PRODUCT ENVIRONMENTAL PROFILE

PRODUCT ENVIRONMENTAL PROFILE OF LUMINAIRES FOR RECESSED LED LUMINAIRE

Reference product: ValineoG4 M84 PW19 38-50/4ML-840 ETDD

Registration number	TRLX-00004-V01.02-EN	**Drafting rules**	PCR-ed4-EN-2021 09 06
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Verifier accreditation number	VH31	**Information and reference documents**	www.pep-ecopassport.org
Date of issue	12-2023	**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”			

CONTENT OF THE PEP REPORT

1 GENERAL INFORMATION

1.1 Company information

TRILUX - Simplify Your Light stands for the simplest way to intelligent, individual light. For more than 100 years TRILUX has been inspiring its customers with high-quality and individual lighting solutions - because light is our passion. This includes not only innovative luminaires but also perfectly matched lighting solutions for offices, industry, healthcare, education, retail and sports. At TRILUX we know that the perfect luminaire alone is not enough. TRILUX focuses on people and contributes with its solutions to a sustainable, healthy and connected world. Because where there is light, there is life.

1.2 Product information

The name of the product under study is “Recessed LED luminaire”.
Recessed LED luminaire with microprismatic cover. Version M84 (625 mm x 625 mm). Lay-in luminaire for ceilings with exposed grids. The luminaire is also suitable for surface-mounted installation with an accessory ordered separately. The luminaire is also suitable for applications in plasterboard ceilings with an accessory ordered separately. Installation in cut apertures via mounting accessory requires a ceiling material thickness of 18 mm - 40 mm Further information and data regarding luminaire installation and fixing can be found in the installation instructions. Microprismatic cover of PMMA. With narrow-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 ≤ 3000 cd/ 2 for beam angle above 65° all-round. Harmonious light effect due to homogeneously illuminated light emission. Luminaire luminous flux adjustable in 4 steps. Luminaire luminous flux 3800 lm - 5000 lm, connected load 26,00 W - 38,00 W, maximum luminous efficiency of luminaire 146 lm/W. Light colour neutral white, correlated colour temperature (CCT) 4000 K, general colour rendering index (CRI) R a > 80. Mean rated service life L80(t q 25 °C) = 70,000 h. The light source is replaceable according to the ecodesign requirements (VO (EU) 2019/2020). Frame made of aluminium, rear luminaire body made of sheet steel. Surface coated white (RAL 9016). Dimensions (L x W): 620 mm x 620 mm, luminaire height 35 mm. Protection rating on room side IP44. 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. Weight: 2,3 kg. With external operating device, digitally dimmable (DALI) Control gear unit according to DALI-2 standard (EN 62386). Luminaire is switchable and dimmable by means of touch functionality via DALI control terminals (Touch DIM).

The control gear unit is replaceable in accordance with the ecodesign requirements (VO (EU) 2019/2020). Output ripple of the control gear unit ≤ 4 % for effective control of the LED system and for flicker-free light. 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.

Further technical information can be obtained by contacting Heidestraße, D-59759 Arnsberg, Germany or on the website https://www.trilux.com or by E-Mail s.ke@trilux.com.

Technical Data

The evaluated product family includes a range of different product characteristics. These have all the characteristics described in PSR-0014-ed2.0-EN-2023 07 13 as belonging to a homogeneous environmental family. The evaluated product family can be divided into ET (switchable) and ETDD (dimmable) series. The categorization is based on the presence (ETDD) or absence (ET) of energy saving functions. The ETDD series can be connected via DALI and energy saving coefficients are equal to 0.5 according to table 5 in PSR-0014-ed2.0-EN-2023 07 13. For the ET series, there are no energy saving functions and energy saving coefficients are equal to 1. This family includes the following products in the following table:

Table 1: The energy saving functions among Recessed LED luminaire

TK	TOC	Description	Energy saving functions	Energy saving coefficient
10315274	8423140	ValineoG4 M73 PW19 38-50/4ML-830 ET	/	1
10315275	8423151	ValineoG4 M73 PW19 38-50/4ML-830 ETDD	DALI	0.5
10315276	8423240	ValineoG4 M73 PW19 38-50/4ML-840 ET	/	1
10315277	8423251	ValineoG4 M73 PW19 38-50/4ML-840 ETDD	DALI	0.5
10315283	8423862	ValineoG4 Act M73 PW19 42-8 ETDD8	DALI	0.5
10315270	8422940	ValineoG4 M84 PW19 38-50/4ML-830 ET	/	1
10315271	8422951	ValineoG4 M84 PW19 38-50/4ML-830 ETDD	DALI	0.5
10315272	8423040	ValineoG4 M84 PW19 38-50/4ML-840 ET	/	1
10315273	8423051	ValineoG4 M84 PW19 38-50/4ML-840 ETDD	DALI	0.5
10315282	8423762	ValineoG4 Act M84 PW19 42-8 ETDD8	DALI	0.5
10315284	8423962	ValineoG4 Act M73 PW19 42-8 ETDD8 X1	DALI	0.5
10315278	8423340	ValineoG4 M73 PW19 38-50/4ML-830 ET X2	/	1
10315279	8423451	ValineoG4 M73 PW19 38-50/4ML-830 ETDD X1	DALI	0.5
10315280	8423540	ValineoG4 M73 PW19 38-50/4ML-840 ET X2	/	1
10315281	8423651	ValineoG4 M73 PW19 38-50/4ML-840 ETDD X1	DALI	0.5

The reference product is the ValineoG4 M84 PW19 38-50/4ML-840 ETDD. The most important information is summarized in the following table:

Table 2: Key technological data

Information	Unit	Description
Light source	-	Integrated LED module
Control gear	-	External
Color temperature	K	4000
Protection index for water and dust (IP)	-	IP20/IP44 (roomside)
Impact resistance index (IK)	-	IK03
Nominal operating voltage	V	220-240
Declared lifetime of the luminaire	Hours	70000
Declaration lifetime of the light source	Hours	70000
Outgoing luminous flux/Useful output flux	Lumen	3800-5000
Electrical input power	W	26-38
Luminous efficiency	Lumen/W	Up to 146
Dimension	mm	620 x 620 x 35

For the Recessed LED luminaire with an assigned lifetime of 70000 hours that can be installed in indoor applications, the Recessed LED luminaire has the following annual service time.

Table 3: Recessed LED luminaire annual operating times according to the type of building

Type of building	Annual operating hours by default	Operational lifetime (years)
Residential building	3500	20
Office	2500	28
Educational institutions	2500	28
Hospital	5000	14
Catering	2500	28
Sports establishments	4000	17.5

Following the requirements of the PSR, the operational lifetime of Recessed LED luminaire is 14 years.

1.3 Functional unit

The functional unit of RECESSED LED LUMINAIRE is defined as “Provide lighting that delivers an outgoing artificial luminous flux of 1000 lumens during a reference lifetime of 35000 hours”.

The reference flow is the amount of products needed to provide the defined function. All other input and output flows in the analysis quantitatively relate to it. The reference flow of RECESSED LED LUMINAIRE corresponding to the functional unit shall take into account the value of the outgoing artificial luminous flux as well as the rated lifetime of the luminaire. According to test report, the outgoing artificial luminous flux of the RECESSED LED LUMINAIRE is 5000 Lumen. The assigned lifetime of the RECESSED LED LUMINAIRE is 70000 Hours, which estimated by the test report.

The reference flow is calculated as: (1000/outgoing luminous flux of the analyzed product in lumens) x (35000/declared product lifetime of the analyzed product in hours). Consequently, the reference flow of the RECESSED LED LUMINAIRE corresponds to:

(1000/5000) x (35000/70000) = 0.1

1.4 Homogeneous environmental family

The present PEP declaration is valid for all the products in the described homogenous environmental family. The parameters used to calculate the coefficients according to the rules of extrapolation required in PSR-0014-ed2.0-EN-2023 07 13 are listed in Table 14 and the range of variations for the products in the same family are listed in Table 4.

Table 4: The range of variations for the products in the same family

Parameter	Value for the reference product	Minimum value in product range	Maximum value in product range
Power (W)	26-38	32	26-38
Lumen (lm)	3800-5000	4200	3800-5000
Weight of luminaire (kg)	2.327	2.224	2.553
Weight of packaging (kg)	0.960	0.949	1.025
Theoretical coefficient of energy saving	0.5	0.5	1

2.1 Overview

Table 5: Product composition

Information	Weight [in kg]	Share [in %]
Product	2.327	70.80
Packaging	0.960	29.20

2.2 Product

Table 6: Material composition – Product

Information	Weight [in kg]	Share [in %]
Metals	1.300	55.86
Plastics	0.812	34.91
Others	0.215	9.23

2.3 Packaging

Table 7: Material composition – Packaging

Information	Weight [in kg]	Share [in %]
Paper/board	0.792	82.52
Plywood	0.160	16.71
Plastics	0.007	0.77

3.1 Manufacturing

The manufacturer sources all parts from suppliers. Within the manufacturing site in China, the product was assembled and tested using energy and auxiliaries. Afterwards the product is packed in packaging materials and distributed to the client.

3.2 Distribution

The main market of the product is Europe and there is no specific data are available. For this reason, an Intercontinental 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
Lorry: 1000 km

3.3 Installation

During installation, product testing takes 0.1 hours and consumes 0.0038 kWh electricity.
There is no material input is required to installation. 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 following PSR-0014-ed2.0-EN-2023 07 13:
Lorry: 100 km

3.4 Use stage

The product has no direct emissions and no maintenance is required. Due to the assigned life time of integrated LED module is 70000 Hours, which is the same as RECESSED LED LUMINAIRE, there is no light sources need to be replaced. Furthermore, no standard repairs or refurbishments are foreseen. The use of the product does consume electricity, but no water.
The Recessed LED luminaire of ValineoG4 M84 PW19 38-50/4ML-840 ETDD can be connected via DALI which has light management function according to PSR-0014-ed2.0-EN-2023 07 13. The energy saving coefficients according to table 5 in PSR-0014-ed2.0-EN-2023 07 13 be applied.

The market of the product is Europe, and the distribution ratio of country/region is the following:

Country/Region	Share (%)	Energy model
Germany	71	Electricity, low voltage {DE}| market for electricity, low voltage | Cut-off, S
France	7	Electricity, low voltage {FR}| market for electricity, low voltage | Cut-off, S
Netherland	5	Electricity, low voltage {NL}| market for electricity, low voltage | Cut-off, S
Qatar	5	Electricity, low voltage {QA}| market for electricity, low voltage | Cut-off, S
Great Britain	2	Electricity, low voltage {GB}| market for electricity, low voltage | Cut-off, S
Other countries in EU	10	Electricity, low voltage {RER}| market group for | Cut-off, S

3.5 End of life

There is no specific data are available to calculate the shipment of 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 and its PCB falls 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

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, 5000 lumens during 70000 hours)

Information	Unit	Value
Total weight of product going into reuse	kg	0.000
Total weight of product going into recycling	kg	1.137
Share of metals	%	92.11
Share of plastics	%	4.69
Share of others	%	3.20
Total weight of product going into incineration with energy recovery	kg	0.329
Share of metals	%	0.0
Share of plastics	%	100.0
Share of others	%	0.0
Total weight of packaging going into reuse	kg	0.160
Total weight of packaging going into recycling	kg	0.653
Share of Paper/board	%	99.53
Share of Plastics	%	0.47
Total weight of packaging going into incineration with energy recovery	kg	0.074
Share of Paper/board	%	96.29
Share of Plastics	%	3.71

4.1 Introduction

The Recessed LED luminaire 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, which coverage averaged 2 months. The environmental information included in this study cover all the stages of the life cycle ("cradle to grave"). The life cycle be divided into manufacturing stage (A1-A3), distribution stage (A4), installation stage (A5), use stage (B1-B7, the value of B1-B7 except B6 are 0 and not reflected in the table 9 and table 11), End-of-life stage (C1-C4) and benefits and loads beyond the system boundaries stage (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 Simapro 9.5 software. Background datasets have been retrieved from Ecoinvent 3.9.1. 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.

4.2 Results per functional unit

The following results of the environmental declaration have been developed by considering an outgoing artificial luminous flux of 1000 lumens over a reference lifetime of 35000 hours.

Table 9: Results core environmental impact indicators per functional unit

Impact category	Unit	Total	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
GWP-total	kg CO_2 eq	5.95E+01	2.68E+00	3.84E-02	1.54E-02	1.00E-01	2.08E-02
ODP	kg CFC11 eq	1.64E-06	7.80E-07	5.94E-10	3.23E-11	1.53E-09	9.85E-11
POCP	kg NMVOC eq	1.15E-01	1.08E-02	2.22E-04	5.06E-05	1.62E-03	4.87E-05
AP	mol H+ eq	1.90E-01	1.61E-02	1.65E-04	8.21E-05	2.04E-03	3.19E-05
EP-freshwater	kg P eq	6.77E-02	1.54E-03	3.05E-06	2.97E-06	4.91E-06	9.45E-07
EP-marine	kg N eq	4.41E-02	2.87E-03	6.05E-05	1.69E-05	5.27E-04	2.57E-05
EP-terrestrial	mol N eq	3.65E-01	2.85E-02	6.47E-04	1.80E-04	5.81E-03	1.23E-04
WDP	m^3 depriv.	5.93E+00	4.34E-01	2.38E-03	1.73E-03	4.39E-03	5.50E-04
ADPF	MJ	1.00E+03	3.19E+01	5.31E-01	1.45E-01	1.28E+00	8.28E-02
ADPE	kg Sb eq	9.12E-04	2.43E-04	1.21E-07	6.08E-08	1.55E-07	2.71E-08
GWP-fossil	kg CO_2 eq	5.86E+01	2.64E+00	3.84E-02	1.54E-02	9.99E-02	7.02E-03
GWP-biogenic	kg CO_2 eq	8.30E-01	3.27E-02	1.24E-05	3.09E-06	2.63E-05	1.38E-02
GWP-lulut	kg CO_2 eq	8.85E-02	4.85E-03	1.97E-05	6.08E-06	6.67E-05	3.12E-06

Impact category	Unit	Use	End of life				Benefits and loads beyond the system boundaries stage
		B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	5.63E+01	7.40E-02	2.47E-02	2.03E-01	6.52E-02	-8.25E-01
ODP	kg CFC11 eq	8.54E-07	1.27E-10	5.28E-10	4.09E-09	3.04E-11	-8.43E-08
POCP	kg NMVOC eq	1.01E-01	6.09E-05	1.51E-04	8.69E-04	3.16E-05	-2.82E-03
AP	mol H+ eq	1.69E-01	8.16E-05	9.97E-05	2.32E-03	1.47E-05	-4.34E-03
EP-freshwater	kg P eq	6.59E-02	6.05E-06	1.72E-06	2.05E-04	1.36E-06	-5.84E-04
EP-marine	kg N eq	4.01E-02	2.34E-05	3.78E-05	2.45E-04	1.53E-04	-8.56E-04
EP-terrestrial	mol N eq	3.27E-01	2.22E-04	4.03E-04	2.54E-03	4.16E-05	-8.23E-03
WDP	m^3 depriv.	5.43E+00	3.14E-03	1.71E-03	4.84E-02	1.03E-03	-1.61E-01
ADPF	MJ	9.63E+02	1.65E-01	3.53E-01	2.73E+00	2.94E-02	-9.37E+00
ADPE	kg Sb eq	6.46E-04	1.06E-07	6.52E-08	2.18E-05	5.37E-09	-2.30E-05
GWP-fossil	kg CO_2 eq	5.55E+01	7.39E-02	2.46E-02	1.95E-01	5.27E-03	-8.14E-01
GWP-biogenic	kg CO_2 eq	7.16E-01	3.68E-05	8.90E-06	6.83E-03	6.00E-02	-8.80E-03
GWP-lulut	kg CO_2 eq	8.32E-02	2.58E-05	1.15E-05	2.31E-04	1.88E-06	-1.55E-03

Acronyms: GWP-total=Global Warming Potential total; GWP-biogenic=Global Warming Potential biogenic; GWP-fossil=Global Warming Potential fossil; GWP-lulut=Global Warming Potential land use and land use transformation; 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 resource deprivation.

Table 10: Results of mandatory indicators per functional unit

Indicators	Unit	Value
Renewable primary energy (without raw material)	MJ	2.27E+02
Renewable primary energy (raw material)	MJ	2.11E+00
Total use of renewable primary energy	MJ	2.29E+02
Non-renewable primary energy (without raw material)	MJ	9.97E+02
Non-renewable primary energy (raw material)	MJ	2.65E+00
Total use of non-renewable primary energy	MJ	1.00E+03
Use of secondary materials	kg	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00
Net use of fresh water	m^3	4.79E-01
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	9.34E-02
Radioactive waste disposed	kg	0.00E+00
Components for reuse	kg	1.60E-02
Materials for recycling	kg	1.79E-01
Materials for energy recovery	kg	4.03E-02
Exported energy	MJ	0.00E+00
Biogenic carbon content of the product	kg of C	0.00E+00
Biogenic carbon content of the associated packaging	kg of C	4.76E-02

4.3 Results per unit of product

The following results of the environmental declaration have been developed by considering one product (outgoing artificial luminous flux of 5000 lumens over a reference lifetime of 70000 hours).

Table 11: Results core environmental impact indicators per unit of product (declared unit, 5000 lumens during 70000 hours)

Impact category	Unit	Total	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
GWP-total	kg CO_2 eq	5.95E+02	2.68E+01	3.84E-01	1.54E-01	1.00E+00	2.08E-01
ODP	kg CFC11 eq	1.64E-05	7.80E-06	5.94E-09	3.23E-10	1.53E-08	9.85E-10
POCP	kg NMVOC eq	1.15E+00	1.08E-01	2.22E-03	5.06E-04	1.62E-02	4.87E-04
AP	mol H+ eq	1.90E+00	1.61E-01	1.65E-03	8.21E-04	2.04E-02	3.19E-04
EP-freshwater	kg P eq	6.77E-01	1.54E-02	3.05E-05	2.97E-05	4.91E-05	9.45E-06
EP-marine	kg N eq	4.41E-01	2.87E-02	6.05E-04	1.69E-04	5.27E-03	2.57E-04
EP-terrestrial	mol N eq	3.65E+00	2.85E-01	6.47E-03	1.80E-03	5.81E-02	1.23E-03
WDP	m^3 depriv.	5.93E+01	4.34E+00	2.38E-02	1.73E-02	4.39E-02	5.50E-03
ADPF	MJ	1.00E+04	3.19E+02	5.31E+00	1.45E+00	1.28E+01	8.28E-01
ADPE	kg Sb eq	9.12E-03	2.43E-03	1.21E-06	6.08E-07	1.55E-06	2.71E-07
GWP-fossil	kg CO_2 eq	5.86E+02	2.64E+01	3.84E-01	1.54E-01	9.99E-01	7.02E-02
GWP-biogenic	kg CO_2 eq	8.30E+00	3.27E-01	1.24E-04	3.09E-05	2.63E-04	1.38E-01
GWP-lulut	kg CO_2 eq	8.85E-01	4.85E-02	1.97E-04	6.08E-05	6.67E-04	3.12E-05

Impact category	Unit	Use	End of life				Benefits and loads beyond the system boundaries stage
		B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	5.63E+02	7.40E-01	2.47E-01	2.03E+00	6.52E-01	-8.25E+00
ODP	kg CFC11 eq	8.54E-06	1.27E-09	5.28E-09	4.09E-08	3.04E-10	-8.43E-07
POCP	kg NMVOC eq	1.01E+00	6.09E-04	1.51E-03	8.69E-03	3.16E-04	-2.82E-02
AP	mol H+ eq	1.69E+00	8.16E-04	9.97E-04	2.32E-02	1.47E-04	-4.34E-02
EP-freshwater	kg P eq	6.59E-01	6.05E-05	1.72E-05	2.05E-03	1.36E-05	-5.84E-03
EP-marine	kg N eq	4.01E-01	2.34E-04	3.78E-04	2.45E-03	1.53E-03	-8.56E-03
EP-terrestrial	mol N eq	3.27E+00	2.22E-03	4.03E-03	2.54E-02	4.16E-04	-8.23E-02
WDP	m^3 depriv.	5.43E+01	3.14E-02	1.71E-02	4.84E-01	1.03E-02	-1.61E+00
ADPF	MJ	9.63E+03	1.65E+00	3.53E+00	2.73E+01	2.94E-01	-9.37E+01
ADPE	kg Sb eq	6.46E-03	1.06E-06	6.52E-07	2.18E-04	5.37E-08	-2.30E-04
GWP-fossil	kg CO_2 eq	5.55E+02	7.39E-01	2.46E-01	1.95E+00	5.27E-02	-8.14E+00
GWP-biogenic	kg CO_2 eq	7.16E+00	3.68E-04	8.90E-05	6.83E-02	6.00E-01	-8.80E-02
GWP-lulut	kg CO_2 eq	8.32E-01	2.58E-04	1.15E-04	2.31E-03	1.88E-05	-1.55E-02

Acronyms: GWP-total=Global Warming Potential total; GWP-biogenic=Global Warming Potential biogenic; GWP-fossil=Global Warming Potential fossil; GWP-lulut=Global Warming Potential land use and land use transformation; 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 resource deprivation.

Table 12: Results of mandatory indicators per unit of product (declared unit, 5000 lumens during 70000 hours)

Indicators	Unit	Value
Renewable primary energy (without raw material)	MJ	2.27E+03
Renewable primary energy (raw material)	MJ	2.11E+01
Total use of renewable primary energy	MJ	2.29E+03
Non-renewable primary energy (without raw material)	MJ	9.97E+03
Non-renewable primary energy (raw material)	MJ	2.65E+01
Total use of non-renewable primary energy	MJ	1.00E+04
Use of secondary materials	kg	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00
Net use of fresh water	m^3	4.79E+00
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	9.34E-01
Radioactive waste disposed	kg	0.00E+00
Components for reuse	kg	1.60E-01
Materials for recycling	kg	1.79E+00
Materials for energy recovery	kg	4.03E-01
Exported energy	MJ	0.00E+00
Biogenic carbon content of the product	kg of C	0.00E+00
Biogenic carbon content of the associated packaging	kg of C	4.76E-01

5 Extrapolation coefficients to a homogeneous environmental family

The extrapolation coefficients at product level (declared unit) are listed in table 13 and the parameters of homogeneous environmental family was used in rules of extrapolation are listed in table 14.

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

Product name	Manufacturing stage	Distribution stage	Installation stage	Use stage	End of life stage	Module D
ValineoG4 M84 PW19 38-50/4ML-840 ETDD	1.000	1.000	1.000	1.000	1.000	1.000
ValineoG4 M73 PW19 38-50/4ML-830 ET	0.967	0.965	0.989	2.000	0.955	0.968
ValineoG4 M73 PW19 38-50/4ML-830 ETDD	0.978	0.977	0.989	1.000	0.973	0.978
ValineoG4 M73 PW19 38-50/4ML-840 ET	0.967	0.965	0.989	2.000	0.955	0.968
ValineoG4 M73 PW19 38-50/4ML-840 ETDD	0.978	0.977	0.989	1.000	0.973	0.978
ValineoG4 M84 PW19 38-50/4ML-830 ET	0.990	0.988	1.000	2.000	0.983	0.990
ValineoG4 M84 PW19 38-50/4ML-840 ET	0.990	0.988	1.000	2.000	0.983	0.990
ValineoG4 M84 PW19 38-50/4ML-830 ETDD	1.000	1.000	1.000	1.000	1.000	1.000
ValineoG4 Act M84 PW19 42-8 ETDD8	1.094	1.088	1.067	0.842	1.097	1.095
ValineoG4 Act M73 PW19 42-8 ETDD8	1.070	1.061	1.039	0.842	1.070	1.072
ValineoG4 Act M73 PW19 42-8 ETDD8 X1	1.070	1.061	1.039	0.842	1.070	1.072
ValineoG4 M73 PW19 38-50/4ML-830 ET X2	0.967	0.965	0.989	2.000	0.955	0.968
ValineoG4 M73 PW19 38-50/4ML-830 ETDD X1	0.978	0.977	0.989	1.000	0.973	0.978
ValineoG4 M73 PW19 38-50/4ML-840 ET X2	0.967	0.965	0.989	2.000	0.955	0.968
ValineoG4 M73 PW19 38-50/4ML-840 ETDD X1	0.978	0.977	0.989	1.000	0.973	0.978

Note: The extrapolation coefficients are intended at product level (declared unit) and not at functional unit, and the extrapolation coefficients at functional unit level shall be taken into account with the following formula:

Extrapolation coefficient at the product level x Lighting output of reference product (lumens)/ Lighting output of concerned product (lumens)

Table 14: The parameters of homogeneous environmental family was used in rules of extrapolation

Product name	Power (W)	Lumen (lm)	Weight of product (kg)	Weight of packaging (kg)	Weight of luminaire structure (kg)	Weight of power equipment (kg)	Weight of light source (kg)
ValineoG4 M84 PW19 38-50/4ML-840 ETDD	26–38	3800–5000	2.327	0.960	1.032	0.217	1.078
ValineoG4 M73 PW19 38-50/4ML-830 ET	26–38	3800–5000	2.224	0.949	0.969	0.177	1.078
ValineoG4 M73 PW19 38-50/4ML-830 ETDD	26–38	3800–5000	2.264	0.949	0.969	0.217	1.078
ValineoG4 M73 PW19 38-50/4ML-840 ET	26–38	3800–5000	2.224	0.949	0.969	0.177	1.078
ValineoG4 M73 PW19 38-50/4ML-840 ETDD	26–38	3800–5000	2.264	0.949	0.969	0.217	1.078
ValineoG4 M84 PW19 38-50/4ML-830 ET	26–38	3800–5000	2.287	0.960	1.032	0.177	1.078
ValineoG4 M84 PW19 38-50/4ML-840 ET	26–38	3800–5000	2.287	0.960	1.032	0.177	1.078
ValineoG4 M84 PW19 38-50/4ML-830 ETDD	26–38	3800–5000	2.327	0.960	1.032	0.217	1.078
ValineoG4 Act M84 PW19 42-8 ETDD8	32	4200	2.553	1.025	1.032	0.284	1.237
ValineoG4 Act M73 PW19 42-8 ETDD8	32	4200	2.490	0.998	0.969	0.284	1.237
ValineoG4 Act M73 PW19 42-8 ETDD8 X1	32	4200	2.490	0.998	0.969	0.284	1.237
ValineoG4 M73 PW19 38-50/4ML-830 ET X2	26–38	3800–5000	2.224	0.949	0.969	0.177	1.078
ValineoG4 M73 PW19 38-50/4ML-830 ETDD X1	26–38	3800–5000	2.264	0.949	0.969	0.217	1.078
ValineoG4 M73 PW19 38-50/4ML-840 ET X2	26–38	3800–5000	2.224	0.949	0.969	0.177	1.078
ValineoG4 M73 PW19 38-50/4ML-840 ETDD X1	26–38	3800–5000	2.264	0.949	0.969	0.217	1.078