micro prismatic PMMA diffuser incl. diffuser film for homogeneous illumination and reduced luminance; direct / indirect light distribution; indirect light component with integrated PC boards for maximum, homogeneous ceiling illumination; energy-efficient LEDs with very good colour rendering.

Technical specifications

Specification	**LITO 60 d/i suspended** (reference product)	**LITO 60 d/i suspended** ESSENTIAL sensor
Inset power	41 W	41 W
Luminous efficacy	up to 116 lm/W	up to 116 lm/W
Colour temperature	3000 K, 4000 K	3000 K, 4000 K
Electrical	DALI-2	ESSENTIAL sensor
Physical	Length 1180 mm Width 60 mm Height 80 mm	Length 1180 mm Width 60 mm Height 80 mm

Specification	**MINO 60** surface	**MINO 60** suspended	**FRAME 60** trim
Inset power	23.3 W	23.3 W	23.3 W
Luminous efficacy	up to 140 lm/W	up to 140 lm/W	up to 140 lm/W
Colour temperature	3000 K, 4000 K	3000 K, 4000 K	3000 K, 4000 K
Electrical	DALI-2	DALI-2	DALI-2
Physical	Length 1180 mm Width 60 mm Height 80 mm	Length 1180 mm Width 60 mm Height 80 mm	Length 1193 mm Width 66 mm Height 78 mm

CB

The products covered by this EPD are thoroughly tested in our externally accredited in-house facilities. CB is available.

UN CPC code(s):
- 4653 (Ver. 2.1) Lighting Equipment

LCA information

Declared unit

The declared unit is one piece of **LITO 60** direct / indirect suspended (1180mm). This product has been chosen as the reference due to the highest share of sales. The Microprismatic cover has been chosen for the model as it represents the worst case. The Opal High Performance cover is made of the same material but in a lighter version. The weight of the product per declared unit is 3.48 kg.
For better comparison with other types of luminaires, conversion factors are also available to convert the results to 1000 lumens during a reference lifetime of 35000 hours. This reference value is proposed by the PEP Category rules (PSR-0014-ed2.0-EN-2023 07 13). The conversion factors are available under “Additional environmental information“.
The principles of “Modularity” and “polluter pay” have been followed.

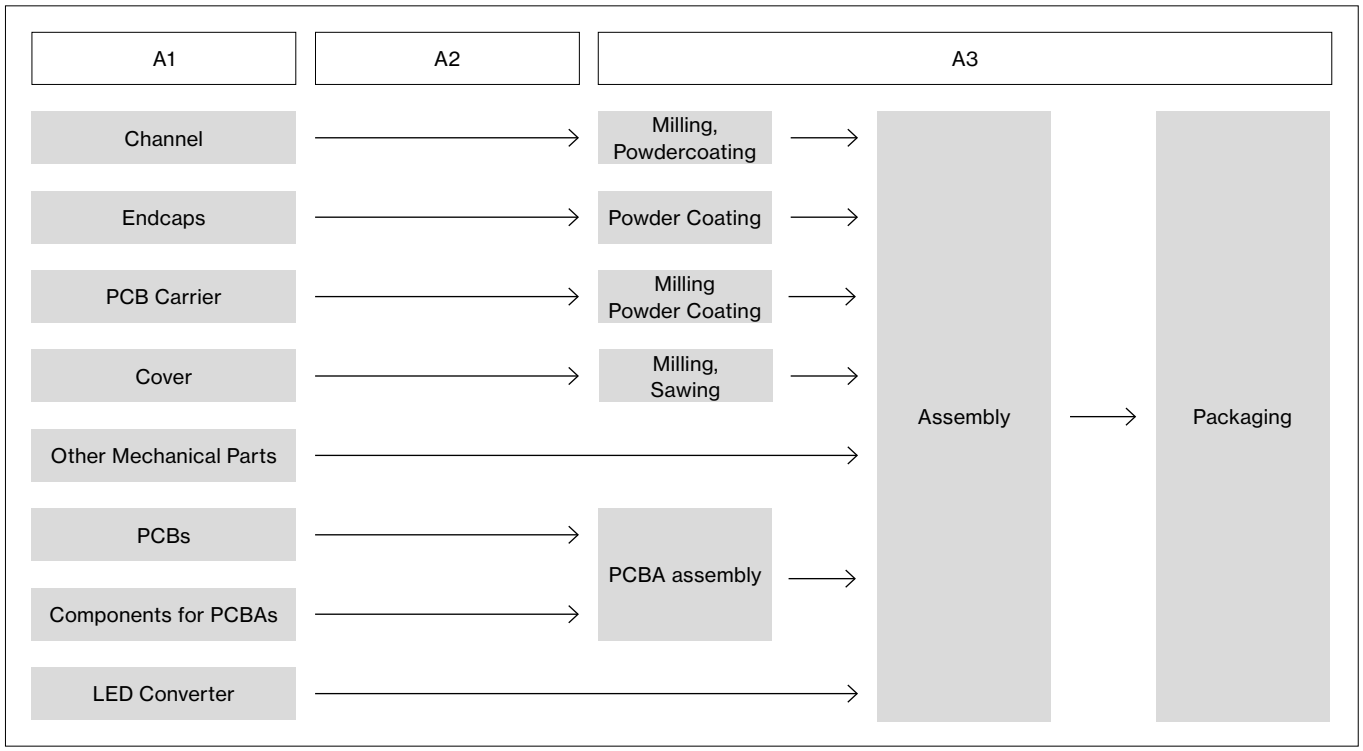
Reference service life
14.7 years

Time representativeness
2024

Database(s) and LCA software used
LCA for Experts 10.9.0.31

Description of system boundaries
Cradle to grave and module D

System diagram (A1 – A3)



Product stage (A1 – A3)

Raw materials are found in the components used for the luminaire production. The raw materials and the necessary process steps have been modelled using LCA for Experts. The assembly of the PCBAs is done in Austria. Milling, Sawing and Powdercoating of profies, endcaps and covers as well as the final assembly of the luminaire is done in Murska Sobota, Slovenia. The corresponding electricity mix has been used for all manufacturing steps. Transportation of all the components is incorporated. For the components which are delivered from China, aggregated data has been used, since transportation involved various routes and transport vehicles. Packaging for the components has been accounted for using a worst-case approach. The ESD-packaging is reused one time within the company, therefore only ½ of the weight is taken into account for the production and the recycling.

Transport to building (A4)

The transport is calculated from Graz, Austria to the capitals of the countries with sales shares >4% (Berlin, Brussels, Paris, Rome, Vienna, and Zurich). The product market includes countries all over the world.

Weighted distance	701.12 km
Truck used	Class EURO 6, 26-28 t
Fuel type	Diesel (0.00287 l/100 kkm)

Installation into building (A5)

No emissions occur during the installation. This module includes the waste treatment of the packaging. For the transport-packaging, the euro pallet is reused 28 times, therefore only 1/28 of the weight is taken into account for the production and the end of life of the pallet. This is an assumption derived from the PEP Eco Passport rules (PSR-0014-ed2.0-EN-2023 07 13). Packaging waste incl transport packaging:

Material	Weight (kg)
Cardboard	0.54
Polyethylene film	0.0065
Wooden Pallet	0.006
Paper	0.044

Use, maintenance, repair, replacement and refurbishment (B1, B2, B3, B4, B5)

These stages include the use, maintenance, repair, replacement and refurbishment of the product, which do not contribute to the environmental impacts of the products functional unit.

Operational Energy Use (B6)

The reference service life of the luminaire is 14.7 years. This calculation is based on the lifespan segments of the application areas. The application areas were determined based on sales data.

Electricity consumption during the use stage is modelled based on the technical parameters of the luminaires and is representative for a weighted average of the following applications – office (72%), hospital (7%), hotel (7%), restaurant (7%), and retail (7%) with an average lifetime of 14.7 years. Geography of the electricity mix is modelled by sales shares and is representative for European countries (99.1% - EU-28) and rest of world countries (0.9%). For the rest of world countries, an electricity mix for China is used following a worst-case approach.

The energy consumption is calculated using the formula from EN 15193:2007: **Energy consumption [kWh] = {Pa × FCP × FO × (FD × tD + FN × tN) + Pp × ty} × 1/1.000 × a**

The results and additional Use Phase Information is presented in the table below:

Scenario	LITO 60 d/i suspended (reference product)	Unit
Electricity use (14.7 years)	1836	kWh
Active power	41	W
Passive power	0.15	W
Total active time	44316	hours
Total passive time	84018	hours
Dimmable	DALI-2	-
Presence control	No	-

Operational water use (B7)

No water is consumed during the use stage. Therefore this stage does not contribute to the environmental impacts of the products functional unit.

End-of-life stage (C1 – C4)

The product is presumed to be decomposed manually; therefore, no emissions should occur. For the corresponding waste destinations, the following distances are used:

- To recycling facility – 250 km
- To incineration facility – 50 km
- To landfill – 100 km for metal and electronic parts, 20 km for plastic parts and packaging waste

Based on official statistics and literature, waste treatment options are taken into account for Europe and rest of the world countries.

Scenario (luminaire + mounting accessory)	LITO 60 d/i suspended (reference product)	Unit
Collected separately	3.48	kg
Collected with mixed (construction) waste	-	kg
For reuse	-	kg
For recycling	2.04	kg
For energy recovery	0.69	kg
For final disposal	0.75	kg

Module D

According to the guidelines of EN 15804+A2 and the PCR from EPD International, calculations are made for Module D. The loads and benefits result from the export of secondary materials and the energy which comes from incineration and landfilling. In Module D also the benefits from the product packaging waste are included.

Scenario (contributing materials, incl. packaging)	LITO 60 d/i suspended (reference product)	Unit
Materials for recycling	2.50	kg
Materials for export of secondary fuels	-	kg
Materials for incineration	0.76	kg

Cut-off rules

Consistent with the PCR, a minimum of 95% of total inflows (mass and energy) are included. In addition, materials and processes with insignificant contributions of less than 1% are also included. For the use and end-of-life stage, scenarios are used, factoring in geographical conditions (such as electricity mix) and applications (waste treatment practices).

The following processes have been excluded:
- Manufacture of equipment used in production, buildings or any other capital goods;
- The transportation of personnel to the plant;
- Transportation of personnel within the plant;
- Research and development activities;
- Long-term emissions.

Data quality

Based on site specific information, this LCA study reflects the production for 2024. Components are supplied by external vendors, therefore manufacturing processes are modelled using LCA for Experts, with the best fitting representative geographical conditions and applications.

Electricity grid

For the manufacturing in Graz, Austria, the corresponding electricity grid mix as stated on the invoice is used: Biomass (65.64%), Solar (25.28%) other RE (9.08%).

For Murska Sobota, Slovenia, the corresponding electricity grid mix is: Hydro Power (58%), Solar (42%).

Environmental impact of the electricity used in	AUT	SLO
CO_2 eq. [kg/kWh]	0.031	0.015

Content information

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	GLO	GLO	AUT, SLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific data used	41.5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-31%/+1%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acronyms	GLO = Global, AUT = Austria, SLO = Slovenia																

Content information

Product components	Weight. kg	Weight-% (versus total weight)	Post-consumer material. weight-%	Biogenic material. weight-% / declared unit	Biogenic material. kg C / declared unit
Aluminum	2.03	58.33	8.50	0.00	0.00
Polymethylmethacrylate (PMMA)	0.42	12.07	0.00	0.00	0.00
Zinc	0.21	6.03	0.00	0.00	0.00
Epoxy-Resin	0.16	4.60	0.00	0.00	0.00
Steel	0.12	3.45	0.00	0.00	0.00
Polycarbonate	0.11	3.16	0.00	0.00	0.00
Copper	0.09	2.59	0.00	0.00	0.00
Thermoplastics	0.09	2.59	0.00	0.00	0.00
Polyvinyl chloride (PVC)	0.06	1.72	0.00	0.00	0.00
Polybutylenterephthalat	0.06	1.72	0.00	0.00	0.00
Glass fibers	0.05	1.44	0.00	0.00	0.00
Others (<1%)	0.08	2.30	0.00	0.00	0.00
TOTAL	**3.48**	**100.00**	**4.94**	**0.00**	**0.00**

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C / declared unit
Paper	0.06	1.71	0.03
Cardboard	0.37	10.59	0.19
TOTAL	**0.43**	**12.30**	**0.22**

The products do not contain any REACH and RoHS SVHC substances in amounts greater than 0.1 % (1000 ppm).

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Usage of results from A1-A3 without considering the results of module C is not encouraged.

Mandatory impact category indicators according to EN 15804

		Results per piece of LITO 60 direct / indirect suspended										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – fossil	kg CO_2 eq.	5.07E+01	2.77E-01	2.53E-02	0.00E+00	5.92E+02	0.00E+00	0.00E+00	6.80E-02	2.33E+00	1.91E-02	-2.13E+01
GWP – biogenic	kg CO_2 eq.	-1.38E+00	0.00E+00	1.38E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP – luluc	kg CO_2 eq.	1.00E-01	2.95E-03	1.44E-04	0.00E+00	1.95E+00	0.00E+00	0.00E+00	7.25E-04	9.69E-05	4.91E-05	-4.60E-02
GWP – total	**kg CO_2 eq.**	**4.95E+01**	**2.80E-01**	**1.40E+00**	**0.00E+00**	**5.94E+02**	**0.00E+00**	**0.00E+00**	**6.87E-02**	**2.34E+00**	**1.92E-02**	**-2.14E+01**
ODP	kg CFC 11 eq.	5.76E-09	3.38E-14	3.35E-14	0.00E+00	1.31E-08	0.00E+00	0.00E+00	8.31E-15	9.70E-13	5.45E-14	-3.18E-10
AP	mol H+ eq.	2.59E-01	4.48E-04	7.08E-05	0.00E+00	1.33E+00	0.00E+00	0.00E+00	1.10E-04	4.78E-04	1.28E-04	-7.97E-02
EP – freshwater	kg P eq.	3.13E-04	7.74E-07	5.32E-07	0.00E+00	1.23E-03	0.00E+00	0.00E+00	1.90E-07	2.04E-07	2.97E-08	-1.48E-05
EP – marine	kg N eq.	5.50E-02	1.83E-04	3.18E-05	0.00E+00	3.16E-01	0.00E+00	0.00E+00	4.49E-05	1.25E-04	3.19E-05	-1.71E-02
EP – terrestrial	mol N eq.	5.95E-01	1.95E-03	3.01E-04	0.00E+00	3.54E+00	0.00E+00	0.00E+00	4.79E-04	2.24E-03	3.49E-04	-1.87E-01
POCP	kg NMVOC eq.	1.60E-01	3.88E-04	9.12E-05	0.00E+00	7.93E-01	0.00E+00	0.00E+00	9.53E-05	3.35E-04	9.79E-05	-4.98E-02
ADP – minerals & metals*	kg Sb eq.	2.09E-03	1.90E-08	1.37E-09	0.00E+00	1.20E-04	0.00E+00	0.00E+00	4.67E-09	1.86E-08	1.62E-09	-1.80E-04
ADP – fossil*	MJ	7.10E+02	3.65E+00	2.67E-01	0.00E+00	1.19E+04	0.00E+00	0.00E+00	8.97E-01	9.83E-01	2.87E-01	-2.82E+02
WDP*	m^3	9.84E+00	1.15E-03	1.22E-02	0.00E+00	1.50E+02	0.00E+00	0.00E+00	2.82E-04	2.36E-01	2.19E-03	-2.01E+00

Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential. Accumulated Exceedance; EP-freshwater = Eutrophication potential. fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential. fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential. Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

		Results per piece of LITO 60 direct / indirect suspended										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – GHG[1]	kg CO_2 eq.	5.08E+01	2.80E-01	2.54E-02	0.00E+00	5.94E+02	0.00E+00	0.00E+00	6.87E-02	2.34E+00	1.92E-02	-2.14E+01
PM	disease inc.	3.14E-06	4.28E-09	5.54E-10	0.00E+00	1.14E-05	0.00E+00	0.00E+00	1.05E-09	5.45E-09	1.52E-09	-1.21E-06
IRP – HE**	kg U235-eq	3.65E+00	6.66E-04	6.05E-04	0.00E+00	3.04E+02	0.00E+00	0.00E+00	1.64E-04	9.15E-03	4.61E-04	-1.37E+00
ETP – fw*	CTUe	3.11E+02	4.74E+00	2.79E-01	0.00E+00	2.00E+03	0.00E+00	0.00E+00	1.16E+00	4.65E-01	1.94E-01	-9.30E+01
HTP – c*	CTUh	1.90E-08	6.37E-11	4.77E-12	0.00E+00	1.90E-07	0.00E+00	0.00E+00	1.57E-11	4.13E-11	1.21E-11	-1.40E-08
HTP – nc*	CTUh	4.01E-07	3.59E-09	2.89E-10	0.00E+00	3.97E-06	0.00E+00	0.00E+00	8.83E-10	3.15E-09	1.12E-09	-1.43E-07
SQP	dimension-less	1.43E+02	1.62E+00	9.12E-02	0.00E+00	4.70E+03	0.00E+00	0.00E+00	3.98E-01	4.13E-01	5.25E-02	1.21E+02

Acronyms	PM = particulate matter emissions. IRP-HE = ionizing radiation potential-human exposure. ETP-fw = ecotoxicity (freshwater). HTP-c = human toxicity potential. cancer effects. HTP-nc = human toxicity potential. non-cancer effects. SQP = land use related impacts.

[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Results of the environmental performance indicators

Resource use indicators

		Results per piece of LITO 60 direct / indirect suspended									
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.63E+02	2.69E-01	3.27E-02	0.00E+00	8.03E+03	0.00E+00	0.00E+00	6.60E-02	5.05E-01	4.52E-02	-1.37E+02
PERM	MJ	7.51E+00	0.00E+00	-7.50E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.07E-02	0.00E+00	0.00E+00
PERT	MJ	2.70E+02	2.69E-01	-7.46E+00	0.00E+00	8.03E+03	0.00E+00	0.00E+00	6.60E-02	4.94E-01	4.52E-02	-1.37E+02
PENRE	MJ	7.10E+02	3.65E+00	2.67E-01	0.00E+00	1.19E+04	0.00E+00	0.00E+00	8.97E-01	9.83E-01	2.87E-01	-2.82E+02
PENRM	MJ	1.91E+01	0.00E+00	-2.72E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.88E+01	0.00E+00	0.00E+00
PENRT	MJ	7.29E+02	3.65E+00	-4.61E-03	0.00E+00	1.19E+04	0.00E+00	0.00E+00	8.97E-01	-1.78E+01	2.87E-01	-2.82E+02
SM	kg	1.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.39E-01	1.29E-04	2.95E-04	0.00E+00	6.34E+00	0.00E+00	0.00E+00	3.18E-05	5.68E-03	6.54E-05	-1.02E-01

Acronyms: 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators

		Results per piece of LITO 60 direct / indirect suspended									
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	4.16E-07	1.32E-10	3.43E-10	0.00E+00	1.54E-05	0.00E+00	0.00E+00	3.25E-11	4.28E-10	4.28E-11	-1.54E-07
Non-hazardous waste disposed	kg	7.25E+00	4.80E-04	4.77E-02	0.00E+00	9.13E+00	0.00E+00	0.00E+00	1.18E-04	2.47E-01	1.08E+00	-5.86E+00
Radioactive waste disposed	kg	2.45E-02	4.80E-06	3.87E-06	0.00E+00	1.84E+00	0.00E+00	0.00E+00	1.18E-06	7.13E-05	3.66E-06	-1.36E-02

Output flow indicators

		Results per piece of LITO 60 direct / indirect suspended									
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	8.08E-01	0.00E+00	6.01E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E+00	0.00E+00	3.53E-01
Materials for energy recovery	kg	0.00E+00	0.00E+00	4.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E+00	0.00E+00	0.00E+00
Exported energy. electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy. thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional environmental information

Scaling Factors for LITO 60 d/i suspended ESSENTIAL sensor, MINO 60 surface, MINO 60 suspended and FRAME 60 trim

The LITO 60 d/i suspended ESSENTIAL sensor, MINO 60 surface, MINO 60 suspended and FRAME 60 trim luminaires have also been incorpotated into the model and therefore been scaled by real factors. The Use Phase B6 of the LITO 60 direct / indirect suspended ESSENT. sensor variants have been factorized with a theoretical coefficient of energy saving (0.55) according to PEP-PCR-ed14-EN-2021 09 06 by PEP-ECO Passport. Accordingly, all length versions of the different luminaires belong to an environmental homogenous family and fullfil the requirements established by the PEP-PCR-ed4-EN-2021 09 06 by PEP-ECO Passport. The length variants use the same material and production technology, but there are differences in the dimension and weight of the components. These differences can be scaled based on the LITO 60 d/i suspended reference product. The scaling factors are:

Variant	Length	A1–A3	A4	A5	B6	C1–C4	D
LITO 60 d/i suspended (reference product)	1180	1.00	1.00	1.00	1.00	1.00	1.00
	1480	1.23	1.17	1.24	1.24	1.17	1.23
	2352	1.93	1.78	1.94	2.00	1.78	1.93
LITO 60 d/i suspended ESSENTIAL sensor	1180	1.01	1.03	1.00	0.55	1.10	1.01
	1480	1.23	1.20	1.24	0.68	1.28	1.23
	2352	1.92	1.83	1.94	1.10	1.78	1.95
MINO 60 surface	580	0.35	0.50	0.79	0.17	0.53	0.45
	880	0.51	0.69	1.17	0.24	0.71	0.65
	1180	0.69	0.92	1.15	0.57	0.72	0.83
	1480	0.83	1.09	1.93	0.41	1.13	1.06
	2352	1.24	1.66	3.07	0.63	1.71	1.59
MINO 60 suspended	880	0.56	0.83	1.17	0.24	0.80	0.75
	1180	0.74	1.00	1.15	0.57	0.89	0.85
	1480	0.90	1.25	1.93	0.41	1.20	1.20
	2352	1.35	1.90	3.07	0.63	1.81	1.79
FRAME 60 trim	593	0.35	0.50	0.79	0.17	0.53	0.45
	893	0.51	0.69	1.17	0.24	0.71	0.65
	1193	0.69	0.92	1.15	0.57	0.72	0.83
	1493	0.83	1.09	1.93	0.41	1.13	1.06
	2365	1.24	1.66	3.07	0.63	1.71	1.59

Results for 1000 lumens during a reference life of 35000 hours produced by 1 LITO 60, MINO 60, FRAME 60 luminaire (As per reference of PEP-ECO Passport PSR-0014-ed2.0-EN-2023 07 13).

A conversion factor can be used for converting the results to 1000 lumens during a reference life of 35000 hours.

				Conversion factors					
Variant	**CRI**	**Lightcolour**	**Length**	**A1–A3**	**A4**	**A5**	**B6**	**C1–C4**	**D**
LITO 60 d/i suspended (reference product)	80	3000 K	1180	0.22	0.22	0.22	0.17	0.22	0.22
	80	4000K	1180	0.21	0.21	0.21	0.16	0.21	0.21
	80	3000 K	1480	0.18	0.18	0.18	0.14	0.18	0.18
	80	4000 K	1480	0.17	0.17	0.17	0.13	0.17	0.17
	80	3000 K	2352	0.11	0.11	0.11	0.09	0.11	0.11
	80	4000 K	2352	0.11	0.11	0.11	0.08	0.11	0.11
LITO 60 d/i suspended ESSENTIAL sensor	80	3000 K	1180	0.22	0.22	0.22	0.17	0.22	0.22
	80	4000 K	1180	0.21	0.21	0.21	0.16	0.21	0.21

Additional environmental information

	80	3000 K	1480	0.18	0.18	0.18	0.14	0.18	0.18
	80	4000 K	1480	0.17	0.17	0.17	0.13	0.17	0.17
	80	3000 K	2352	0.11	0.11	0.11	0.09	0.11	0.11
	80	4000 K	2352	0.11	0.11	0.11	0.08	0.11	0.11

Variant	Cover	CRI	Lightcolour	Length	A1–A3	A4	A5	B6	C1–C4	D
MINO 60 surface	HPO[2]	90	3000 K	580	0.84	0.84	0.84	0.63	0.84	0.84
	MP[3]	90	3000K	580	0.96	0.96	0.96	0.72	0.96	0.96
	HPO	90	4000 K	580	0.77	0.77	0.77	0.58	0.77	0.77
	MP	90	4000 K	580	0.89	0.89	0.89	0.66	0.89	0.89
	HPO	80	3000K	580	0.72	0.72	0.72	0.54	0.72	0.72
	MP	80	3000K	580	0.83	0.83	0.83	0.62	0.83	0.83
	HPO	80	4000 K	580	0.64	0.64	0.64	0.47	0.64	0.64
	MP	80	4000 K	580	0.73	0.73	0.73	0.55	0.73	0.73
	HPO	90	3000K	880	0.56	0.56	0.56	0.43	0.56	0.56
	MP	90	3000K	880	0.64	0.64	0.64	0.49	0.64	0.64
	HPO	90	4000 K	880	0.52	0.52	0.52	0.40	0.52	0.52
	MP	90	4000 K	880	0.60	0.60	0.60	0.46	0.60	0.60
	HPO	80	3000K	880	0.48	0.48	0.48	0.37	0.48	0.48
	MP	80	3000K	880	0.55	0.55	0.55	0.42	0.55	0.55
	HPO	80	4000 K	880	0.42	0.42	0.42	0.32	0.42	0.42
	MP	80	4000 K	880	0.49	0.49	0.49	0.37	0.49	0.49
	HPO	90	3000K	1180	0.42	0.42	0.42	0.32	0.42	0.42
	MP	90	3000K	1180	0.48	0.48	0.48	0.37	0.48	0.48
	HPO	90	4000 K	1180	0.39	0.39	0.39	0.30	0.39	0.39
	MP	90	4000 K	1180	0.45	0.45	0.45	0.34	0.45	0.45
	HPO	80	3000K	1180	0.36	0.36	0.36	0.28	0.36	0.36
	MP	80	3000K	1180	0.42	0.42	0.42	0.32	0.42	0.42
	HPO	80	4000 K	1180	0.32	0.32	0.32	0.24	0.32	0.32
	MP	80	4000 K	1180	0.36	0.36	0.36	0.28	0.36	0.36
	HPO	90	3000K	1480	0.34	0.34	0.34	0.26	0.34	0.34
	MP	90	3000K	1480	0.39	0.39	0.39	0.30	0.39	0.39
	HPO	90	4000 K	1480	0.31	0.31	0.31	0.24	0.31	0.31
	MP	90	4000 K	1480	0.36	0.36	0.36	0.27	0.36	0.36
	HPO	80	3000K	1480	0.29	0.29	0.29	0.22	0.29	0.29
	MP	80	3000K	1480	0.33	0.33	0.33	0.26	0.33	0.33
	HPO	80	4000 K	1480	0.25	0.25	0.25	0.19	0.25	0.25
	MP	80	4000 K	1480	0.29	0.29	0.29	0.22	0.29	0.29
	HPO	90	3000K	2352	0.21	0.21	0.21	0.16	0.21	0.21
	MP	90	3000K	2352	0.24	0.24	0.24	0.18	0.24	0.24
	HPO	90	4000 K	2352	0.22	0.22	0.22	0.17	0.22	0.22
	MP	90	4000 K	2352	0.19	0.19	0.19	0.15	0.19	0.19
	HPO	80	3000K	2352	0.18	0.18	0.18	0.14	0.18	0.18
	MP	80	3000K	2352	0.21	0.21	0.21	0.16	0.21	0.21
	HPO	80	4000 K	2352	0.16	0.16	0.16	0.12	0.16	0.16
	MP	80	4000 K	2352	0.18	0.18	0.18	0.14	0.18	0.18

[2] HPO: High Performance Opal

[3] MP: Microprismatic

Additional environmental information

Variant	Cover	CRI	Lightcolour	Length	A1–A3	A4	A5	B6	C1–C4	D
MINO 60 suspended	HPO	90	3000 K	880	0.56	0.56	0.56	0.43	0.56	0.56
	MP	90	3000K	880	0.64	0.64	0.64	0.49	0.64	0.64
	HPO	90	4000 K	880	0.52	0.52	0.52	0.40	0.52	0.52
	MP	90	4000 K	880	0.60	0.60	0.60	0.46	0.60	0.60
	HPO	80	3000K	880	0.48	0.48	0.48	0.37	0.48	0.48
	MP	80	3000K	880	0.55	0.55	0.55	0.42	0.55	0.55
	HPO	80	4000 K	880	0.42	0.42	0.42	0.32	0.42	0.42
	MP	80	4000 K	880	0.49	0.49	0.49	0.37	0.49	0.49
	HPO	90	3000K	1180	0.42	0.42	0.42	0.32	0.42	0.42
	MP	90	3000K	1180	0.48	0.48	0.48	0.37	0.48	0.48
	HPO	90	4000 K	1180	0.39	0.39	0.39	0.30	0.39	0.39
	MP	90	4000 K	1180	0.45	0.45	0.45	0.34	0.45	0.45
	HPO	80	3000K	1180	0.36	0.36	0.36	0.28	0.36	0.36
	MP	80	3000K	1180	0.42	0.42	0.42	0.32	0.42	0.42
	HPO	80	4000 K	1180	0.32	0.32	0.32	0.24	0.32	0.32
	MP	80	4000 K	1180	0.36	0.36	0.36	0.28	0.36	0.36
	HPO	90	3000K	1480	0.34	0.34	0.34	0.26	0.34	0.34
	MP	90	3000K	1480	0.39	0.39	0.39	0.30	0.39	0.39
	HPO	90	4000 K	1480	0.31	0.31	0.31	0.24	0.31	0.31
	MP	90	4000 K	1480	0.36	0.36	0.36	0.27	0.36	0.36
	HPO	80	3000K	1480	0.29	0.29	0.29	0.22	0.29	0.29
	MP	80	3000K	1480	0.33	0.33	0.33	0.26	0.33	0.33
	HPO	80	4000 K	1480	0.25	0.25	0.25	0.19	0.25	0.25
	MP	80	4000 K	1480	0.29	0.29	0.29	0.22	0.29	0.29
	HPO	90	3000K	2352	0.21	0.21	0.21	0.16	0.21	0.21
	MP	90	3000K	2352	0.24	0.24	0.24	0.18	0.24	0.24
	HPO	90	4000 K	2352	0.22	0.22	0.22	0.17	0.22	0.22
	MP	90	4000 K	2352	0.19	0.19	0.19	0.15	0.19	0.19
	HPO	80	3000K	2352	0.18	0.18	0.18	0.14	0.18	0.18
	MP	80	3000K	2352	0.21	0.21	0.21	0.16	0.21	0.21
	HPO	80	4000K	2352	0.16	0.16	0.16	0.12	0.16	0.16
	MP	80	4000 K	2352	0.18	0.18	0.18	0.14	0.18	0.18

Additional environmental information

Variant	Cover	CRI	Lightcolour	Length	A1–A3	A4	A5	B6	C1–C4	D
FRAME 60 trim	HPO	90	3000 K	593	0.84	0.84	0.84	0.64	0.84	0.84
	MP	90	3000K	593	0.96	0.96	0.96	0.73	0.96	0.96
	HPO	90	4000 K	593	0.77	0.77	0.77	0.59	0.77	0.77
	MP	90	4000 K	593	0.89	0.89	0.89	0.68	0.89	0.89
	HPO	80	3000K	593	0.72	0.72	0.72	0.55	0.72	0.72
	MP	80	3000K	593	0.83	0.83	0.83	0.64	0.83	0.83
	HPO	80	4000 K	593	0.64	0.64	0.64	0.49	0.64	0.64
	MP	80	4000 K	593	0.73	0.73	0.73	0.56	0.73	0.73
	HPO	90	3000K	893	0.56	0.56	0.56	0.43	0.56	0.56
	MP	90	3000K	893	0.64	0.64	0.64	0.49	0.64	0.64
	HPO	90	4000 K	893	0.52	0.52	0.52	0.40	0.52	0.52
	MP	90	4000 K	893	0.60	0.60	0.60	0.46	0.60	0.60
	HPO	80	3000K	893	0.48	0.48	0.48	0.37	0.48	0.48
	MP	80	3000K	893	0.55	0.55	0.55	0.42	0.55	0.55
	HPO	80	4000 K	893	0.42	0.42	0.42	0.32	0.42	0.42
	MP	80	4000 K	893	0.49	0.49	0.49	0.37	0.49	0.49
	HPO	90	3000K	1193	0.42	0.42	0.42	0.32	0.42	0.42
	MP	90	3000K	1193	0.48	0.48	0.48	0.37	0.48	0.48
	HPO	90	4000 K	1193	0.39	0.39	0.39	0.30	0.39	0.39
	MP	90	4000 K	1193	0.45	0.45	0.45	0.34	0.45	0.45
	HPO	80	3000K	1193	0.36	0.36	0.36	0.28	0.36	0.36
	MP	80	3000K	1193	0.42	0.42	0.42	0.32	0.42	0.42
	HPO	80	4000 K	1193	0.32	0.32	0.32	0.24	0.32	0.32
	MP	80	4000 K	1193	0.36	0.36	0.36	0.28	0.36	0.36
	HPO	90	3000K	1493	0.34	0.34	0.34	0.26	0.34	0.34
	MP	90	3000K	1493	0.39	0.39	0.39	0.30	0.39	0.39
	HPO	90	4000 K	1493	0.31	0.31	0.31	0.24	0.31	0.31
	MP	90	4000 K	1493	0.36	0.36	0.36	0.27	0.36	0.36
	HPO	80	3000K	1493	0.29	0.29	0.29	0.22	0.29	0.29
	MP	80	3000K	1493	0.33	0.33	0.33	0.26	0.33	0.33
	HPO	80	4000 K	1493	0.25	0.25	0.25	0.19	0.25	0.25
	MP	80	4000 K	1493	0.29	0.29	0.29	0.22	0.29	0.29
	HPO	90	3000K	2365	0.21	0.21	0.21	0.16	0.21	0.21
	MP	90	3000K	2365	0.24	0.24	0.24	0.18	0.24	0.24
	HPO	90	4000 K	2365	0.22	0.22	0.22	0.17	0.22	0.22
	MP	90	4000 K	2365	0.19	0.19	0.19	0.15	0.19	0.19
	HPO	80	3000K	2365	0.18	0.18	0.18	0.14	0.18	0.18
	MP	80	3000K	2365	0.21	0.21	0.21	0.16	0.21	0.21
	HPO	80	4000 K	2365	0.16	0.16	0.16	0.12	0.16	0.16
	MP	80	4000 K	2365	0.18	0.18	0.18	0.14	0.18	0.18

Information related to the sectorial EPD

This EPD is not sectoral.

Differences from previous versions

This is the first version of the EPD.

References

EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.

EN 15193:2007 Energy performance of buildings - Energy requirements for lighting

European court of auditors. EU actions and existing challenges on electronic waste. Review No. 4. 2021

General Programme Instructions of the International EPD® System. Version 4.0.

ISO 14025:2006 - Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040:2021 Environmental management – Life cycle assessment – Principles and framework

ISO 14044:2021 Environmental management – Life cycle assessment – Requirements and guidelines

LCA Background Report, LITO | MINO | FRAME 60 2025-06-03

LCA for Experts 10.9.0.31

PCR-ed4-EN-2021 09 062021 P.E.P. Association. Product Category Rules for Electrical. Electronic and HVAC-R Products.

Product category rules (PCR) 2019:14 Construction products version 1.3.4, 2024-04-30. The EPD International, 2024

PSR-0014-ed2.0-EN-2023 07 13. PSR SPECIFIC RULES FOR LUMINAIRES. According to PSRmodele-ed2-EN-2021 11 18.

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