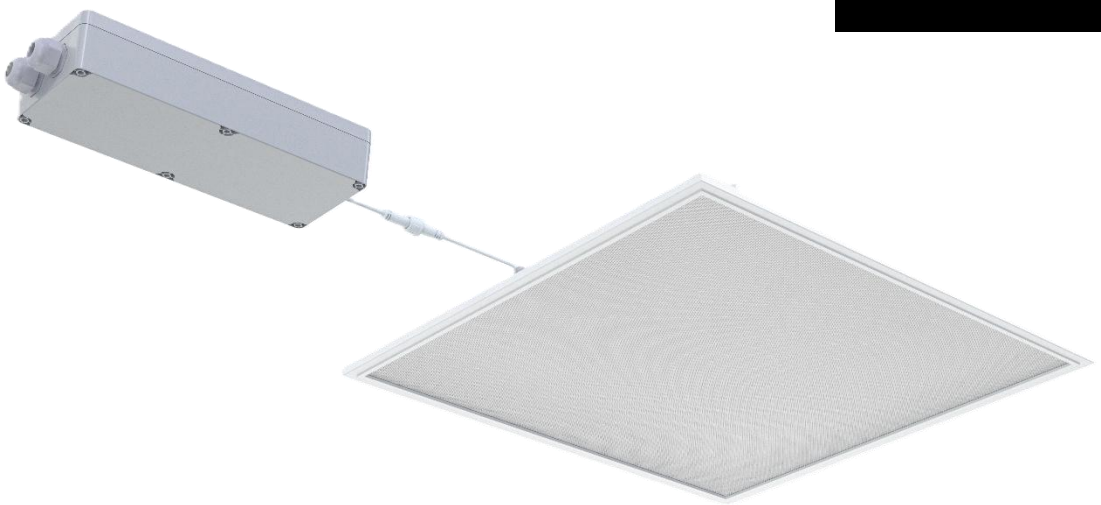


ENVIRONMENTAL

PRODUCT DECLARATION

PRODUCT ENVIRONMENTAL PROFILE - Valineo IP AR

Reference product: Valineo IP AR M73 PW19 38-50/4ML-9MC DD

Registration number	TRLX-00042-V01.01-EN	**Drafting rules**	PCR-ed4-EN-2021 09 06
		Supplemented by	PSR-0014-ed2.0-EN-2023 07 13
Verifier accreditation number	VH31	**Information and reference documents**	www.pep-ecopassport.org
Date of publication	08-2026	**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 and EN 50693:2019 or NF E38-500:2022

The components of the present PEP cannot be compared with elements from another program.

Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"

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1. GENERAL INFORMATION

1.1 Product information

LED recessed luminaire with microprismatic PC cover, model M73 (595mm x595 mm), M46 (1195 mm x 295 mm) suitable for workplaces with high water resistance requirements. Designed for installation in ceilings with visible support rails; with accessories, also suitable for surface or cut-out ceiling mounting (material thickness 18–40 mm). The symmetrical, wide beam optical system ensures low glare (UGR < 19, EN 12464-1) and uniform light, with luminance limited to L ⩽ 3000 cd/m² at angles above 65°. The LED system offers four adjustable luminous flux levels (3800–5000 lm), rated power 27–36 W, high efficiency (up to 140 lm/W), switchable colour temperature (3000 K/4000 K), high color rendering (Ra > 90), color consistency ⩽ 3 SDCM, median lifetime L80 (100,000 h at tq 25°C), flicker-free lighting (Pst LM ⩽ 1.0, SVM ⩽ 0.4). The luminaire body consists of an aluminum frame and steel rear housing, white coated (approx. RAL 9016), measuring 595 x 595x 37mm, with IP65 room-side protection, IP65 overall, impact resistance IK03, glow-wire tested at 650°C, suitable for ambient temperatures up to 30°C, and weighing 2.73 kg. The product features a digitally dimmable electronic ballast (DALI) or on/off driver, replaceable per Ecodesign requirements (EU 2019/2020), output ripple⩽ 10%, CE marked, and ENEC certified.

The Valineo IP AR product family comprises a range of product variants with different characteristics, as listed in table 1. These products have the characteristics described in PSR-0014-ed2.0-EN-2023-07-13 and belong to a homogeneous environmental family. The reference product is the Valineo IP AR M73 PW19 38-50/4ML-9MC DD and the most important information is summarized in table 2.

Table 1: Products Included in the Valineo IP AR Family

Product variant	TK	TOC	EAN
Valineo IP AR M73 PW19 38-50/4ML-9MC ET	6001076840	10450073	4069072136648
Valineo IP AR M73 PW19 38-50/4ML-9MC DD	6001076651	10450071	4069072136624
Valineo IP AR M46 PW19 38-50/4ML-9MC ET	6001076740	10450072	4069072136631
Valineo IP AR M46 PW19 38-50/4ML-9MC DD	6001076551	10450070	4069072136617

1. GENERAL INFORMATION

Table 2: Key technological data

Information	Unit	
Light source	-	Internal LED module
Control gear	-	External
Color temperature	K	4000&3000
Protection index for water and dust (IP)	-	IP65
Impact resistance index (IK)	-	IK03
Nominal operating voltage	V	220-240
Declared lifetime of the luminaire	Hours	100,000
Declaration lifetime of the light source	Hours	100,000
Outgoing luminous flux/Useful output flux	Lumen	3800/4200/4600/5000 @4000K 3540/3900/4280/4650 @3000K
Electrical input power	W	27/30/33/36
Luminous efficiency	Lumen/W	140 @4000K 130 @3000K
Reference use scenario	-	Residential building, Office, Educational institutions, Hospital, Hotel, Catering, Sports establishments, Retail (wholesale and retail services), Industry (manufacturing plants)
Lifetime in years according to reference use scenario	yr	20

1.2 Goal and Scope

Following information has been used to generate the PEP:

Table 3: 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*	0.070 pieces of product
Life cycle stages covered	Cradle-to-grave and Module D
Product category according to PSR	Luminaires
Product family name	Valineo IP AR
Product name	Valineo IP AR M73 PW19 38-50/4ML-9MC DD

*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 Valineo IP AR corresponds to: (1,000/5,000) x (35,000/100,000) = 0.070

2. CONSTITUENT MATERIALS

2.1 Overview

The product composition is shown in the following table.

Table 4: Product composition

	Weight [in kg]	Share [in %]
Total Weight	4.006	100.00
Product	2.747	68.57
Packaging	1.259	31.43

2.2 Product

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

Table 5: Material composition – product

		Weight [in kg]	Share [in %]
Total weight		2.747	100.00
Metals		1.138	41.43
	Aluminium	0.251	9.12
	Steel	0.844	30.71
	Stainless Steel	0.029	1.06
	Copper	0.015	0.53
	Other non-ferrous metals	0.000	0.00
Plastics		1.417	51.58
	Acrylonitrile butadiene styrene (ABS)	0.000	0.00
	Poly Vinyl Chloride (PVC)	0.019	0.68
	Polyamide (PA)	0.034	1.22
	Ethylene Propylene Diene Monomer (EPDM)	0.010	0.35
	Polycarbonate/Polybutylene terephthalate (PC/PBT) blend	0.000	0.00
	Polycarbonate (PC)	1.159	42.19
	Polycarbonate/Acrylonitrile butadiene styrene (PC/ABS) blend	0.000	0.00
	Polymethyl Methacrylate (PMMA)	0.077	2.79
	Polyurethane (PU)	0.000	0.00
	Silicone	0.039	1.41
	Polyethylene (PE)	0.000	0.00
	Polyethylene terephthalate (PET)	0.061	2.22
	Polypropylene (PP)	0.000	0.00
	Polystyrene (PS)	0.000	0.00
	Other plastics or plastics containing additives / fillers	0.020	0.72
Other		0.192	6.99
	Electronics	0.192	6.99
	Batteries	0.000	0.00
	Glass	0.000	0.00
	Paint	0.000	0.00
	Graphite	0.000	0.00

2. CONSTITUENT MATERIALS

2.3 Packaging

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

Table 6: Material composition – packaging

	Weight [in kg]	Share [in %]
Total weight	1.259	100.00
Paper/Cardboard	1.028	81.66
Plastic	0.000	0.00
Wood	0.231	18.34

3. INFORMATION ON LIFE CYCLE STAGES



3.1 Manufacturing stage (A1-A3)

The manufacturer sources all parts from suppliers. Within the manufacturing site in China, the manufacturer produced Printed Circuit Board Assembly through surface mounting and hole-through mounting process from the Printed Circuit Board using energy and auxiliaries. Then the product was assembled and tested using energy. Afterwards the product is packed in packaging materials and distributed to the client.



3.2 Distribution stage (A4)

The main market for the product is Europe and there is no specific data available. For this reason, an International transport from China to the arrival of the product at the place of use following PEP-PCR-ed4-EN-2021 09 06 is considered in the model: Ship: 19,000 km and Lorry: 1,000 km



3.3 Installation stage (A5)

The product can easily be installed without any special tool. No energy or material input is required. The End-of-life scenario of packaging materials was used according to PSR-0014-ed2.0-EN-2023 07 13. The transport of packaging materials was modelled in accordance with PSR-0014-ed2.0-EN-2023 07 13, assuming a transport distance of 100 km by lorry.



3.4 Use stage (B1-B7)

The product has no direct emissions and no maintenance is required. Since the assigned lifetime of the integrated LED module is 100,000 hours, which is the same as that of Valineo IP AR, no replacement of the light source is required during reference service life. Furthermore, no standard repairs or refurbishments are foreseen. The use of the product does consume electricity, but no water.

The main market for the product is Europe, and the distribution ratio of country/region is listed in the table below:

Table 7: The LCI dataset used in the use stage

Country/Region	Share (%)	Energy model
Poland	78	market for electricity, low voltage | electricity, low voltage | Cutoff, S - PL
Rest countries in EU	1	market group for electricity, low voltage | electricity, low voltage | Cutoff, S - RER
Romania	6	market for electricity, low voltage | electricity, low voltage | Cutoff, S - RO
Slovakia	9	market for electricity, low voltage | electricity, low voltage | Cutoff, S - SK
Lithuania	4	market for electricity, low voltage | electricity, low voltage | Cutoff, S - LT
Croatia	2	market for electricity, low voltage | electricity, low voltage | Cutoff, S - HR

3. INFORMATION ON LIFE CYCLE STAGES

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

There is no specific data available to calculate the shipment of the product from the installation site to the approved treatment centers. The default distance is 1000 km by lorry was used according to PEP-PCR-ed4-EN-2021 09 06. The product can easily be deinstalled without any special tool. No energy or material input is required. There is no energy LCI dataset used in this stage.

The product and its PCB fall under the Waste from Electrical and Electronic Equipment (WEEE) directive 2012/19/EU. The valuable fractions (Aluminium, Steel and Plastics, etc.) are recycling within the default recycling recovering rate established in EN 50693. The remaining parts, based on mass balance, are sent to sanitary landfill.

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

The reuse/recycling of the product (incl. packaging) and incineration with energy recovery generates environmental benefits by avoiding the production of primary materials or energy. The scope of the Module D is With Net Benefits and the net benefits and loads beyond the system boundaries are calculated using the formulas described in PEP-PCR-ed4-EN-2021 09 06. The amount and type of material flows used for the calculation of benefits are listed in Table 8.

Table 8: Material flows for reuse, recycling and/or recovery per unit of product (declared unit, 5,000 lumens during 100,000 hours)

Information	Unit	Value
Total weight of product going into reuse	kg	0.000
Total weight of product going into recycling	kg	0.883
Share of metals	%	100.00
Share of plastics	%	0.00
Share of others	%	0.00
Total weight of product going into incineration with energy recovery	kg	0.708
Share of metals	%	0.00
Share of plastics	%	100.00
Share of others	%	0.00
Total weight of packaging going into reuse	kg	0.231
Total weight of packaging going into recycling	kg	0.843
Share of Paper/board	%	100.00
Share of Plastics	%	0.00
Total weight of packaging going into incineration with energy recovery	kg	0.093
Share of Paper/board	%	100.00
Share of Plastics	%	0.00

4. ENVIRONMENTAL INFORMATION

The Valineo IP AR evaluated in this PEP are in lined with EN 60598-1.

The primary data collected were representative of a current scenario in terms of geographical coverage and technological, of which coverage averaged 6 months. The environmental information included in this study covers all stages of the life cycle (cradle to grave and Module D: A1-A5, B1-B7, C1-C4 and D). The life cycle is divided into the manufacturing stage (A1-A3), distribution stage (A4), installation stage (A5), use stage (B1-B7, where only module B6 has a non-zero contribution; modules B1, B2, B3, B4, B5 and B7 are equal to 0 and are therefore not reflected in Tables 9 to 12), end-of-life stage (C1-C4), and benefits and loads beyond the system boundaries (Module 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.

The environmental impacts assessment of the reference product has been performed using openLCA 2.5.0 software. Background datasets have been retrieved from Ecoinvent 3.12 database. 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.

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; EP=Eutrophication; POCP=Photochemical ozone formation; ADPE=Depletion of abiotic resources-minerals and metals; ADPF=Depletion of abiotic resources-fossil fuels; WDP=Water resource depletion; 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

4. ENVIRONMENTAL INFORMATION

Table 9: Results core environmental impact indicators per functional unit

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
GWP - total	kg CO_2 eq.	1.06E+02	2.10E+00	2.73E-02	3.61E-02	8.15E-02	1.80E-01
GWP - fossil	kg CO_2 eq.	1.06E+02	2.26E+00	2.73E-02	1.75E-02	8.14E-02	6.94E-03
GWP - biogenic	kg CO_2 eq.	8.64E-02	-1.57E-01	6.73E-06	1.86E-02	1.85E-05	1.73E-01
GWP - luluc	kg CO_2 eq.	5.91E-02	3.88E-03	1.20E-05	8.88E-06	4.64E-05	8.84E-06
ODP	kg CFC-11 eq.	7.69E-07	2.43E-07	3.75E-10	6.75E-11	1.22E-09	1.02E-10
AP	Mole of H+ eq.	7.56E-01	1.63E-02	9.31E-05	1.02E-04	1.00E-03	3.69E-05
EP - freshwater	kg P eq.	1.22E-01	1.52E-03	2.99E-06	3.63E-06	5.50E-06	8.58E-07
EP - marine	kg N eq.	9.99E-02	2.48E-03	3.03E-05	2.21E-05	4.00E-04	1.62E-05
EP- terrestrial	Mole of N eq.	8.51E-01	2.68E-02	3.27E-04	2.32E-04	4.43E-03	1.48E-04
POCP	kg NMVOC eq.	2.51E-01	9.18E-03	1.29E-04	6.34E-05	1.24E-03	5.56E-05
ADPE	kg Sb eq.	7.80E-04	2.16E-04	9.03E-08	8.25E-08	1.70E-07	2.58E-08
ADPF	MJ	1.27E+03	3.10E+01	3.77E-01	1.84E-01	1.07E+00	8.65E-02
WDP	m^3 world equiv.	3.30E+01	7.35E-01	2.16E-03	2.40E-03	4.83E-03	-1.30E-04

Impact category	Unit	Use	End of life				Benefits*
		B6	C1	C2	C3	C4	D
GWP - total	kg CO_2 eq.	1.04E+02	0.00E+00	1.96E-02	1.56E-01	4.77E-03	-3.77E-01
GWP - fossil	kg CO_2 eq.	1.03E+02	0.00E+00	1.96E-02	1.56E-01	4.77E-03	-3.74E-01
GWP - biogenic	kg CO_2 eq.	5.23E-02	0.00E+00	4.59E-06	1.64E-05	1.61E-06	-1.82E-03
GWP - luluc	kg CO_2 eq.	5.51E-02	0.00E+00	7.12E-06	5.81E-06	4.41E-07	-1.12E-03
ODP	kg CFC-11 eq.	5.24E-07	0.00E+00	4.62E-10	1.06E-10	2.04E-11	-5.43E-09
AP	Mole of H+ eq.	7.38E-01	0.00E+00	4.61E-05	6.78E-05	5.24E-06	-2.22E-03
EP - freshwater	kg P eq.	1.21E-01	0.00E+00	1.45E-06	3.03E-06	7.54E-08	-2.62E-04
EP - marine	kg N eq.	9.68E-02	0.00E+00	1.28E-05	3.00E-05	1.01E-04	-4.24E-04
EP- terrestrial	Mole of N eq.	8.19E-01	0.00E+00	1.38E-04	2.71E-04	2.20E-05	-4.08E-03
POCP	kg NMVOC eq.	2.40E-01	0.00E+00	8.16E-05	7.08E-05	8.77E-06	-1.23E-03
ADPE	kg Sb eq.	5.63E-04	0.00E+00	5.76E-08	1.66E-07	1.32E-09	-7.63E-06
ADPF	MJ	1.23E+03	0.00E+00	2.96E-01	7.52E-02	1.69E-02	-5.62E+00
WDP	m^3 world equiv.	3.22E+01	0.00E+00	1.73E-03	4.13E-03	-7.67E-03	-1.79E-01

*Benefits and loads beyond the system boundaries

4. ENVIRONMENTAL INFORMATION

Table 10: Results indicators describing resource use, waste categories, and output flows per functional unit

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
PERE	MJ	1.87E+02	2.73E+00	5.26E-03	2.39E-02	1.17E-02	2.24E-03
PERM	MJ	1.46E+00	1.46E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.88E+02	4.20E+00	5.26E-03	2.39E-02	1.17E-02	2.24E-03
PENRE	MJ	1.26E+03	2.81E+01	3.77E-01	1.84E-01	1.07E+00	8.66E-02
PENRM	MJ	2.86E+00	2.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.27E+03	3.10E+01	3.77E-01	1.84E-01	1.07E+00	8.66E-02
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	m^3	7.66E-01	1.69E-02	4.88E-05	5.55E-05	1.05E-04	-3.52E-06
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	8.74E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.48E-03
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	1.62E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-02
MFR	kg	1.32E-01	0.00E+00	0.00E+00	1.10E-02	0.00E+00	5.90E-02
MER	kg	5.61E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.48E-03
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in product	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in packaging	kg of C	4.41E-02	4.41E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Impact category	Unit	Use	End of life				Benefits*
		B6	C1	C2	C3	C4	D
PERE	MJ	1.84E+02	0.00E+00	4.60E-03	6.98E-03	2.11E-04	-1.90E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.84E+02	0.00E+00	4.60E-03	6.98E-03	2.11E-04	-1.90E+00
PENRE	MJ	1.23E+03	0.00E+00	2.96E-01	7.52E-02	1.69E-02	-5.62E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.23E+03	0.00E+00	2.96E-01	7.52E-02	1.69E-02	-5.62E+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	m^3	7.49E-01	0.00E+00	3.91E-05	9.55E-05	-1.79E-04	-4.15E-03
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.09E-02	0.00E+00
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	6.18E-02	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.96E-02	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in product	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in packaging	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*Benefits and loads beyond the system boundaries

4. ENVIRONMENTAL INFORMATION

4.2 Results per unit of product

The following results of the environmental declaration have been developed by considering one product (outgoing artificial luminous flux of 5,000 lumens over a reference lifetime of 100,000 hours).

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
GWP - total	kg CO_2 eq.	1.52E+03	3.01E+01	3.91E-01	5.16E-01	1.16E+00	2.57E+00
GWP - fossil	kg CO_2 eq.	1.51E+03	3.23E+01	3.90E-01	2.50E-01	1.16E+00	9.92E-02
GWP - biogenic	kg CO_2 eq.	1.23E+00	-2.25E+00	9.61E-05	2.66E-01	2.64E-04	2.47E+00
GWP - luluc	kg CO_2 eq.	8.44E-01	5.55E-02	1.72E-04	1.27E-04	6.63E-04	1.26E-04
ODP	kg CFC-11 eq.	1.10E-05	3.47E-06	5.36E-09	9.64E-10	1.74E-08	1.45E-09
AP	Mole of H+ eq.	1.08E+01	2.33E-01	1.33E-03	1.45E-03	1.43E-02	5.26E-04
EP - freshwater	kg P eq.	1.75E+00	2.17E-02	4.27E-05	5.19E-05	7.86E-05	1.23E-05
EP - marine	kg N eq.	1.43E+00	3.54E-02	4.32E-04	3.16E-04	5.72E-03	2.32E-04
EP- terrestrial	Mole of N eq.	1.22E+01	3.82E-01	4.68E-03	3.31E-03	6.34E-02	2.11E-03
POCP	kg NMVOC eq.	3.59E+00	1.31E-01	1.84E-03	9.05E-04	1.76E-02	7.94E-04
ADPE	kg Sb eq.	1.11E-02	3.09E-03	1.29E-06	1.18E-06	2.43E-06	3.69E-07
ADPF	MJ	1.81E+04	4.42E+02	5.38E+00	2.63E+00	1.53E+01	1.24E+00
WDP	m^3 world equiv.	4.71E+02	1.05E+01	3.09E-02	3.43E-02	6.90E-02	-1.85E-03

Impact category	Unit	Use	End of life				Benefits*
		B6	C1	C2	C3	C4	D
GWP - total	kg CO_2 eq.	1.48E+03	0.00E+00	2.80E-01	2.24E+00	6.82E-02	-5.38E+00
GWP - fossil	kg CO_2 eq.	1.48E+03	0.00E+00	2.80E-01	2.24E+00	6.81E-02	-5.34E+00
GWP - biogenic	kg CO_2 eq.	7.47E-01	0.00E+00	6.55E-05	2.35E-04	2.30E-05	-2.60E-02
GWP - luluc	kg CO_2 eq.	7.87E-01	0.00E+00	1.02E-04	8.30E-05	6.30E-06	-1.60E-02
ODP	kg CFC-11 eq.	7.48E-06	0.00E+00	6.61E-09	1.51E-09	2.92E-10	-7.76E-08
AP	Mole of H+ eq.	1.05E+01	0.00E+00	6.59E-04	9.69E-04	7.49E-05	-3.17E-02
EP - freshwater	kg P eq.	1.73E+00	0.00E+00	2.07E-05	4.33E-05	1.08E-06	-3.75E-03
EP - marine	kg N eq.	1.38E+00	0.00E+00	1.83E-04	4.29E-04	1.44E-03	-6.05E-03
EP- terrestrial	Mole of N eq.	1.17E+01	0.00E+00	1.97E-03	3.87E-03	3.15E-04	-5.82E-02
POCP	kg NMVOC eq.	3.43E+00	0.00E+00	1.17E-03	1.01E-03	1.25E-04	-1.76E-02
ADPE	kg Sb eq.	8.04E-03	0.00E+00	8.23E-07	2.37E-06	1.88E-08	-1.09E-04
ADPF	MJ	1.76E+04	0.00E+00	4.22E+00	1.07E+00	2.41E-01	-8.03E+01
WDP	m^3 world equiv.	4.61E+02	0.00E+00	2.48E-02	5.90E-02	-1.10E-01	-2.55E+00

*Benefits and loads beyond the system boundaries

4. ENVIRONMENTAL INFORMATION

Table 12: Results indicators describing resource use, waste categories, and output flows per unit of product

Impact category	Unit	Total (excl. D)	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
PERE	MJ	2.67E+03	3.90E+01	7.52E-02	3.42E-01	1.67E-01	3.19E-02
PERM	MJ	2.09E+01	2.09E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.69E+03	5.99E+01	7.52E-02	3.42E-01	1.67E-01	3.19E-02
PENRE	MJ	1.80E+04	4.02E+02	5.38E+00	2.63E+00	1.53E+01	1.24E+00
PENRM	MJ	4.08E+01	4.08E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.81E+04	4.42E+02	5.38E+00	2.63E+00	1.53E+01	1.24E+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	m^3	1.09E+01	2.41E-01	6.98E-04	7.93E-04	1.50E-03	-5.03E-05
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.25E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.26E-02
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	2.31E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-01
MFR	kg	1.88E+00	0.00E+00	0.00E+00	1.57E-01	0.00E+00	8.43E-01
MER	kg	8.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.26E-02
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in product	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in packaging	kg of C	6.30E-01	6.30E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Impact category	Unit	Use	End of life				Benefits*
		B6	C1	C2	C3	C4	D
PERE	MJ	2.63E+03	0.00E+00	6.57E-02	9.96E-02	3.01E-03	-2.71E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.63E+03	0.00E+00	6.57E-02	9.96E-02	3.01E-03	-2.71E+01
PENRE	MJ	1.76E+04	0.00E+00	4.22E+00	1.07E+00	2.41E-01	-8.03E+01
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.76E+04	0.00E+00	4.22E+00	1.07E+00	2.41E-01	-8.03E+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	m^3	1.07E+01	0.00E+00	5.58E-04	1.36E-03	-2.55E-03	-5.92E-02
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+00	0.00E+00
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	8.83E-01	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.08E-01	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in product	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in packaging	kg of C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*Benefits and loads beyond the system boundaries

5. EXTRAPOLATION RULE FOR PRODUCT VARIANTS

5.1 Extrapolation coefficients

The extrapolation coefficients included in the PEP have been developed according to the valid PCR & PSR. The extrapolation coefficients at product level (declared unit) are listed in table 13.

Table 13: The extrapolation coefficients at the product level (declared unit)

Product variant	Fabrication stage	Distribution stage	Installation stage	Use stage	End of life stage	Module D
Valineo IP AR M73 PW19 38-50/4ML-9MC DD	1.00	1.00	1.00	1.00	1.00	1.00
Valineo IP AR M73 PW19 38-50/4ML-9MC ET	0.98	0.98	1.00	2.00	0.98	0.98
Valineo IP AR M46 PW19 38-50/4ML-9MC DD	1.00	1.00	0.93	1.00	1.03	1.00
Valineo IP AR M46 PW19 38-50/4ML-9MC ET	0.98	0.98	0.93	2.00	1.00	0.98

Note: The extrapolation at the level of the functional unit needs to take into account according to the following formula:

$$\textbf{Extrapolation coefficients at the product} \times \left(\frac{\textbf{lighting output of reference product (lumens)}}{\textbf{lighting output of concerned product (lumens)}}\right)$$

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