Environmental Product Declaration

EPD of multiple products based on a representative product in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/ AC:2021 for:

BETO circle suspended direct/indirect

from XAL GmbH

Included products
- direct/indirect power 800 mm (= reference product)
- direct/indirect power 1600 mm

Programme
The International EPD® System
www.environdec.com

Programme operator
EPD International AB

EPD registration number	EPD-IES-0015723
Publication date	2024-08-09
Valid until	2029-08-08

General information

Programme information

Programme	The International EPD® System
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website	www.environdec.com
E-mail	info@environdec.com

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): 46539 (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

Hudai Kara, PhD
Metsims Sustainability Consulting
www.metsims.com

Approved by
The International EPD® System

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

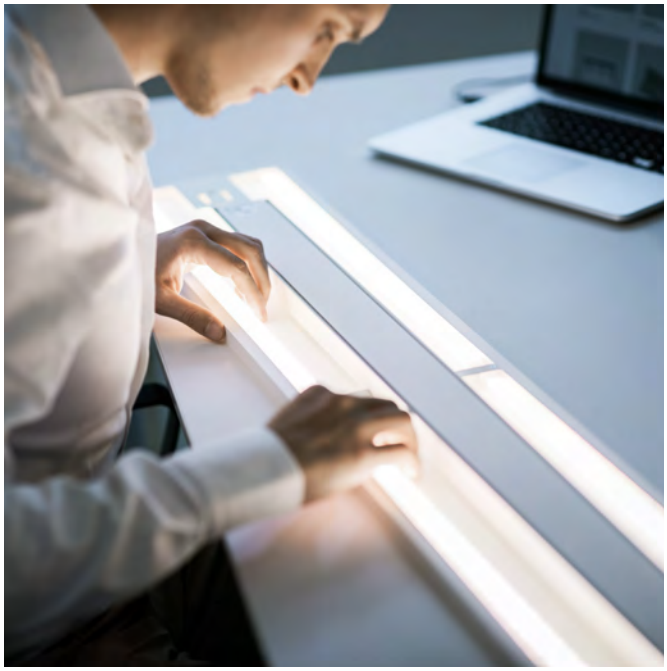
EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804:2012+A2:2019/AC:2021, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions 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
Auer-Welsbach-Gasse 36
8055 Graz
AUSTRIA

epd@xal.com



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

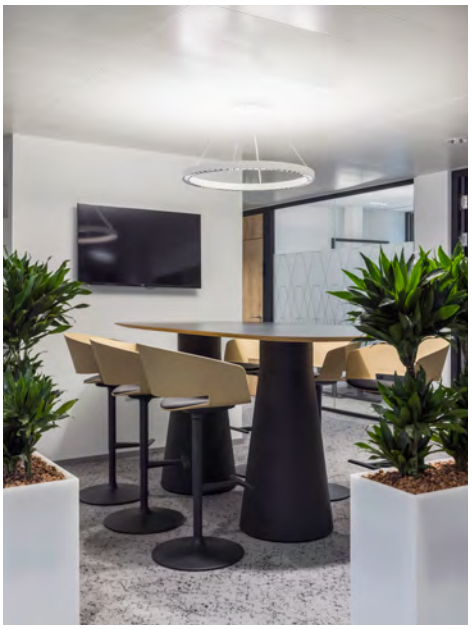
XAL is certified according to several management and CSR standards.

- **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).

More information
xal.com

Product information



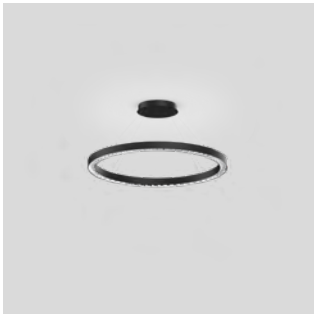
Product name

BETO circle 800 direct / indirect power suspended

Product identification

Ring-shaped luminaire body made of rolled and seamlessly welded aluminum extrusion profile; extremely slim design (only 42 × 42 mm); surface white powder-coated; pendant light with 1500 mm cable suspension (central canopy); tool-free height adjustment on the luminaire; including transparent power supply cable; extrusion profile for improved thermal management; light color 3000 K; initial binning MacAdam ≤ 3 SDCM; CRI ≥ 80; min. 90 % of luminous flux after 50,000 operating hours; energy-efficient LEDs with high color rendering; high-gloss reflector with faceted optics; reflector chrome; UGR ≤ 19; screen-compatible workplace luminaire according to DIN EN 12464-1; luminance above 65° ≤ 1500 cd/m²; protection class IP 20; SK1220-240V; internal luminaire wiring halogen-free; including DALI-2 converter; converter included in the canopy; light source replaceable by authorized professionals; control gear replaceable by authorized professionals.

This EPD covers both variations of the BETO circle suspended



BETO circle 800 direct / indirect power suspended
(reference product)

BETO circle 1600 direct / indirect power suspended

Product information

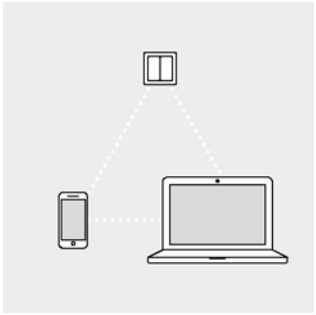
Product description

BETO combines technical excellence with subtle, minimalist design. The BETO product family is available as a floor lamp as well as in a suspended version. In all variants, the luminaire features special reflectors for optimal, screen-friendly task lighting: Ideally suited as a floor lamp for single or double workstations and in a corresponding suspended version for double or quadruple workstations. Both floor and suspended versions feature indirect light to enhance ceiling illumination. With a color rendering index of up to CRI ≥ 98, BETO creates an additional pleasant room atmosphere. Available in light colors 3000 K, 4000 K, or as a Tunable White option. Optionally, the luminaire can be equipped with a presence and brightness sensor, as well as a SENSE sensor, which additionally measures temperature, air quality, humidity, and noise level. This allows the lighting to be tailored to office activities while reducing energy costs

Technical specifications

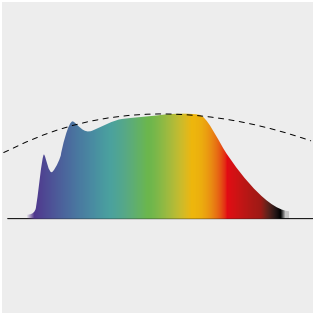
Specification	BETO circle 800 D/I power	BETO circle 1600 D/I power
Inset power	46 W	91 W
Luminous efficacy	up to 127 lm/W	up to 135 lm/W
Colour temperature	3000 K, 4000 K, tunable white	3000 K, 4000 K, tunable white
Electrical	DALI-2 single control	DALI-2 single control
Physical	Diameter 807 mm Height 42 mm	Diameter 1569 mm Height 42 mm

Product features



Control Options
Easy control of the luminaires

Magnetic Mounting
Installation and assembly are quick and easy



Full Spectrum LED
Healthy and eye-friendly light

CB

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

UN CPC code(s):

- 46539 (Ver. 2.1) Lighting Equipment

LCA information

Declared unit

The declared unit is one piece of **BETO circle 800 direct / indirect power** including the LED-Converter and Mounting Set. This product has been chosen as the reference due to the highest share of sales. The weight of the product per declared unit is 5.03 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 35 000 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.

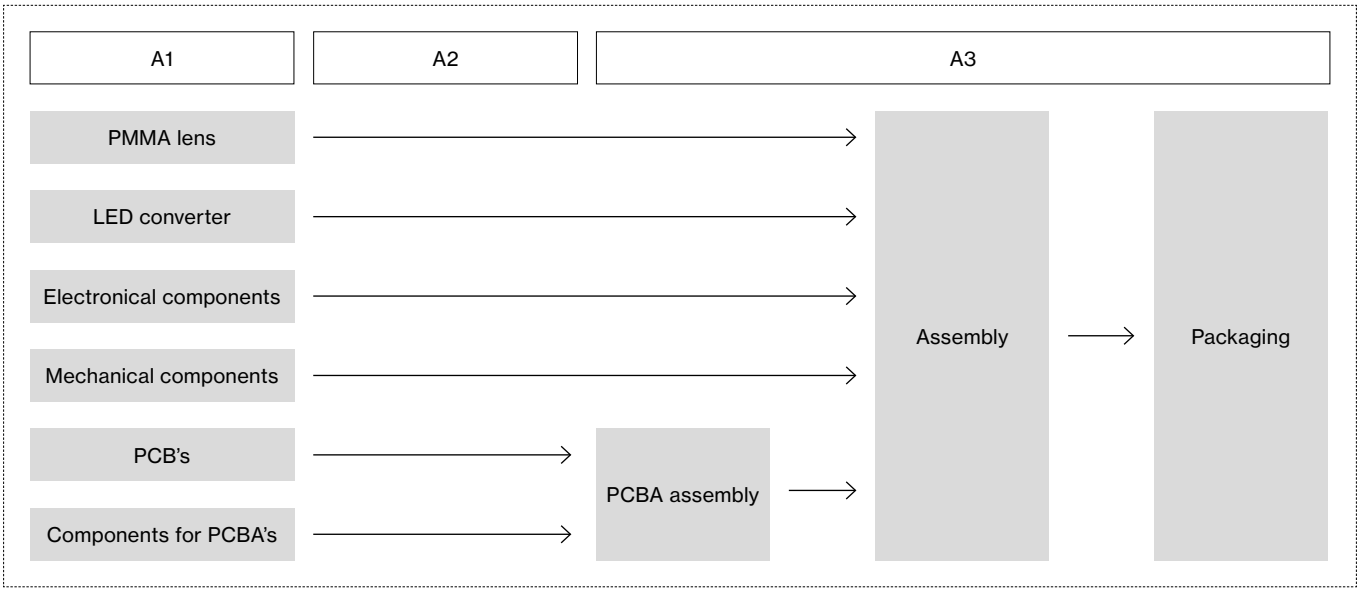
Reference service life
15 years

Time representativeness
2023

Database(s) and LCA software used
LCA for Experts 10.7.1.28

Description of system boundaries
Cradle to grave and module D

System diagram



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 Population of the PCBA is done in Graz, Austria. The components are then supplied to Murska Sobota, Slovenia where the components underly different process steps like, milling, turning, bending, welding and punching. The Canopy Housing, Aluminum Profile, and the magnet plate get also powder coated. The corresponding electricity mix has been used for all manufacturing steps (see electricity grid mix below). 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 to the capitals of the countries with sales shares > 4 % (New Delhi, Berlin, Paris, Vienna, Warschau, Zurich, Rome, Vilnius, Beirut).
The product market includes countries all over the world.

Weighted distance	**732.25 km**
Truck used	Class EURO 6, 26-28 t
Fuel type	Diesel (0.00287 kg/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 36 times, therefore only 1/36 of the weight is taken into account for the production and the end of life of the pallet.

Material	**Weight (kg)**
Cardboard	5.28
Polyethylene film	0.14
Wooden Pallet	0.05
Paper	0.04

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 product's functional unit.

Operational Energy Use (B6)

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 (90 %), hospital (5 %), restaurant (0 %), and retail (5 %) with an average lifetime of 15 years. Geography of the electricity mix is modelled by sales shares and is representative for European countries (99.42% - EU-28) and rest of world countries (0.58 %). 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 x FCP x FO x (FD x tD + FN x tN) + Pp x ty} x 1/1.000 x a**
The results are presented in the additional information chapter.

Scenario	BETO circle 800 D / I	Unit
Electricity use (15 years)	3821	kWh
Active power	92	W
Passive power	0.20	W
Total active time	41250	hours
Total passive time	90150	hours
Dimmable	non-dimmable, DALI-2 control	-
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 product's 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)	BETO circle 800 D / I	Unit
Collected separately	5.03	kg
Collected with mixed (construction) waste	-	kg
For reuse	-	kg
For recycling	3.12	kg
For energy recovery	0.89	kg
For final disposal	1.02	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)	BETO circle 800 D / I	Unit
Materials for recycling	7.35	kg
Materials for export of secondary fuels	-	kg
Materials for incineration	1.39	kg
Materials for land filling	1.46	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 2023. 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: Hydro (87.3 %), Wind (8.4 %), Solar (2 %), Biomass (1.4 %), other RE (0.9 %).

For Murska Sobota, Slovenia, the electricity used is 100% from Hydro Power.

Environmental impact of the electricity used in	AUT	SLO
CO_2 eq. [kg/kWh]	0,008	0,005

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	>90 %			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – products	+57 %			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – sites	0 %			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Acronyms	GLO = Global, AUT = Austria, SLO = Slovenia																

Content information

Product components	Weight kg	Weight-% of product	Post-consumer material, weight-%	Biogenic material, weight-% / declared unit	Biogenic material, kg C / declared unit
Aluminum	2.89	57.37	0.00	0.00	0.00
Polycarbonate	0.75	14.96	0.00	0.00	0.00
Steel	0.58	11.57	0.00	0.00	0.00
Copper	0.15	3.06	0.00	0.00	0.00
Polymethylmethacrylate (PMMA)	0.14	2.86	0.00	0.00	0.00
Silane modified Polymers	0.08	1.64	0.00	0.00	0.00
Epoxy-Resin	0.07	1.46	0.00	0.00	0.00
Glass fibers	0.07	1.35	0.00	0.00	0.00
Ferrites	0.06	1.28	0.00	0.00	0.00
Polymer	0.05	1.06	0.00	0.00	0.00
TOTAL	**5.03**	**100.00**	**0.00**	**0.00**	**0.00**

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C / declared unit
Paper	0.04	0.79	0,02
Cardboard	3.36	73.12	1.70
Polyethylen	0.09	1.91	0.00
TOTAL	**3.49**	**75.82**	**1.72**

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+A2 (based on EF 3.1)

		Results per BETO circle direct / indirect power 800										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – fossil	kg CO_2 eq.	6,86E+01	6,57E-01	3,42E-01	0,00E+00	5,82E+02	0,00E+00	0,00E+00	5,28E-02	3,34E+00	3,37E-02	-3,80E+01
GWP – biogenic	kg CO_2 eq.	-9,05E+00	0,00E+00	9,05E+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.	3,61E-02	1,09E-02	1,06E-03	0,00E+00	1,85E-01	0,00E+00	0,00E+00	8,76E-04	1,04E-05	9,41E-05	6,46E-04
GWP – total	**kg CO_2 eq.**	**5,96E+01**	**6,57E-01**	**9,39E+00**	**0,00E+00**	**1,16E+02**	**0,00E+00**	**0,00E+00**	**5,28E-02**	**3,34E+00**	**3,37E-02**	**-3,80E+01**
ODP	kg CFC 11 eq.	7,44E-10	6,54E-14	5,68E-13	0,00E+00	2,30E-08	0,00E+00	0,00E+00	5,25E-15	2,10E-12	8,95E-14	-2,11E-10
AP	mol H+ eq.	3,54E-01	9,28E-04	5,89E-04	0,00E+00	3,51E+00	0,00E+00	0,00E+00	7,46E-05	8,00E-04	2,31E-04	-1,31E-01
EP – freshwater	kg P eq.	1,20E-03	2,77E-06	5,75E-06	0,00E+00	4,83E-03	0,00E+00	0,00E+00	2,23E-07	4,66E-07	6,18E-08	-5,53E-05
EP – marine	kg N eq.	6,94E-02	3,43E-04	2,58E-04	0,00E+00	5,82E-01	0,00E+00	0,00E+00	2,76E-05	2,29E-04	5,79E-05	-2,86E-02
EP – terrestrial	mol N eq.	7,32E-01	4,08E-03	2,46E-03	0,00E+00	6,15E+00	0,00E+00	0,00E+00	3,27E-04	3,71E-03	6,37E-04	-3,07E-01
POCP	kg NMVOC eq.	2,04E-01	8,79E-04	7,86E-04	0,00E+00	1,61E-01	0,00E+00	0,00E+00	7,06E-05	6,14E-04	1,78E-04	-8,04-02
ADP – minerals & metals*	kg Sb eq.	1,02E-03	5,52E-08	1,39E-08	0,00E+00	2,33E-04	0,00E+00	0,00E+00	4,44E-09	3,12E-08	3,05E-09	-2,84E-04
ADP – fossil*	MJ	9,04E+02	8,47E+00	2,02E+00	0,00E+00	2,39E+04	0,00E+00	0,00E+00	6,81E-01	2,41E+00	4,89E-01	-5,07E+02
WDP*	m^3	2,42E+01	9,67E-03	1,29E-01	0,00E+00	2,26E+02	0,00E+00	0,00E+00	7,77E-04	3,54E-01	3,89E-03	-4,90E+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 BETO circle direct / indirect power 800										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – GHG[1]	kg CO_2 eq.	6,86E+01	6,57E-01	3,42E-01	0,00E+00	1,16E+02	0,00E+00	0,00E+00	5,28E-02	3,34E+00	3,37E-02	-3,80E+01
PM	disease inc.	6,06E-06	9,40E-09	4,61E-09	0,00E+00	2,96E-05	0,00E+00	0,00E+00	7,55E-10	8,98E-09	2,78E-09	-2,22E-06
IRP – HE**	kg U235-eq	2,86E+00	1,53E-03	1,16E-02	0,00E+00	3,49E+02	0,00E+00	0,00E+00	1,23E-04	2,86E-02	7,35E-04	-2,31E+00
ETP – fw*	CTUe	3,92E+02	6,23E+00	1,29E+00	0,00E+00	6,13E+03	0,00E+00	0,00E+00	5,01E-01	8,87E-01	2,84E-01	-1,66E+02
HTP – c*	CTUh	8,37E-05	1,25E-10	3,65E-11	0,00E+00	4,10E-07	0,00E+00	0,00E+00	1,00E-12	7,51E-11	2,69E-11	-2,62E-08
HTP – nc*	CTUh	6,56E-07	5,57E-09	2,04E-09	0,00E+00	5,80E-06	0,00E+00	0,00E+00	4,47E-10	4,83E-09	2,67E-09	-3,78E-07
SQP	dimension-less	4,63E+02	4,19E+00	6,64E-01	0,00E+00	1,13E+03	0,00E+00	0,00E+00	3,37E-01	8,69E-01	9,67E-02	1,03E+03

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+A2:2019/AC:2021.

Results of the environmental performance indicators

Resource use indicators

Results per BETO circle direct / indirect power 800

Indicator	Unit	A1 – A3	A4	A5	B1 – B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	5,65E+02	7,16E-01	4,37E-01	0,00E+00	1,69E+03	0,00E+00	0,00E+00	5,75E-02	1,18E-01	7,31E-02	-6,84E+01
PERM	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
PERT	MJ	5,65E+02	7,16E-01	4,37E-01	0,00E+00	1,69E+03	0,00E+00	0,00E+00	5,75E-02	1,18E-01	7,31E-02	-6,84E+01
PENRE	MJ	9,05E+02	8,47E+00	2,02E+00	0,00E+00	2,39E+04	0,00E+00	0,00E+00	6,81E-01	2,42E+00	4,90E-01	-5,07E+02
PENRM	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
PENRT	MJ	9,05E+02	8,47E+00	2,02E+00	0,00E+00	2,39E+04	0,00E+00	0,00E+00	6,81E-01	2,42E+00	4,90E-01	-5,07E+02
SM	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
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	7,53E-01	8,04E-04	3,20E-03	0,00E+00	7,82E+00	0,00E+00	0,00E+00	6,46E-05	8,66E-03	1,18E-05	-1,86E-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 BETO circle direct / indirect power 800

Indicator	Unit	A1 – A3	A4	A5	B1 – B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3,35E-06	2,74E-10	1,14E-08	0,00E+00	3,57E-05	0,00E+00	0,00E+00	2,20E-11	1,61E-09	6,38E-11	7,06E-08
Non-hazardous waste disposed	kg	1,71E+01	1,32E-03	5,01E-01	0,00E+00	2,16E+01	0,00E+00	0,00E+00	1,06E-05	3,62E-01	2,05E+00	-1,26E+01
Radioactive waste disposed	kg	2,69E-02	1,09E-05	7,24E-05	0,00E+00	3,75E+00	0,00E+00	0,00E+00	8,80E-07	1,96E-04	5,96E-06	-2,26E-02

Output flow indicators

Results per BETO circle direct / indirect power 800

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	2,78E+00	0,00E+00	4,35E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,12E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	6,60E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,57E+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

Results for 1,000 lumens during a reference life of 35,000 hours (PSR-0014-ed2.0-EN-2023 07 13)

A conversion factor can be used for converting the results to 1 000 lumens during a reference life of 35 000 hours.

	Conversion factors					
	A1–A3	**A4**	**A5**	**B6**	**C1–C4**	**D**
BETO circle 800 direct / indirect power (reference)	0.08	0.08	0.08	0.07	0.08	0.08
BETO circle 1600 direct / indirect power	0.04	0.04	0.04	0.03	0.04	0.04

Conversion to BETO circle suspended direct / indirect 1600mm

The BETO circle direct/indirect power 800mm and the 1600mm luminaires belong to an environmental homogenous family and fulfil the requirements established by the PEP-PCR-ed4-EN-2021 09 06 by PEP-ECO Passport.
The 1600 variants use the same material and production technology, but there are differences in weight for the Aluminum profile, LED Converter, the amount of cover lenses, louvers and the length of cables, These differences have been incorporated in the model and therefore the difference in the environmental impact can be scaled based on the BETO circle direct/indirect power 800mm reference product using the given conversion factors:

	Conversion factors					
	A1–A3	**A4**	**A5**	**B6**	**C1–C4**	**D**
BETO circle 800 direct / indirect power (reference)	1	1	1	1	1	1
BETO circle 1600 direct / indirect power	1.57	1.79	1.63	1.87	1.91	1.57

Information about the Product Family

	Power	**Lumen**	**Structure Weight**	**Weight of Light source**	**Weight of Packaging**	**Weight of Product excl Packaging**	**Weight of Product incl. Packaging**
	W	lm/W	kg	kg	Kg	kg	kg
BETO circle 800 D/I power (reference)	92	137	4.34	0.69	6.03	5.03	11.33
BETO circle 1600 D/I power	172	145	7.91	0.88	10.26	10.04	20.30

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 for Experts 10.7.1.28

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

Photo credits

p. 4 ALLPLAN Österreich GmbH, AT –
by KLAUSS Elektro- Anlagen Planungsges.m.b.H.
© Tim Ertl

Office
Visualisation