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:

BETO system linear

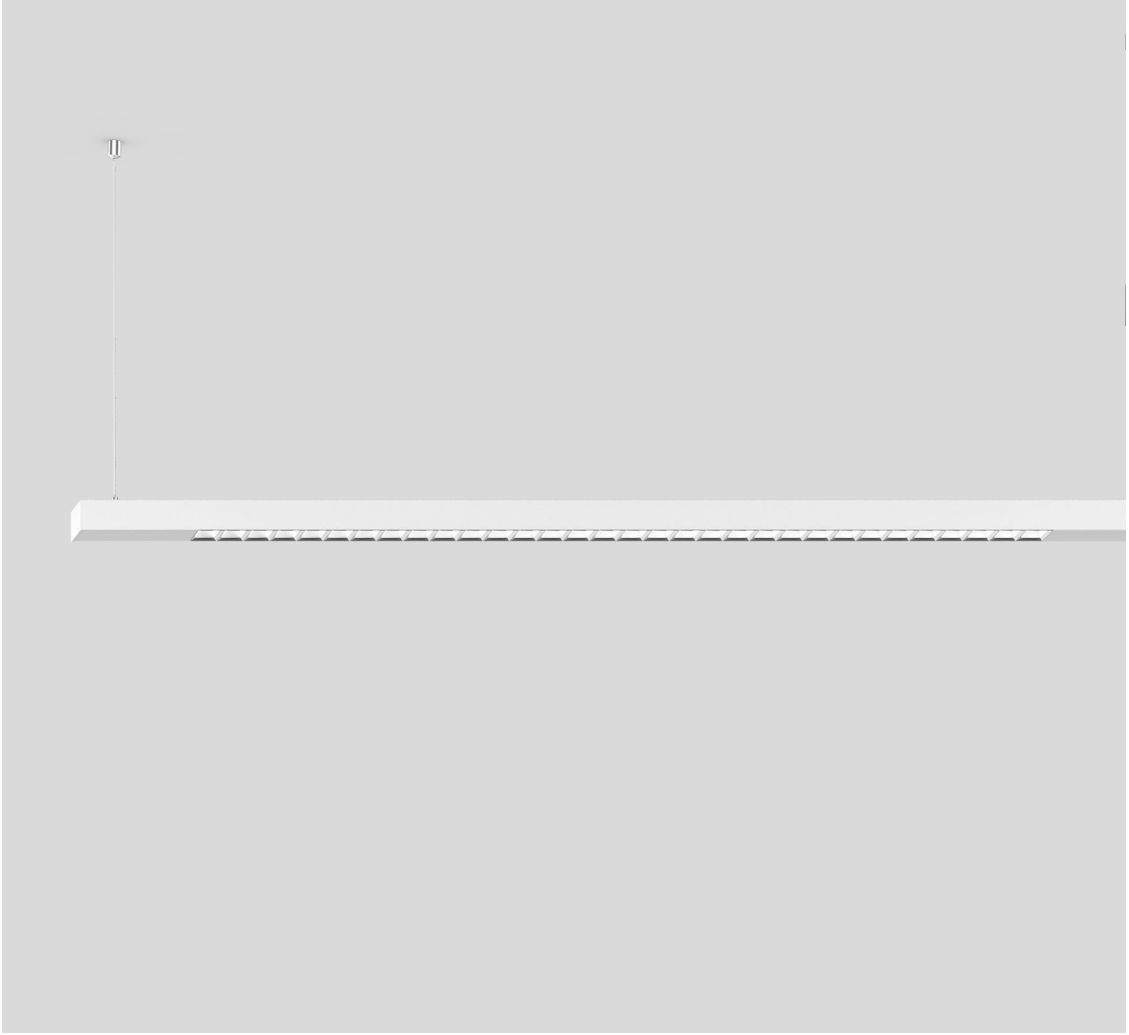
from XAL GmbH

Included products:
- **BETO** system linear direct ceiling / suspended (reference product)
- **BETO** system linear direct / indirect power suspended

Programme
The International EPD® System
www.environdec.com

Programme operator
EPD International AB

EPD registration number	EPD-IES-0019979:001
Publication date	2025-04-22
Valid until	2030-04-21



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
Website	www.environdec.com
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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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GREENIZE Projects
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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
Auer-Welsbach-Gasse 36
8055 Graz
AUSTRIA

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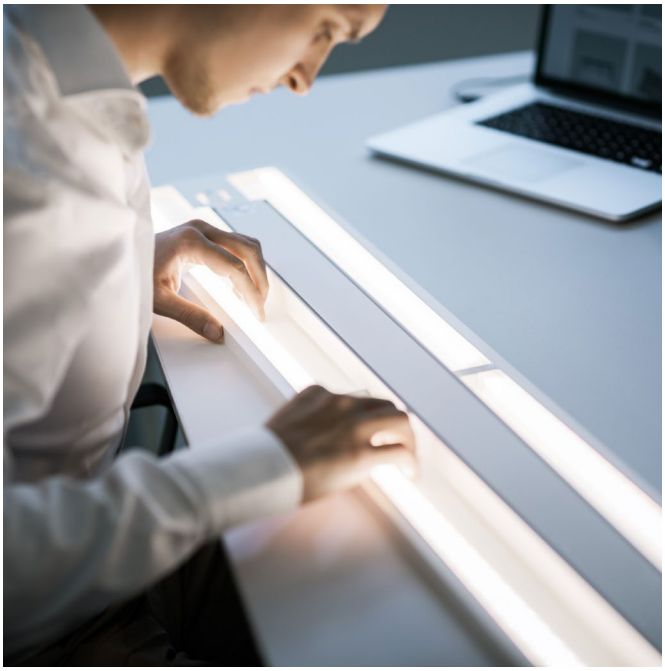


Description of the organisation

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.

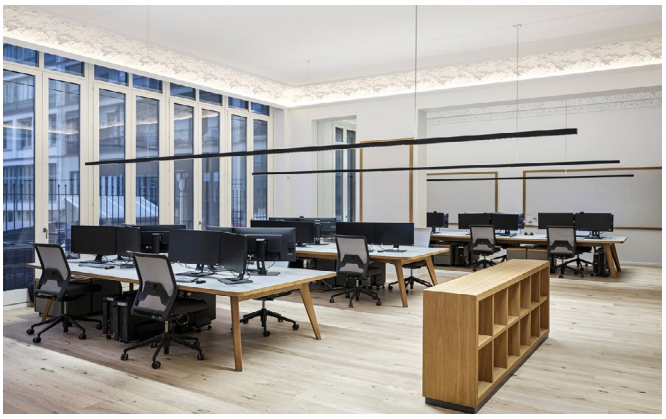
- **ISO 9001** – Quality management systems
- **ISO 14001** – Environmental management systems
- **ISO 45001** – Occupational health and safety management systems
- **Ecovadis** – regular evaluation of our corporate social responsibility based on objective criteria with a focus on the environment, labour 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.

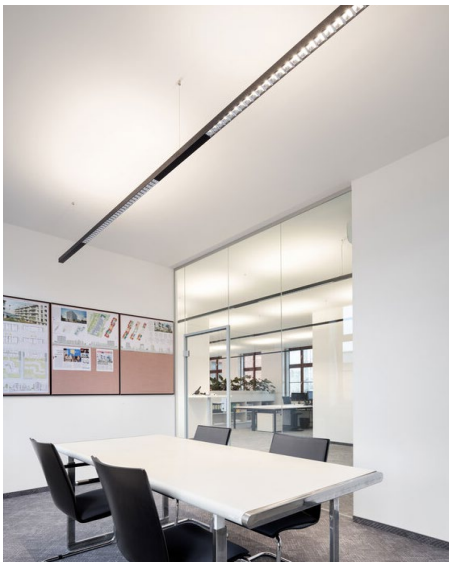
Name and location of production site(s)
The production sites are located in Murska Sobota (XAL Svetila d.o.o., Slovenia) and in Graz (XAL GmbH, Austria).

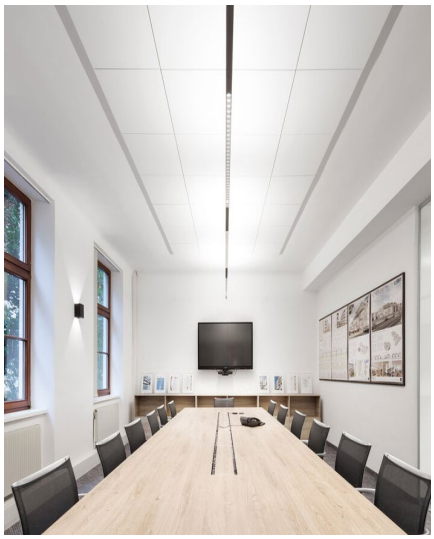
The production facilities operate in a complementary manner, with each product passing through both facilities.

More information
xal.com

Product information







Product name

BETO system linear direct ceiling / suspended (reference product)

Product identification

Luminaire housing from extruded aluminium profile. Linear segments, DALI-2, direct or direct / indirect lighting. Available in two different sizes (1700mm, 3400mm). 3400mm versions available with sensor and tunable white (TW) option.

This EPD covers multiple products:

- **BETO** system linear direct ceiling / suspended (reference product)
- **BETO** system linear direct / indirect power suspended

Product description

Luminaire housing from extruded aluminium profile, angular design (only 42 x 42 mm); no visible screws; designed for lighting systems; different versions: linear segment design; surface powder coated; for ceiling surface mounting or suspended mounting; pendant fitting with cable suspension; height adjustment without tools; spring clip attachment to the luminaire; incl. feeder cable; extruded profile for improved thermal management; high gloss reflector with faceted design; either with direct or direct / indirect light distribution,, separately controllable; energy-efficient LEDs with very good colour rendering.

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

Technical specifications

Specification	**BETO** system linear direct ceiling / suspended (reference product)	**BETO** system linear direct / indirect power suspended system
Inset power	45 W	95 W
Luminous efficacy	up to 161 lm/W	up to 164 lm/W
Colour temperature	3000 K, 4000 K	3000 K, 4000 K
Electrical	DALI-2, DALI-2 sensor	DALI-2, DALI-2 sensor
Physical	Length 3400 mm; Width 42 mm; Height 42 mm	Length 3400 mm; Width 42 mm; Height 42 mm

LCA information

Declared unit

The declared unit is one piece BETO system linear direct ceiling / suspended 3400 mm including all accessories weighted based on sales volume. This product has been chosen as the reference due to the highest share of sales. The BETO linear system is also available in 1700 mm length version. The length versions use the exact same materials and production technology. The results can be scaled for all different types. The weight of the product per declared unit is 5.26 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.

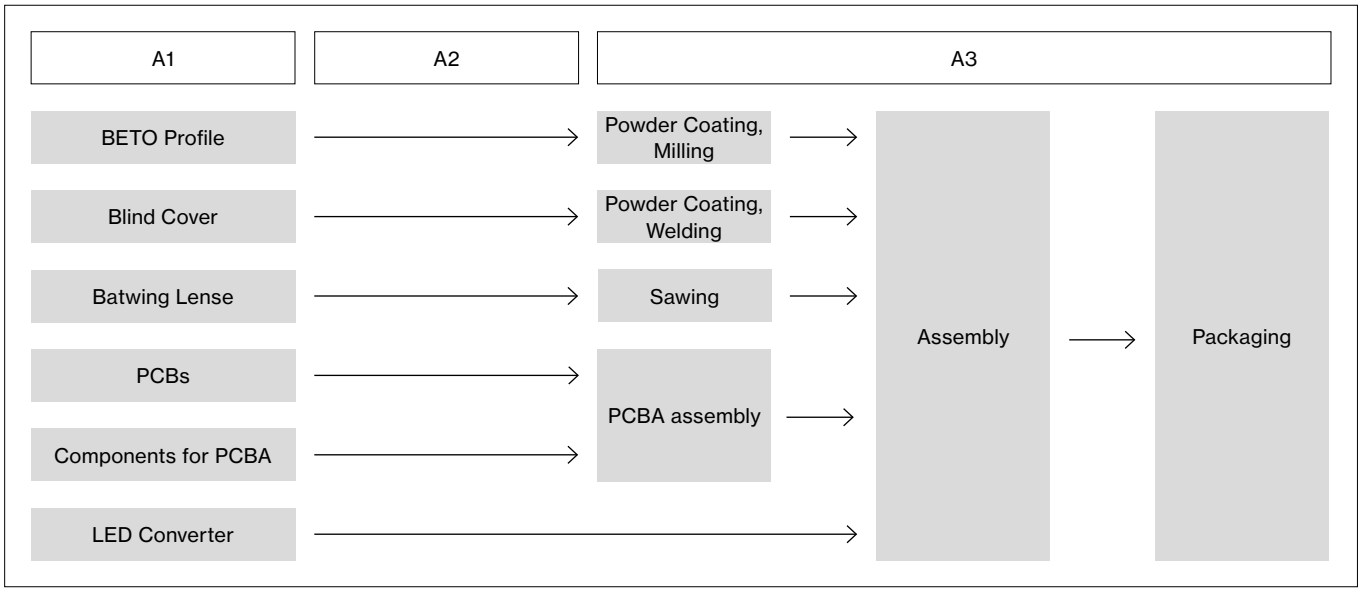
Reference service life
15 years

Time representativeness
2023

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. Assembling of the PCBA is done in Austria. Milling + powdercoating of the profile, powdercoating + welding of the Blind cover 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. Since connectors typically consist of various material compositions, the EPDs of XAL GmbH assume plastic/metal connectors with a ratio of 50/50.

Transport to building (A4)

The transport is calculated from Graz, Austria to the capitals of the countries with sales shares >4% (Vienna, Brussels, Copenhagen, Berlin, Rome and Zurich).

The product market includes countries all over the world.

Weighted distance	768.8 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 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	0.731
Polyethylene film	0.005
Wooden Pallet	0.143
Paper	0.053

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 15 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 (90%), hospital (5%) and retail (5%) with an average lifetime of 15 years. For the variants with sensors, a discount was applied in the scaling according to the guidelines of PSR-0014-ed2.0-EN-2023 07 13. PSR SPECIFIC RULES FOR LUMINAIRES according to PSR modele-ed2-EN-2021 11 18. Geography of the electricity mix is modelled by sales shares and is representative for European countries (98.4% - EU-28) and rest of world countries (1.6%). 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 0 × a**

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

Scenario	**BETO** system linear direct ceiling / suspended (ref.P.)	Unit
Electricity use (15 years)	1876	kWh
Active power	45	W
Passive power	0.15	W
Total active time	41250	hours
Total passive time	90150	hours
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 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)	**BETO** system linear direct ceiling / suspended (ref.P.)	Unit
Collected separatwely	5.261	kg
Collected with mixed (construction) waste	-	kg
For reuse	-	kg
For recycling	3.254	kg
For energy recovery	0.780	kg
For final disposal	1.277	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** system linear direct ceiling / suspended (ref.P.)	Unit
Materials for recycling	3.890	kg
Materials for export of secondary fuels	-	kg
Materials for incineration	0.866	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, purchased renewable 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 corresponding electricity grid mix is: 100% Hydro.

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	46.8%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	+63%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	3.51	66.69	12.30	0.00	0.00
Polycarbonate	0.67	12.66	0.00	0.00	0.00
Copper	0.27	5.12	0.00	0.00	0.00
Inorganic flame retardants	0.12	2.36	0.00	0.00	0.00
Epoxy resin	0.12	2.22	0.00	0.00	0.00
Polyester	0.11	2.09	0.00	0.00	0.00
Glass fibers	0.11	2.06	0.00	0.00	0.00
Thermoplastics	0.09	1.71	0.00	0.00	0.00
Polyethylene PE-LD	0.08	1.50	0.00	0.00	0.00
Steel	0.07	1.35	0.00	0.00	0.00
Others (<1%)	0.11	2.24	0.00	0.00	0.00
TOTAL	**5.26**	**100.00**	**0.43**	**0.00**	**0.00**

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C / declared unit
Paper	0.07	1.24	0.03
Cardboard	0.38	7.31	0.19
TOTAL	**0.45**	**8.55**	**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

Mandatory impact category indicators according to EN 15804

		Results per piece of BETO system linear direct ceiling / suspended 3400mm										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – fossil	kg CO_2 eq.	7.46E+01	4.86E-01	3.01E-02	0.00E+00	5.75E+02	0.00E+00	0.00E+00	1.07E-01	3.02E+00	3.21E-02	-2.95E+01
GWP – biogenic	kg CO_2 eq.	-1.72E+00	0.00E+00	1.72E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-03
GWP – luluc	kg CO_2 eq.	4.65E-02	8.30E-03	2.97E-04	0.00E+00	1.07E-01	0.00E+00	0.00E+00	1.83E-03	8.64E-05	9.67E-05	-5.23E-03
GWP – total	**kg CO_2 eq.**	**7.29E+01**	**4.94E-01**	**1.75E+00**	**0.00E+00**	**5.75E+02**	**0.00E+00**	**0.00E+00**	**1.09E-01**	**3.02E+00**	**3.22E-02**	**-2.95E+01**
ODP	kg CFC 11 eq.	1.03E-08	4.97E-14	3.67E-14	0.00E+00	1.26E-08	0.00E+00	0.00E+00	1.10E-14	1.89E-12	8.74E-14	-1.82E-10
AP	mol H+ eq.	3.86E-01	7.06E-04	8.82E-05	0.00E+00	1.15E+00	0.00E+00	0.00E+00	1.56E-04	6.95E-04	2.17E-04	-1.18E-01
EP – freshwater	kg P eq.	5.04E-04	2.11E-06	7.31E-07	0.00E+00	2.30E-03	0.00E+00	0.00E+00	4.66E-07	4.14E-07	5.98E-08	-4.16E-05
EP – marine	kg N eq.	7.36E-02	2.61E-04	3.93E-05	0.00E+00	2.84E-01	0.00E+00	0.00E+00	5.78E-05	1.91E-04	5.43E-05	-2.40E-02
EP – terrestrial	mol N eq.	7.94E-01	3.10E-03	3.76E-04	0.00E+00	2.98E+00	0.00E+00	0.00E+00	6.85E-04	3.19E-03	5.97E-04	-2.60E-01
POCP	kg NMVOC eq.	2.16E-01	6.68E-04	1.19E-04	0.00E+00	7.57E-01	0.00E+00	0.00E+00	1.48E-04	5.15E-04	1.67E-04	-7.03E-02
ADP – minerals & metals*	kg Sb eq.	2.91E-03	4.20E-08	1.98E-09	0.00E+00	1.04E-04	0.00E+00	0.00E+00	9.29E-09	2.85E-08	2.80E-09	-5.58E-04
ADP – fossil*	MJ	1.01E+03	6.44E+00	3.49E-01	0.00E+00	1.18E+04	0.00E+00	0.00E+00	1.42E+00	2.19E+00	4.76E-01	-3.73E+02
WDP*	m^3	1.45E+01	7.35E-03	1.57E-02	0.00E+00	1.60E+02	0.00E+00	0.00E+00	1.63E-03	3.14E-01	3.74E-03	-4.65E+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 BETO system linear direct ceiling / suspended 3400mm										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – GHG[1]	kg CO_2 eq.	7.46E+01	4.94E-01	3.04E-02	0.00E+00	5.75E+02	0.00E+00	0.00E+00	1.09E-01	3.02E+00	3.22E-02	-2.95E+01
PM	disease inc.	5.06E-06	7.15E-09	7.09E-10	0.00E+00	1.00E-05	0.00E+00	0.00E+00	1.58E-09	7.77E-09	2.61E-09	-2.04E-06
IRP – HE**	kg U235-eq	6.11E+00	1.16E-03	6.61E-04	0.00E+00	3.05E+02	0.00E+00	0.00E+00	2.57E-04	2.61E-02	7.41E-04	-2.00E+00
ETP – fw*	CTUe	4.74E+02	4.74E+00	2.43E-01	0.00E+00	3.39E+03	0.00E+00	0.00E+00	1.05E+00	7.94E-01	2.78E-01	-1.25E+02
HTP – c*	CTUh	5.54E-08	9.51E-11	5.79E-12	0.00E+00	1.93E-07	0.00E+00	0.00E+00	2.10E-11	6.59E-11	2.31E-11	-2.09E-08
HTP – nc*	CTUh	7.72E-07	4.24E-09	3.27E-10	0.00E+00	2.97E-06	0.00E+00	0.00E+00	9.37E-10	4.25E-09	2.22E-09	-3.09E-07
SQP	dimension-less	2.19E+02	3.19E+00	1.32E-01	0.00E+00	4.91E+03	0.00E+00	0.00E+00	7.05E-01	7.79E-01	9.30E-02	1.67E+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 BETO system linear direct ceiling / suspended 3400mm										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.40E+02	5.45E-01	4.24E-02	0.00E+00	8.44E+03	0.00E+00	0.00E+00	1.20E-01	1.06E+00	7.10E-02	-1.61E+02
PERM	MJ	8.81E+00	0.00E+00	-8.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.94E-03	0.00E+00	0.00E+00
PERT	MJ	3.48E+02	5.45E-01	-8.76E+00	0.00E+00	8.44E+03	0.00E+00	0.00E+00	1.20E-01	1.05E+00	7.10E-02	-1.61E+02
PENRE	MJ	1.01E+03	6.44E+00	3.49E-01	0.00E+00	1.18E+04	0.00E+00	0.00E+00	1.42E+00	2.19E+00	4.76E-01	-3.73E+02
PENRM	MJ	3.31E+01	0.00E+00	-2.15E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.29E+01	0.00E+00	0.00E+00
PENRT	MJ	1.05E+03	6.44E+00	1.35E-01	0.00E+00	1.18E+04	0.00E+00	0.00E+00	1.42E+00	-3.07E+01	4.76E-01	-3.73E+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	3.14E+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	6.79E-01	6.12E-04	3.90E-04	0.00E+00	6.58E+00	0.00E+00	0.00E+00	1.35E-04	7.69E-03	1.13E-04	-1.49E-01

Acronyms: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy re-sources 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 BETO system linear direct ceiling / suspended 3400mm										
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B1 – B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5.25E-06	2.08E-10	2.89E-10	0.00E+00	1.69E-05	0.00E+00	0.00E+00	4.61E-11	1.43E-09	7.00E-11	-1.05E-07
Non-hazardous waste disposed	kg	1.09E+01	1.00E-03	6.33E-02	0.00E+00	9.66E+00	0.00E+00	0.00E+00	2.22E-04	3.21E-01	1.90E+00	-1.09E+01
Radioactive waste disposed	kg	3.78E-02	8.33E-06	4.25E-06	0.00E+00	1.86E+00	0.00E+00	0.00E+00	1.84E-06	1.79E-04	5.90E-06	-1.94E-02

Output flow indicators

		Results per piece of BETO system linear direct ceiling / suspended 3400mm										
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	1.21E+00	0.00E+00	7.98E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.02E+00	0.00E+00	2.43E-01
Materials for energy recovery	kg	0.00E+00	0.00E+00	6.38E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E+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

The BETO system linear direct ceiling / suspended as well as the BETO system linear direct / indirect power suspended 3400mm variants are available with / without sensor. For the BETO system linear direct / indirect power suspended 3400mm variant there is a tunable white (TW) option. These variants have been incorporated into the model and are therefore scaled by real factors. The Use Phase B6 of the sensor variants have been factorized with a theoretical coefficient of energy saving (0.55) according to PEP-PCR-ed4-EN-2021 09 06 by PEP-ECO Passport.

The light management includes a combination of presence detection and luminosity function.
The 1700mm length versions belong to an environmental homogenous family and also fulfil the requirements established by the PEP-PCR-ed4-EN-2021 09 06 by PEP-ECO Passport.

Variant	Length	A1–A3	A4	A5	B6	C1–C4	D
direct ceiling / suspended (reference product)	3400	1.00	1.00	1.00	1.00	1.00	1.00
direct ceiling / suspended	1700	0.50	0.50	0.51	0.50	0.50	0.50
direct ceiling / suspended sensor	3400	1.00	1.01	1.00	0.55	1.01	1.00
direct / indirect power suspended	3400	1.55	1.13	1.02	2.10	1.23	1.02
direct / indirect power suspended	1700	0.81	0.56	0.51	1.13	1.01	0.81
direct / indirect power suspended TW	3400	1.62	1.15	1.03	2.10	1.26	1.02
direct / indirect power suspended sensor	3400	1.63	1.13	1.02	1.15	1.23	1.63
direct / indirect power suspended TW sensor	3400	1.63	1.15	1.03	1.15	1.26	1.02

Results for 1000 lumens during a reference life of 35000 hours produced by 1 BETO system linear 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	Length	A1–A3	A4	A5	B6	C1–C4	D
direct ceiling / suspended	80	1700	0.32	0.32	0.32	0.24	0.32	0.32
direct ceiling / suspended	90	1700	0.37	0.37	0.37	0.27	0.37	0.37
direct ceiling / suspended (reference product)	80	3400	0.16	0.16	0.16	0.12	0.16	0.16
direct ceiling / suspended	90	3400	0.18	0.18	0.18	0.14	0.18	0.18
direct ceiling / suspended sensor	80	3400	0.16	0.16	0.16	0.12	0.16	0.16
direct ceiling / suspended sensor	90	3400	0.18	0.18	0.18	0.14	0.18	0.18
direct / indirect power suspended	80	1700	0.15	0.15	0.15	0.11	0.15	0.15
direct / indirect power suspended	90	1700	0.17	0.17	0.17	0.13	0.17	0.17
direct / indirect power suspended	80	3400	0.07	0.07	0.07	0.05	0.07	0.07
direct / indirect power suspended	90	3400	0.08	0.08	0.08	0.06	0.08	0.08
direct / indirect power suspended sensor	80	3400	0.07	0.07	0.07	0.05	0.07	0.07
direct / indirect power suspended sensor	90	3400	0.08	0.08	0.08	0.06	0.08	0.08
direct / indirect power suspended TW	90	3400	0.08	0.08	0.08	0.06	0.08	0.08
direct / indirect power suspended TW sensor	90	3400	0.08	0.08	0.08	0.06	0.08	0.08

Information related to the sectorial EPD

This EPD is not sectoral.

Differences from previous versions

This is the first version of the EPD.

References

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