



ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT ENVIRONMENTAL PROFILE – OPENDO C+D

Reference product: Opendo D2-L PW19 47-840 ET 01

Registration number	TRLX-00022-V01.01-EN	Drafting rules	PCR-ed4-EN-2021 09 06
		Supplemented by	PSR-0014-ed2.0-EN2023 07 13
Verifier accreditation number	VH45	Information and reference documents	www.pep-ecopassport.org
Date of issue	05-2025	Validity period	5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006			
Internal		External	X
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain) PEPs are compliant with XP C08-100-1:2016 or EN 50693:2019			
The components of the present PEP may not be compared with components from any other program.			
Document complies with ISO 14025:2006			
"Environmental labels and declarations.			
Type III environmental declarations"			



Company information:

Further technical information can be obtained by contacting:

- TRILUX GmbH & Co. KG, Heidestraße 4, D-59759 Arnsberg, Germany
- or on the website www.trilux.com
- or by E-Mail support@trilux.de

1. GENERAL INFORMATION

1.1 Product information

Rectangular surface-mounted LED ceiling luminaire with full-surface, borderless PMMA cover. Suitable for use in HACCP, IFS and/or BRC Global Standard Food certified companies. Surface-mounted luminaire for ceiling mounting in indoor rooms. For individual or continuous line applications by means of accessories to be ordered separately. Suitable for through-wiring. With an internal microprismatic cover and an opal PMMA cover smooth on room side. With symmetric limited wide light distribution. Glare evaluation according to UGR rating (EN 12464-1) < 19. Suitable for VDU workstations according to EN 12464-1 via limited luminance $L \leq 3000 \text{ cd/2}$ for beam angle above 65° all-round. Luminaire luminous flux and light color fixed. Luminaire luminous flux 4700 lm, connected load 37 W, maximum luminous efficiency of luminaire 127 lm/W. Light colour neutral white, correlated colour temperature (CCT) 4000 K, general colour rendering index (CRI) $R_a > 80$. Colour locus tolerance (initial MacAdam) ≤ 3 SDCM. Rated service life L80/B50 ($t_q 25^\circ\text{C}$) = 50,000 h. The light source is replaceable according to the ecodesign requirements (VO (EU) 2019/2020). Luminaire body sheet steel. Surface coated white (similar to RAL 9016). Dimensions (L x W): 1408 mm x 161 mm, luminaire height 48 mm. Safety class (EN 61140): I, protection rating (DIN EN 60529): IP20, impact resistance level in accordance with IEC 62262: IK03, testing temperature of wire glow test in accordance with IEC 60695-2-11: 650 °C. Permissible ambient temperature (t_a): 25 °C Weight: 4,7 kg. With electronic transformer, switchable. The control gear unit is replaceable in accordance with the ecodesign requirements (VO (EU) 2019/2020). The luminaire complies with the fundamental requirements of applicable EU regulations and product safety legislation and bears the CE symbol. The luminaire is also ENEC-certified by an independent testing authority. Luminaire available for 10 years, spare parts (LED module, control gear unit, optical system) for 15 years from date of invoice, subject to reasonable modifications in the interests of progress.

1. GENERAL INFORMATION

Table 1: Key technological data

Information	Unit	
Light source	–	Integrated LED module
Power supply	–	Integrated power supply
Color temperature	K	4000
Protection index for water and dust (IP)	–	IP20
Impact resistance index (IK)	–	IK03
Nominal operating voltage	V	220-240
Declared lifetime of the luminaire	Hours	50.000
Declaration lifetime of the light source	Hours	50.000
Outgoing luminous flux/Useful output flux	Lumen	4.700
Electrical input power	W	37
Luminous efficiency	Lumen/W	123
Dimension	mm	1.408 x 161 x 48
Reference use scenario	–	Office
Lifetime in years according to reference use scenario	yr	20

1.2 Goal and Scope

Following information have been used to generate the PEP:

Table 2: Goal and Scope

Information	
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours
Reference flow / declared unit*	0.1489 pieces of product
Life cycle stages covered	Cradle-to-grave and Module D
Product category according to PSR	Luminaires
Product family name	OPENDO C+D

All products of the product family ("X" refer to placeholders for different product codes)	Opendo D1-L PW19 XX-XXX ET XX, Opendo D1-L PW19 XX-XXX ETDD XX, Opendo D1-L DWW XX-XXX ET XX, Opendo D1-L DWW XX-XXX ETDD XX, Opendo D2-L PW19 XX-XXX ET XX, Opendo D2-L PW19 XX-XXX ETDD XX, Opendo D2-L DWW XX-XXX ET XX, Opendo D2-L DWW XX-XXX ETDD XX, Opendo M36 PW19 XX-XXX ET XX, Opendo M36 PW19 XX-XXX ETDD XX, Opendo M36 DWW XX-XXX ET XX, Opendo M36 DWW XX-XXX ETDD XX, Opendo M37 PW19 XX-XXX ET XX, Opendo M37 PW19 XX-XXX ETDD XX, Opendo M37 DWW XX-XXX ET XX, Opendo M37 DWW XX-XXX ETDD XX, Opendo M38 PW19 XX-XXX ET XX, Opendo M38 PW19 XX-XXX ETDD XX, Opendo M38 DWW XX-XXX ET XX, Opendo M38 DWW XX-XXX ETDD XX, Opendo M39 PW19 XX-XXX ET XX, Opendo M39 PW19 XX-XXX ETDD XX, Opendo M39 DWW XX-XXX ET XX, Opendo M39 DWW XX-XXX ETDD XX
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Extrapolation rules (if family EPD)	The tables in the last section provide information about the used extrapolation rules and the resulting extrapolation factors according to the applied PSR.
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* The reference flow is calculated as: (1,000/outgoing luminous flux of the analyzed product in lumens) x (35,000/declared product lifetime of the analyzed product in hours)

Consequently, the reference flow of the following product correspond to: (1,000/4,700) x (35,000/50,000) = 0.1489

2. CONSTITUENT MATERIAL

2.1 Overview

The product composition is shown in the following table.

Table 3: Product composition

	Weight [in kg]	Share [in %]
Total weight	5.39	100
Product	4.70	87
Packaging	0.69	13

2.2 Product

The material composition of the product is shown in the following table.

Table 4: Material composition - product

	Weight [in kg]	Share [in %]
Total weight	4.70	100
Metals	3.12	66
• Stainless Steel	0.02	< 1
• Steel	3.10	65
Plastics	0.86	18
• Polyvinyl chloride (PVC)	0.01	< 1
• Polycarbonate (PC)	0.02	< 1
• Polymethyl methacrylate (PMMA)	0.62	13
• Polyethylene (PE)	0.2	4
Other	0.72	15
• Electronics (incl. wires)	0.45	10
• Paint	0.28	6

2.3 Packaging

The product composition is shown in the following table.

Table 5: Material composition – packaging

	Weight [in kg]	Share [in %]
Total weight	0.69	100
Paper/cardboard	0.68	99
Plastics	0.01	< 1

3. INFORMATION ON LIFE CYCLE STAGES



3.1 Manufacturing stage (A1-A3)

The product components are manufactured or assembled by TRILUX GmbH & Co. KG in Arnsberg (Germany). The production sites in Arnsberg, Alhama de Aragón and Zaragoza (both Spain) have certified environmental management systems in accordance with ISO 14001. The Arnsberg site also has a certified energy management system according with ISO 50001.

TRILUX products are manufactured in compliance with RoHS 2011/65/EU and REACH 1907/2006 declarations.

The energy model used in manufacturing is based on Sphera's Managed LCA Content and primary information on the energy mix of TRILUX.



3.2 Distribution stage (A4)

The main market of the product is Europe and there is no specific data available. For this reason, an intracontinental transport (3,500 km by truck (diesel driven, EURO 0-6, >27t payload) to the place of use following PEP-PCR-ed4-EN-2021 09 06 is considered.



3.3 Installation stage (A5)

The product can easily be installed without any special tool. No energy or material input is required. Packaging waste is treated according to the scenario given in PEP-PSR-0014-ed2-EN-2023 07 13.



3.4 Use stage (B1-B7)

The product has no direct emissions (B1). No maintenance (B2), repair (B3), replacement (B4), or refurbishment (B5) is required. The use of the product does consume electricity (B6), but no water (B7).

The operational electricity consumption over the entire lifetime of the product is 1,850 kWh. It has been calculated according to PSR edition 2. The used energy model refers to an average European electricity grid mix from Sphera's Managed LCA Content.



3.5 End-of-life stage (C1-C4)

The product falls under the Waste from Electrical and Electronic Equipment (WEEE) directive 2012/19/ EU. Therefore, a collection rate of 100% and a typical end-of-life scenario for electronic products is assumed. All (mechanical and electronic) metals are recycled. Plastic & renewable materials are incinerated with energy recovery. Batteries & glass are landfilled.

For the transport to end-of-life treatment 1,000 km by truck according to PEP PCR is considered.

3.6 Benefits and loads beyond the system boundaries stage (D)

The recycling of the product (incl. packaging) and incineration with energy recovery generates environmental benefits and loads beyond the system boundaries (D). The calculation of this module is in line with the formulars described in PEP-PCR-ed4-EN-2021 09 06. The amount of the material flows used for the calculation are listed in the table below.

3. INFORMATION ON LIFE CYCLE STAGES

Table 7: Material flows for benefits and loads beyond the system boundaries per functional unit

	Weight [in kg]
Total weight going into reuse	0
Total weight going into recycling	1.36E+00
Total weight going into incineration with energy recovery	3.80E+00

4. Results

The environmental information included in this study cover all stages of the life cycle („cradle-to-grave“).

The life cycle is divided into manufacturing stage (A1-A3), distribution stage (A4), installation stage (A5), use stage (B1-B7, but only applicable modules are shown), End-of-life stage (C1-C4) and benefits and loads beyond the system boundaries (D). The results refer to the core environmental impact indicators and mandatory indicators describing resource use, waste categories, and output flows according to PEP-PCR–ed4,- EN-2021 09 06 and EN 15804+A2:2019.

The results have been calculated using the LCA Software “LCA for Experts 10” and the LCI database “Sphera Managed LCA Content”.

4.1 Results per functional unit

The following results of the environmental declaration have been developed, considering an outgoing artificial luminous flux of 1,000 lumens over a reference lifetime of 35,000 hours.

Acronyms: GWP-total=Global Warming Potential total; GWP-biogenic=Global Warming Potential biogenic; GWP-fossil=Global Warming Potential fossil; GWP-luluc=Global Warming Potential land use and land use change; ODP=Ozone Depletion; AP=Acidification; E=Eutrophication; POCP=Photochemical ozone formation; ADPE=Depletion of abiotic resources-minerals and metals; ADPF=Depletion of abiotic resources-fossil fuels; WDP=Water re- source deprivation; PERE=Renewable primary energy (without raw material); PERM=Renewable primary energy (raw material); PERT=Total use of renewable primary energy; PENRE=Non-renewable primary energy (without raw material); PENRM=Non-renewable primary energy (raw material); PENRT=Total use of non-renewable primary energy; SM=Use of secondary materials; RSF=Use of renewable secondary fuels; NRSF=Use of non-renewable secondary fuels; FW=Net use of fresh water; HWD=Hazardous waste disposed; NHWD=Non-hazardous waste disposed; RWD=Radioactive waste disposed; CRU=Components for reuse; MFR=Materials for recycling; MER=Materials for energy recovery; EEE=Exported electricity; EET=Exported thermal energy; Biog. C in product=Biogenic carbon content of the product; Biog. C in packaging=Biogenic carbon content of the associated packaging

Table 8: Results core environmental impact indicators per functional unit (0.1489 pcs product incl. packaging)

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3		
GWP - total	kg CO2 eq.	9,36E+01	2,49E+00	5,01E-02	5,58E-01	2,12E-01	8,35E-02
GWP - fossil	kg CO2 eq.	9,27E+01	2,51E+00	4,68E-02	5,18E-01	2,07E-01	5,22E-02
GWP - biogenic	kg CO2 eq.	8,28E-01	-2,44E-02	2,84E-03	3,93E-02	3,68E-03	3,11E-02
GWP - luluc	kg CO2 eq.	1,29E-02	9,63E-04	4,10E-04	7,42E-04	5,13E-04	2,06E-04
ODP	kg CFC-11 eq.	1,66E-09	7,94E-12	5,97E-15	7,98E-12	1,76E-14	8,80E-14
AP	Mole of H+ eq.	2,01E-01	6,51E-03	1,44E-04	9,29E-04	3,61E-03	9,47E-05
EP - freshwater	kg P eq.	3,49E-04	8,22E-06	1,62E-07	6,82E-06	2,36E-07	1,40E-06
EP - marine	kg N eq.	4,87E-02	1,44E-03	5,34E-05	3,83E-04	1,30E-03	4,29E-05
EP - terrestrial	Mole of N eq.	5,10E-01	1,53E-02	6,00E-04	3,83E-03	1,42E-02	4,01E-04
POCP	kg NMVOC eq.	1,31E-01	4,58E-03	1,35E-04	9,19E-04	3,56E-03	9,07E-05
ADPE	kg Sb eq.	9,85E-05	8,46E-05	2,96E-09	1,16E-07	5,05E-09	2,04E-08
ADPF	MJ	1,92E+03	3,58E+01	6,41E-01	7,53E+00	2,62E+00	7,29E-01
WDP	m ³ world equiv.	2,01E+01	2,35E-01	5,40E-04	2,42E-02	9,21E-04	2,95E-03

4. Results

Impact category	Unit	Use	End of life				Benefits and loads beyond the system boundaries stage
		B2	B6	C2	C3	C4	D
GWP - total	kg CO2 eq.	0,00E+00	8,96E+01	5,10E-02	4,81E-01	0,00E+00	-1,05E+00
GWP - fossil	kg CO2 eq.	0,00E+00	8,89E+01	4,75E-02	4,81E-01	0,00E+00	-1,17E+00
GWP - biogenic	kg CO2 eq.	0,00E+00	7,73E-01	3,09E-03	1,09E-04	0,00E+00	1,22E-01
GWP - luluc	kg CO2 eq.	0,00E+00	9,66E-03	4,45E-04	1,08E-05	0,00E+00	-7,13E-04
ODP	kg CFC-11 eq.	0,00E+00	1,64E-09	6,26E-15	3,14E-13	0,00E+00	1,26E-12
AP	Mole of H+ eq.	0,00E+00	1,90E-01	7,71E-05	1,22E-04	0,00E+00	-2,59E-03
EP - freshwater	kg P eq.	0,00E+00	3,32E-04	1,76E-07	7,60E-08	0,00E+00	-2,33E-06
EP - marine	kg N eq.	0,00E+00	4,54E-02	2,98E-05	3,56E-05	0,00E+00	-6,74E-04
EP - terrestrial	Mole of N eq.	0,00E+00	4,74E-01	3,42E-04	5,62E-04	0,00E+00	-7,19E-03
POCP	kg NMVOC eq.	0,00E+00	1,21E-01	6,85E-05	9,49E-05	0,00E+00	-2,12E-03
ADPE	kg Sb eq.	0,00E+00	1,37E-05	3,19E-09	2,37E-09	0,00E+00	-4,33E-07
ADPF	MJ	0,00E+00	1,87E+03	6,55E-01	4,10E-01	0,00E+00	-1,13E+01
WDP	m³ world equiv.	0,00E+00	1,98E+01	5,81E-04	5,20E-02	0,00E+00	-3,67E-02

Table 9: Results indicators describing resource use, waste categories, and output flows per functional unit (0.1489 pcs product incl. packaging)

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
PERE	MJ	1,13E+03	4,66E+00	4,40E-02	3,65E+00	6,28E-02	3,28E-01
PERM	MJ	1,95E+00	5,32E-01	0,00E+00	1,57E+00	0,00E+00	-1,52E-01
PERT	MJ	1,13E+03	5,19E+00	4,40E-02	5,23E+00	6,28E-02	1,77E-01
PENRE	MJ	1,92E+03	3,16E+01	6,44E-01	7,58E+00	2,63E+00	7,35E-01
PENRM	MJ	-7,24E-01	4,23E+00	0,00E+00	-4,44E-02	0,00E+00	-4,85E-03
PENRT	MJ	1,92E+03	3,59E+01	6,44E-01	7,54E+00	2,63E+00	7,30E-01
SM	kg	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	M3	9,30E-01	2,20E-02	4,83E-05	3,26E-03	7,06E-05	7,22E-04
HWD	kg	2,12E-07	1,29E-07	2,00E-12	5,98E-08	8,24E-12	2,27E-08
NHWD	kg	1,60E+00	1,45E-01	9,58E-05	2,23E-02	2,86E-04	9,29E-03
RWD	kg	2,98E-01	5,65E-04	1,18E-06	2,37E-04	3,61E-06	1,50E-05
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	5,74E-01	0,00E+00	0,00E+00	2,56E-02	0,00E+00	8,35E-02
MER	kg	2,66E-01	0,00E+00	0,00E+00	2,18E-02	0,00E+00	9,26E-03
EEE	MJ	7,60E-01	2,11E-03	0,00E+00	0,00E+00	0,00E+00	2,39E-02
EET	kg	1,74E+00	3,78E-03	0,00E+00	0,00E+00	0,00E+00	3,65E-02
Biog. C in product	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biog. C in packaging	kg	5,37E+00	1,35E+00	0,00E+00	4,02E+00	0,00E+00	0,00E+00

4. Results

Impact category	Unit	Use				End of life	Benefits and loads beyond the system boundaries stage
		B2	B6	C2	C3	C4	D
PERE	MJ	0.00E+00	1,12E+03	4,77E-02	1,79E-01	0,00E+00	-1,58E+00
PERM	MJ	0.00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	0.00E+00	1,12E+03	4,77E-02	1,79E-01	0,00E+00	-1,58E+00
PENRE	MJ	0.00E+00	1,87E+03	6,58E-01	5,31E+00	0,00E+00	-1,14E+01
PENRM	MJ	0.00E+00	0,00E+00	0,00E+00	-4,90E+00	0,00E+00	0,00E+00
PENRT	MJ	0.00E+00	1,87E+03	6,58E-01	4,10E-01	0,00E+00	-1,14E+01
SM	kg	0.00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,71E-01
RSF	MJ	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
FW	M3	0.00E+00	9,03E-01	5,22E-05	1,28E-03	0,00E+00	-2,24E-03
HWD	kg	0.00E+00	0,00E+00	2,04E-12	8,16E-10	0,00E+00	-2,40E-08
NHWD	kg	0.00E+00	1,37E+00	1,00E-04	5,37E-02	0,00E+00	-1,93E-02
RWD	kg	0.00E+00	2,97E-01	1,23E-06	3,30E-05	0,00E+00	-1,37E-04
CRU	kg	0.00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0.00E+00	0,00E+00	0,00E+00	4,64E-01	0,00E+00	0,00E+00
MER	kg	0.00E+00	0,00E+00	0,00E+00	2,35E-01	0,00E+00	0,00E+00
EEE	MJ	0.00E+00	0,00E+00	0,00E+00	7,34E-01	0,00E+00	0,00E+00
EET	kg	0.00E+00	0,00E+00	0,00E+00	1,70E+00	0,00E+00	0,00E+00
Biog. C in product	kg	0.00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biog. C in packaging	kg	0.00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

4. Results

4.2 Results per unit of product

The following results of the environmental declaration have been developed, considering one piece of product.

Table 10: Results core environmental impact indicators per unit of product

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
GWP - total	kg CO2 eq.	6,28E+02	1,67E+01	3,36E-01	3,75E+00	1,42E+00	5,61E-01
GWP - fossil	kg CO2 eq.	6,23E+02	1,69E+01	3,14E-01	3,48E+00	1,39E+00	3,51E-01
GWP - biogenic	kg CO2 eq.	5,56E+00	-1,64E-01	1,91E-02	2,64E-01	2,47E-02	2,09E-01
GWP - luluc	kg CO2 eq.	8,70E-02	6,47E-03	2,75E-03	4,98E-03	3,45E-03	1,38E-03
ODP	kg CFC-11 eq.	1,11E-08	5,33E-11	4,01E-14	5,36E-11	1,18E-13	5,91E-13
AP	Mole of H+ eq.	1,35E+00	4,37E-02	9,65E-04	6,24E-03	2,43E-02	6,36E-04
EP - freshwater	kg P eq.	2,34E-03	5,52E-05	1,09E-06	4,58E-05	1,59E-06	9,40E-06
EP - marine	kg N eq.	3,27E-01	9,69E-03	3,59E-04	2,57E-03	8,70E-03	2,88E-04
EP - terrestrial	Mole of N eq.	3,42E+00	1,03E-01	4,03E-03	2,57E-02	9,54E-02	2,69E-03
POCP	kg NMVOC eq.	8,77E-01	3,07E-02	9,06E-04	6,17E-03	2,39E-02	6,09E-04
ADPE	kg Sb eq.	6,61E-04	5,68E-04	1,99E-08	7,80E-07	3,39E-08	1,37E-07
ADPF	MJ	1,29E+04	2,40E+02	4,31E+00	5,06E+01	1,76E+01	4,90E+00
WDP	m³ world equiv.	1,35E+02	1,58E+00	3,63E-03	1,63E-01	6,18E-03	1,98E-02
Impact category	Unit	Use				End of life	Benefits and loads beyond the system boundaries stage
		B2	B6	C2	C3	C4	D
GWP - total	kg CO2 eq.	0,00E+00	6,02E+02	3,42E-01	3,23E+00	0,00E+00	-7,06E+00
GWP - fossil	kg CO2 eq.	0,00E+00	5,97E+02	3,19E-01	3,23E+00	0,00E+00	-7,88E+00
GWP - biogenic	kg CO2 eq.	0,00E+00	5,19E+00	2,07E-02	7,34E-04	0,00E+00	8,21E-01
GWP - luluc	kg CO2 eq.	0,00E+00	6,49E-02	2,99E-03	7,27E-05	0,00E+00	-4,79E-03
ODP	kg CFC-11 eq.	0,00E+00	1,10E-08	4,20E-14	2,11E-12	0,00E+00	8,45E-12
AP	Mole of H+ eq.	0,00E+00	1,27E+00	5,18E-04	8,16E-04	0,00E+00	-1,74E-02
EP - freshwater	kg P eq.	0,00E+00	2,23E-03	1,18E-06	5,11E-07	0,00E+00	-1,57E-05
EP - marine	kg N eq.	0,00E+00	3,05E-01	2,00E-04	2,39E-04	0,00E+00	-4,53E-03
EP - terrestrial	Mole of N eq.	0,00E+00	3,19E+00	2,30E-03	3,77E-03	0,00E+00	-4,83E-02
POCP	kg NMVOC eq.	0,00E+00	8,14E-01	4,60E-04	6,37E-04	0,00E+00	-1,42E-02
ADPE	kg Sb eq.	0,00E+00	9,23E-05	2,14E-08	1,59E-08	0,00E+00	-2,91E-06
ADPF	MJ	0,00E+00	1,26E+04	4,40E+00	2,75E+00	0,00E+00	-7,59E+01
WDP	m³ world equiv.	0,00E+00	1,33E+02	3,90E-03	3,50E-01	0,00E+00	-2,46E-01

4. Results

Table 11: Results core environmental impact indicators per unit of product

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
PERE	MJ	7,57E+03	3,13E+01	2,96E-01	2,45E+01	4,22E-01	2,21E+00
PERM	MJ	1,31E+01	3,57E+00	0,00E+00	1,06E+01	0,00E+00	-1,02E+00
PERT	MJ	7,58E+03	3,48E+01	2,96E-01	3,51E+01	4,22E-01	1,19E+00
PENRE	MJ	1,29E+04	2,12E+02	4,32E+00	5,09E+01	1,76E+01	4,93E+00
PENRM	MJ	-4,86E+00	2,84E+01	0,00E+00	-2,98E-01	0,00E+00	-3,26E-02
PENRT	MJ	1,29E+04	2,41E+02	4,32E+00	5,06E+01	1,76E+01	4,90E+00
SM	kg	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	M3	6,25E+00	1,48E-01	3,24E-04	2,19E-02	4,74E-04	4,85E-03
HWD	kg	1,42E-06	8,64E-07	1,34E-11	4,02E-07	5,53E-11	1,53E-07
NHWD	kg	1,08E+01	9,75E-01	6,43E-04	1,50E-01	1,92E-03	6,24E-02
RWD	kg	2,00E+00	3,79E-03	7,91E-06	1,59E-03	2,43E-05	1,01E-04
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	3,85E+00	0,00E+00	0,00E+00	1,72E-01	0,00E+00	5,61E-01
MER	kg	1,79E+00	0,00E+00	0,00E+00	1,46E-01	0,00E+00	6,22E-02
EEE	MJ	5,11E+00	1,42E-02	0,00E+00	0,00E+00	0,00E+00	1,60E-01
EET	kg	1,17E+01	2,54E-02	0,00E+00	0,00E+00	0,00E+00	2,45E-01
Biog. C in product	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biog. C in packaging	kg	3,61E+01	9,06E+00	0,00E+00	2,70E+01	0,00E+00	0,00E+00
Impact category	Unit	Use				End of life	Benefits and loads beyond the system boundaries stage
		B2	B6	C2	C3	C4	D
PERE	MJ	0,00E+00	7,51E+03	3,20E-01	1,20E+00	0,00E+00	-1,06E+01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	0,00E+00	7,51E+03	3,20E-01	1,20E+00	0,00E+00	-1,06E+01
PENRE	MJ	0,00E+00	1,26E+04	4,42E+00	3,57E+01	0,00E+00	-7,64E+01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	-3,29E+01	0,00E+00	0,00E+00
PENRT	MJ	0,00E+00	1,26E+04	4,42E+00	2,75E+00	0,00E+00	-7,64E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,16E+00
RSF	MJ	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
FW	M3	0,00E+00	6,06E+00	3,51E-04	8,59E-03	0,00E+00	-1,51E-02
HWD	kg	0,00E+00	0,00E+00	1,37E-11	5,48E-09	0,00E+00	-1,61E-07
NHWD	kg	0,00E+00	9,20E+00	6,73E-04	3,60E-01	0,00E+00	-1,30E-01
RWD	kg	0,00E+00	2,00E+00	8,27E-06	2,22E-04	0,00E+00	-9,22E-04
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	3,12E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	1,58E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	4,93E+00	0,00E+00	0,00E+00
EET	kg	0,00E+00	0,00E+00	0,00E+00	1,14E+01	0,00E+00	0,00E+00
Biog. C in product	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biog. C in packaging	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

4. Results

4.3 Extrapolation Rules for the Product Family

The extrapolation coefficients included in the PEP Eco-passport have been developed according to the valid PCR & PSR. shows the key properties of the reference product, function as extrapolation basis.

Table 121: Reference values for the extrapolation

Parameter	Unit	Reference product Opendo D2-L PW19 47-840 ET 01
Weight of structure	kg	4.415
Weight of ECGs	kg	0.18
Weight of LEDMs	kg	0.105
Weight of packaging	kg	0.8
Energy saving coefficient		1
Assigned Lifetime	hours	50.000

The extrapolation at the level of the functional unit needs to be done according to the following formula:

Extrapolation coefficient at the product level × $\left(\frac{\text{Lighting output of reference product (lumens)}}{\text{Lighting output of product concerned (lumens)}} \right)$

The required extrapolation coefficients at the product level are listed in the following table.

4. Results

The extrapolation factors to other family members than the reference luminaire are provided in the table below. The family members are referenced by their product code. The extrapolation factor of the use stage must be calculated as shown in the table, where the electrical input power P of the family member can be read from its datasheet and P_ref is the electrical input power of the reference luminaire, i.e. P_ref = 37 W.

Table 13: Extrapolation coefficients at the product level

Product code			Extrapolation factors per stage				
Type/Size	Optics	Switching Type	Fabrication	Distribution	Installation	Use	End-of-Life
D1-L	PW19	ET	0,88	0,87	1,00	1,00 * P/P_ref	0,85
		ETDD	0,89	0,87	1,00	0,50 * P/P_ref	0,85
	DWW	ET	0,88	0,87	1,00	1,00 * P/P_ref	0,85
		ETDD	0,89	0,87	1,00	0,50 * P/P_ref	0,85
D2-L	PW19	ET	1,00	1,00	1,00	1,00 * P/P_ref	1,00
		ETDD	1,01	1,00	1,00	0,50 * P/P_ref	1,00
	DWW	ET	1,00	1,00	1,00	1,00 * P/P_ref	1,00
		ETDD	1,01	1,00	1,00	0,50 * P/P_ref	1,00
M36	PW19	ET	1,02	1,02	0,88	1,00 * P/P_ref	1,04
		ETDD	1,02	1,02	0,88	0,50 * P/P_ref	1,04
	DWW	ET	1,02	1,02	0,88	1,00 * P/P_ref	1,04
		ETDD	1,02	1,02	0,88	0,50 * P/P_ref	1,04
M37	PW19	ET	1,09	1,09	1,13	1,00 * P/P_ref	1,09
		ETDD	1,09	1,09	1,13	0,50 * P/P_ref	1,09
	DWW	ET	1,09	1,09	1,13	1,00 * P/P_ref	1,09
		ETDD	1,09	1,09	1,13	0,50 * P/P_ref	1,09
M38	PW19	ET	1,24	1,24	1,25	1,00 * P/P_ref	1,23
		ETDD	1,24	1,24	1,25	0,50 * P/P_ref	1,23
	DWW	ET	1,24	1,24	1,25	1,00 * P/P_ref	1,23
		ETDD	1,24	1,24	1,25	0,50 * P/P_ref	1,23
M39	PW19	ET	1,29	1,27	1,00	1,00 * P/P_ref	1,32
		ETDD	1,29	1,27	1,00	0,50 * P/P_ref	1,32
	DWW	ET	1,29	1,27	1,00	1,00 * P/P_ref	1,32
		ETDD	1,29	1,27	1,00	0,50 * P/P_ref	1,32

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4.4 Annex

Indicator	Acronym [Unit]
Renewable primary energy (without raw material)	PERE [MJ]
Renewable primary energy (raw material)	PERM [MJ]
Total use of renewable primary energy	PERT [MJ]
Non-renewable primary energy (without raw material)	PENRE [MJ]
Non-renewable primary energy (raw material)	PENRM [MJ]
Total use of non-renewable primary energy	PENRT [MJ]
Use of secondary materials	SM [kg]
Use of renewable secondary fuels	RSF [MJ]
Use of non-renewable secondary fuels	NRSF [MJ]
Net use of fresh water	FW [m3]
Hazardous waste disposed	HWD [kg]
Non-hazardous waste disposed	NHWD [kg]
Radioactive waste disposed	RWD [kg]
Components for reuse	CRU [kg]
Materials for recycling	MFR [kg]
Materials for energy recovery	MER [kg]
Exported electricity	EEE [MJ]
Exported thermal energy	EET [MJ]
Biogenic carbon content of the product	Biog. C in product [kg]
Biogenic carbon content of the associated packaging	Biog. C in packaging [kg]
Global Warming Potential, total	GWP - total [kg CO2 eq.]
Global Warming Potential, fossil	GWP - fossil [kg CO2 eq.]
Global Warming Potential, biogenic	GWP - biogenic [kg CO2 eq.]
Global Warming Potential, land use and land use change	GWP - luluc [kg CO2 eq.]
Ozone depletion	ODP [kg CFC-11 eq.]
Acidification	AP [Mole of H+ eq.]
Eutrophication, freshwater	EP - freshwater [kg P eq.]
Eutrophication, marine	EP - marine [kg N eq.]
Eutrophication, terrestrial	EP - terrestrial [Mole of N eq.]
Photochemical ozone formation, human health	POCP [kg NMVOC eq.]
Resource use, mineral and metals	ADPE [kg Sb eq.]
Resource use, fossils	ADPF [MJ]
Water use	WDP [m³ world equiv.]

