



Surface-mounted LED ceiling luminaire

ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT ENVIRONMENTAL PROFILE OF SURFACE-MOUNTED LED CEILING LUMINAIRE

Reference product: 2350 G4 D3 PW19 60/40/ML-8MC ET

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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 Company information

TRILUX Simplify Your Light represents the most simple and reliable path to customized, energy-efficient and sustainable lighting solutions. In the dynamic and ever more complex lighting market, customers are provided with optimal advice, ideal orientation and perfect light. To ensure this, TRILUX offers a wide portfolio of technologies as well as high-performance partners within the TRILUX Group, and unites single components to create custom-designed complete solutions – always perfectly matched to customer requirements and specific applications.

In this way, complex and extensive projects are simply and rapidly realized from a single source. According to the principle of "SIMPLIFY YOUR LIGHT", planning, installation and ease of use, besides quality and cost efficiency, is focused on for customers.

1.2 Product information

The name of the product under study is "Surface-mounted LED ceiling luminaire".

The reference product is the 2350 G4 D3 PW19 60/40/ML-8MC ET. Surface-mounted LED ceiling luminaire with translucent PMMA cover. For ceiling mounting indoors. Cover of translucent PMMA with photometrically effective prism structure. With symmetric limited wide light distribution. Glare evaluation according to UGR rating (EN 12464-1) < 19. Luminaire luminous flux adjustable in 2 levels, light color adjustable in 2 levels. Luminaire luminous flux -, connected load -, luminous efficiency of luminaire 130 lm/W. Light color warm white or neutral white, correlated color temperature (CCT) 3000 K or 4000 K, general color rendering index (CRI) $R_a > 80$. Color locus tolerance (initial MacAdam) < 4 SDCM. Mean rated service life $L_{70}(t_{q\ 25\ ^\circ\text{C}}) = 50,000$ h. Luminaire body of aluminum. Surface coated white (RAL 9016). Dimensions (L x W): 1502 mm x 302 mm, luminaire height 50 mm. Safety class (EN 61140): I, protection rating (DIN EN 60529): IP20, impact resistance level in accordance with IEC 62262: IK02, testing temperature of wire glow test in accordance with IEC 60695-2-11: 650 °C.

Weight: 4,7 kg. With electronic control gear unit, switchable. The control gear unit is

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replaceable in accordance with the eco-design 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.

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.

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 switchable (ET) and dimmable (ETDD and ETWD) series. The categorization is based on the presence (ETDD and ETWD) or absence (ET) of energy saving functions. The ETDD series can be connected via DALI and the ETWD series can be connected via Bluetooth. The energy saving coefficients of ETDD and ETWD series 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 table 1. The reference product is the 2350 G4 D3 PW19 60/40/ML-8MC ET and the most important information is summarized in the table 2.

Table 1: The energy saving functions among Surface-mounted LED ceiling luminaire family

Description	Energy saving functions	Energy saving coefficient
2350 G4 D3 PW19 60/40/ML-8MC ET	/	1.0
2350 G4 D PW19 36/29/ML-8MC ET	/	1.0
2350 G4 D2 PW19 40/30/ML-8MC ET	/	1.0
2350 G4 D2 PW19 4000-8MC ETDD	DALI	0.5
2350 G4 D3 PW19 6000-8MC ETDD	DALI	0.5
2350 G4 D2 PW19 4000-8MC ETWD	Bluetooth	0.5
2350 G4 D3 PW19 4400-8MC ETWD	Bluetooth	0.5
2350 G4 D PW19 3600-8MC ETWD	Bluetooth	0.5

Table 2: Key technological data

Information	Unit	
Light source	-	Integrated LED module
Power supply	-	External
Color temperature	K	3000/4000
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	50000
Declaration lifetime of the light source	Hours	50000
Outgoing luminous flux/Useful output flux	Lumen	4000/5500/4300/6000
Electrical input power	W	33/46
Luminous efficiency	Lumen/W	Up to 130
Dimension	mm	1495 x 295 x 15

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For the Surface-mounted LED ceiling luminaire with an assigned lifetime of 50,000 hours that can be installed in indoor applications, the Surface-mounted LED ceiling luminaire has the following annual service time.

Table 3: Surface-mounted LED ceiling luminaire annual operating times according to the type of building

Type of building	Annual operating hours by default	Operational lifetime (years)
Residential building	3500	14.3
Office	2500	20
Educational institutions	2000	25
Hospital	5000	10
Hotel	5000	10
Catering	2500	20
Sports establishments	4000	12.5

Following the requirements of the PSR, the operational lifetime of Surface-mounted LED ceiling luminaire is 10 years.

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1.3 Functional Unit

The functional unit (FU) is the quantified performance of a product system. Surface-mounted LED ceiling luminaire with the characterization of luminaires, according to PSR-0014-ed2.0-EN-2023 07 13, the functional unit of Surface-mounted LED ceiling luminaire is defined as “Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours”.

The reference flow is the amounts 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 LED Panel 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 Surface-mounted LED ceiling luminaire is 6,000 Lumen. The assigned lifetime of the Surface-mounted LED ceiling luminaire is 50,000 Hours, which estimated by the test report.

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 Surface-mounted LED ceiling luminaire corresponds to:

$$(1,000/6,000) \times (35,000/50,000) = 0.117$$

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 showed the extrapolation coefficients at product level based on the technical parameters of Surface-mounted LED ceiling luminaire, and the extrapolation coefficients at functional unit level shall be taken into account with the following formula:

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

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)	33/46	28	49
Lumen (lm)	4000/5500/4300/6000	6000	4000
Weight of luminaire (kg)	4.951	3.408	4.951
Weight of packaging (kg)	1.796	1.431	1.809
Theoretical coefficient of energy saving	1.0	0.5	1.0

2 Constituent materials

2.1 Overview

Table 5: Product composition

Information	Weight [in kg]	Share [in %]
Product	4.950	73.37
Packaging	1.796	26.63

2.2 Product

Table 6: Material composition – Product

Information	Weight [in kg]	Share [in %]
Metal	2.321	46.894
Plastics	2.349	47.451
Others	0.280	5.655

2.3 Packaging

Table 7: Material composition – Packaging

Information	Weight [in kg]	Share [in %]
Paper/board	1.237	68.84
Wooden pallet	0.549	30.59
Plastics	0.010	0.57

3 Information on life cycle stages



3.1 Manufacturing stage

The manufacturer acquires all parts from suppliers. At the manufacturing site located in China, the manufacturer fabricated Printed Circuit Board Assembly through surface mounting and hole-through mounting processes from the Printed Circuit Board by utilizing energy and auxiliaries. Subsequently, the product was assembled and tested with the application of energy. In the end, the product is packaged in packaging materials and distributed to the client.



3.2 Distribution stage

The main market for 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 PCR-ed4-EN-2021 09 06 is considered in the model.

Ship: 19,000 km

Lorry: 1,000 km



3.3 Installation stage

During the installation process, product testing lasts for 0.1 hours and consumes 0.0046 kWh of electricity. No material input is required for installation. The end-of-life scenario of packaging materials was utilized in accordance with PSR-0014-ed2.0-EN-2023 07 13. The transportation of packaging materials follows PSR-0014-ed2.0-EN-2023 07 13.



3.4 Use stage

The product has no direct emissions, and no maintenance is required. Given that the assigned lifetime of integrated LED module is 50,000 Hours, which is the same as Surface-mounted LED ceiling luminaire, no light sources need to be replaced. Furthermore, no standard repairs or refurbishments are anticipated. The use of the product consumes electricity, but no water.

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

Country/Region	Share (%)	Energy model
Germany	75.21	Electricity, low voltage {DE} market for electricity, low voltage Cut-off, S
France	17.84	Electricity, low voltage {FR} market for electricity, low voltage Cut-off, S
Poland	1.01	Electricity, low voltage {PL} market for electricity, low voltage Cut-off, S
Spain	0.94	Electricity, low voltage {ES} market for electricity, low voltage Cut-off, S
Netherland	0.30	Electricity, low voltage {NL} market for electricity, low voltage Cut-off, S
Austria	2.68	Electricity, low voltage {AT} market for electricity, low voltage Cut-off, S
Other countries in EU	1.89	Electricity, low voltage {RER} market group for Cut-off, S
Belgium	0.01	Electricity, low voltage {BE} market for electricity, low voltage Cut-off, S
Switzerland	0.11	Electricity, low voltage {CH} market for electricity, low voltage Cut-off, S

3 Information on life cycle stages



3.5 End-of-life stage

There is no specific data 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 PCR-ed4-EN-2021 09 06. There is no energy LCI dataset was used in this stage, the process of deinstallation used the LCI dataset of mechanical treatment of used industrial electronic device.

The product and its PCB falls under the Waste from Electrical and Electronic Equipment (WEEE) directive 2012/19/EU. The valuable fractions (Aluminum, 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

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 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, 6,000 lumens during 50,000 hours)

Information	Unit	Value
Total weight of product going into reuse	kg	0.000
Total weight of product going into recycling	kg	1.866
Share of metals	%	90.60
Share of plastics	%	6.60
Share of others	%	2.80
Total weight of product going into incineration with energy recovery	kg	1.113
Share of plastics	%	100
Share of others	%	0
Total weight of packaging going into reuse	kg	0.549
Total weight of packaging going into recycling	kg	1.018
Share of Paper/board	%	99.6
Share of Plastics	%	0.04
Total weight of packaging going into incineration with energy recovery	kg	0.015
Share of Paper/board	%	96.7
Share of Plastics	%	3.3

4 Environmental impacts

4.1 Introduction

The Surface-mounted LED ceiling 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 one year. 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 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 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 1,000 lumens over a reference lifetime of 35,000 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	1.10E+02	6.15E+00	8.63E-02	1.64E-01	2.39E-01	3.84E-02
ODP	kg CFC11 eq	1.65E-06	3.24E-07	1.33E-09	3.43E-10	3.66E-09	1.88E-10
POCP	kg NMVOC eq	2.12E-01	2.51E-02	4.99E-04	5.12E-04	3.89E-03	9.22E-05
AP	mol H ⁺ eq	3.75E-01	3.76E-02	3.70E-04	8.74E-04	4.89E-03	6.07E-05
EP-freshwater	kg P eq	1.39E-01	2.47E-03	6.85E-06	3.17E-05	1.18E-05	1.70E-06
EP-marine	kg N eq	8.83E-02	7.14E-03	1.36E-04	1.80E-04	1.26E-03	4.77E-05
EP-terrestrial	mol N eq	7.05E-01	6.53E-02	1.45E-03	1.92E-03	1.39E-02	2.35E-04
WDP	m ³ depriv.	1.14E+01	1.32E+00	5.35E-03	1.84E-02	1.05E-02	1.03E-03
ADPF	MJ	2.10E+03	7.75E+01	1.19E+00	1.55E+00	3.07E+00	1.59E-01
ADPE	kg Sb eq	1.50E-03	2.03E-04	2.71E-07	6.48E-07	3.71E-07	5.05E-08
GWP-fossil	kg CO ₂ eq	1.08E+02	6.07E+00	8.62E-02	1.64E-01	2.39E-01	1.33E-02
GWP-biogenic	kg CO ₂ eq	1.76E+00	6.84E-02	2.79E-05	3.28E-05	6.29E-05	2.51E-02
GWP-lulut	kg CO ₂ eq	1.73E-01	1.12E-02	4.43E-05	6.48E-05	1.60E-04	5.89E-06

4 Environmental impacts

Table 9: Results core environmental impact indicators per functional unit

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	1.02E+02	1.84E-01	6.12E-02	3.99E-01	1.75E-01	-2.68E+00
ODP	kg CFC11 eq	1.31E-06	3.16E-10	1.31E-09	8.04E-09	8.17E-11	-3.86E-08
POCP	kg NMVOC eq	1.80E-01	1.51E-04	3.76E-04	1.71E-03	8.49E-05	-9.12E-03
AP	mol H ⁺ eq	3.26E-01	2.02E-04	2.47E-04	4.56E-03	3.95E-05	-1.47E-02
EP-freshwater	kg P eq	1.36E-01	1.50E-05	4.27E-06	4.03E-04	3.66E-06	-1.61E-03
EP-marine	kg N eq	7.85E-02	5.81E-05	9.38E-05	4.82E-04	4.11E-04	-2.87E-03
EP-terrestrial	mol N eq	6.16E-01	5.51E-04	1.00E-03	5.00E-03	1.12E-04	-2.82E-02
WDP	m ³ depriv.	9.97E+00	7.78E-03	4.25E-03	1.03E-01	2.77E-03	-4.85E-01
ADPF	MJ	2.01E+03	4.11E-01	8.76E-01	5.39E+00	7.89E-02	-3.22E+01
ADPE	kg Sb eq	1.25E-03	2.64E-07	1.62E-07	4.27E-05	1.44E-08	-5.06E-05
GWP-fossil	kg CO ₂ eq	1.01E+02	1.83E-01	6.12E-02	3.85E-01	1.42E-02	-2.64E+00
GWP-biogenic	kg CO ₂ eq	1.50E+00	9.13E-05	2.21E-05	1.34E-02	1.61E-01	-3.30E-02
GWP-lulut	kg CO ₂ eq	1.61E-01	6.41E-05	2.84E-05	4.59E-04	5.04E-06	-5.60E-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	4.72E+02
Renewable primary energy (raw material)	MJ	4.71E+00
Total use of renewable primary energy	MJ	4.77E+02
Non-renewable primary energy (without raw material)	MJ	2.09E+03
Non-renewable primary energy (raw material)	MJ	8.48E+00
Total use of non-renewable primary energy	MJ	2.10E+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	1.03E+00
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	2.43E-01
Radioactive waste disposed	kg	0.00E+00
Components for reuse	kg	6.41E-02
Materials for recycling	kg	3.75E-01

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Table 10: Results of mandatory indicators per functional unit

Indicators	Unit	Value
Materials for energy recovery	kg	1.43E-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	1.04E-01

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 6,000 lumens over a reference lifetime of 50,000 hours).

Table 11: Results core environmental impact indicators per unit of product (declared unit, 6,000 lumens during 50,000 hours)

Impact category	Unit	Total	Manufacturing			Distribution	Installation
			A1	A2	A3	A4	A5
GWP-total	kg CO ₂ eq	9.41E+02	5.27E+01	7.40E-01	1.41E+00	2.05E+00	3.29E-01
ODP	kg CFC11 eq	1.42E-05	2.78E-06	1.14E-08	2.94E-09	3.13E-08	1.61E-09
POCP	kg NMVOC eq	1.82E+00	2.15E-01	4.28E-03	4.39E-03	3.33E-02	7.91E-04
AP	mol H ⁺ eq	3.21E+00	3.22E-01	3.17E-03	7.49E-03	4.19E-02	5.20E-04
EP-freshwater	kg P eq	1.19E+00	2.12E-02	5.87E-05	2.71E-04	1.01E-04	1.46E-05
EP-marine	kg N eq	7.57E-01	6.12E-02	1.16E-03	1.54E-03	1.08E-02	4.09E-04
EP-terrestrial	mol N eq	6.05E+00	5.60E-01	1.25E-02	1.64E-02	1.19E-01	2.02E-03
WDP	m ³ depriv.	9.80E+01	1.13E+01	4.58E-02	1.58E-01	9.01E-02	8.84E-03
ADPF	MJ	1.80E+04	6.64E+02	1.02E+01	1.32E+01	2.63E+01	1.36E+00
ADPE	kg Sb eq	1.28E-02	1.74E-03	2.32E-06	5.55E-06	3.18E-06	4.33E-07
GWP-fossil	kg CO ₂ eq	9.25E+02	5.20E+01	7.39E-01	1.41E+00	2.05E+00	1.14E-01
GWP-biogenic	kg CO ₂ eq	1.51E+01	5.86E-01	2.39E-04	2.81E-04	5.39E-04	2.15E-01
GWP-lulut	kg CO ₂ eq	1.49E+00	9.58E-02	3.80E-04	5.55E-04	1.37E-03	5.05E-05

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Table 11: Results core environmental impact indicators per unit of product (declared unit, 6,000 lumens during 50,000 hours)

Impact category	Unit	Use					Benefits and loads beyond the system boundaries stage
		B6	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	8.77E+02	1.57E+00	5.25E-01	3.42E+00	1.50E+00	-2.29E+01
ODP	kg CFC11 eq	1.13E-05	2.71E-09	1.12E-08	6.89E-08	7.00E-10	-3.31E-07
POCP	kg NMVOC eq	1.54E+00	1.29E-03	3.22E-03	1.46E-02	7.28E-04	-7.81E-02
AP	mol H ⁺ eq	2.80E+00	1.74E-03	2.12E-03	3.91E-02	3.39E-04	-1.26E-01
EP-freshwater	kg P eq	1.16E+00	1.29E-04	3.66E-05	3.45E-03	3.14E-05	-1.38E-02
EP-marine	kg N eq	6.73E-01	4.98E-04	8.04E-04	4.13E-03	3.52E-03	-2.46E-02
EP-terrestrial	mol N eq	5.28E+00	4.73E-03	8.58E-03	4.28E-02	9.59E-04	-2.42E-01
WDP	m ³ depriv.	8.54E+01	6.67E-02	3.64E-02	8.80E-01	2.38E-02	-4.16E+00
ADPF	MJ	1.72E+04	3.52E+00	7.51E+00	4.62E+01	6.77E-01	-2.76E+02
ADPE	kg Sb eq	1.07E-02	2.26E-06	1.39E-06	3.66E-04	1.24E-07	-4.34E-04
GWP-fossil	kg CO ₂ eq	8.63E+02	1.57E+00	5.24E-01	3.30E+00	1.21E-01	-2.26E+01
GWP-biogenic	kg CO ₂ eq	1.28E+01	7.83E-04	1.89E-04	1.15E-01	1.38E+00	-2.83E-01
GWP-lulut	kg CO ₂ eq	1.38E+00	5.50E-04	2.44E-04	3.93E-03	4.32E-05	-4.80E-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, 6,000 lumens during 50,000 hours)

Indicators	Unit	Value
Renewable primary energy (without raw material)	MJ	4.05E+03
Renewable primary energy (raw material)	MJ	4.03E+01
Total use of renewable primary energy	MJ	4.09E+03
Non-renewable primary energy (without raw material)	MJ	1.79E+04
Non-renewable primary energy (raw material)	MJ	7.27E+01
Total use of non-renewable primary energy	MJ	1.80E+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	8.81E+00
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	2.08E+00
Radioactive waste disposed	kg	0.00E+00
Components for reuse	kg	5.49E-01

4 Environmental impacts

Table 12: Results of mandatory indicators per unit of product (declared unit, 6,000 lumens during 50,000 hours)

Indicators	Unit	Value
Materials for recycling	kg	3.21E+00
Materials for energy recovery	kg	1.23E+00
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	8.93E-01

5 Extrapolation coefficients

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
2350 G4 D3 PW19 60/40/ML-8MC ET	1.000	1.000	1.000	1.000	1.000	1.000
2350 G4 D PW19 36/29/ML-8MC ET	0.735	0.728	0.797	0.609	0.703	0.735
2350 G4 D2 PW19 40/30/ML-8MC ET	0.793	0.789	0.840	0.674	0.770	0.793
2350 G4 D2 PW19 4000-8MC ETDD	0.818	0.810	0.840	0.359	0.799	0.818
2350 G4 D3 PW19 6000-8MC ETDD	0.975	0.972	1.007	0.533	0.959	0.975
2350 G4 D2 PW19 4000-8MC ETWD	0.793	0.791	0.840	0.321	0.774	0.793
2350 G4 D3 PW19 4400-8MC ETWD	0.957	0.954	1.007	0.391	0.934	0.957
2350 G4 D PW19 3600-8MC ETWD	0.721	0.717	0.797	0.359	0.688	0.721

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:

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

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 control gear (kg)	Weight of light source (kg)
2350 G4 D3 PW19 60/40/ML-8MC ET	33/46	4000/5500/4300/6000	4.951	1.796	4.550	0.269	0.132
2350 G4 D PW19 36/29/ML-8MC ET	22/28	2700/3350/2900/3600	3.482	1.431	3.155	0.260	0.067
2350 G4 D2 PW19 40/30/ML-8MC ET	22/31	2600/3700/2900/4000	3.813	1.509	3.435	0.269	0.109
2350 G4 D2 PW19 4000-8MC ETDD	33	3700/4000	3.954	1.509	3.525	0.319	0.109
2350 G4 D3 PW19 6000-8MC ETDD	49	5500/6000	4.748	1.809	4.314	0.319	0.115
2350 G4 D2 PW19 4000-8MC ETWD	29.5	3300/3600	3.831	1.509	3.525	0.197	0.109
2350 G4 D3 PW19 4400-8MC ETWD	36	4000/4400	4.626	1.809	4.314	0.197	0.115
2350 G4 D PW19 3600-8MC ETWD	33	3700/4000	3.408	1.431	3.155	0.186	0.067

