PHILIPS

TrueLine

Product declaration

Environmental Product Declaration

TrueLine Recessed

as per ISO 14021, based on ISO 14040/14044

The aesthetically appealing and office-compliant TrueLine is bringing the combination of design and efficiency (up to 140 lm/W with CRI 90) to office spaces. The luminaire offers various benefits such as flexible mounting options, high quality of light and option of delivering both direct and indirect illumination.

TrueLine is also offering the option of getting it connected to various controls as well as software based lighting management systems such as Interact Office. By making the luminaire part of the connected infrastructure, it then becomes an IoT enabled device ready to be used for data collection and other IoT enabled services and innovations that the future brings.

- Best-in-class efficacy up to 140 LPW with CRI>90
- Complies with office lighting norms
- Stand-alone and continuous lines with various lengths - 2Ft, 4Ft, 5Ft, 8Ft & 10Ft.
- Family of Recessed, Surface & Suspended version
- Direct and Indirect light
- 3000K, 4000K, and Tunable White versions available all with CRI>90
- Homogeneous exit window
- Long lifetime L90 at 50,000 hours
- Environmental Product Declaration (EPD)

Product

Product family range

The TrueLine Recessed is a configurator product family, the assembly of the products is implemented on the manufacturing site in Signify Poland Sp. z o.o. in Pila, Poland. Since September 2020, Signify achieved carbon neutrality for all its operations across the world as well as using 100% renewable electricity, including the manufacturing site in Pila.

The EPD does not present the assessment of the impacts of the whole range, and focused on representation through the most probable worst case scenario rather than through average impacts with assessment of deviations. This approach is based on the Signify developed EPD framework.

Representative product

TrueLine Recessed product RC530B LED50S/TW9 SIA W8L145 PCV U4 PI3 is chosen as a representative product for the family as the luminaire with the highest power consumption over the lifetime, with inclusion of an emergency power supply module. Based on multiple LCA studies of the LED based luminaires, it is defined that the use stage (and electricity consumption in particular) tends to contribute the majority of the life-cycle impacts. Thus, a product with the largest power consumption over the lifetime in the family is most likely to have the largest impacts, and thus represent a worst case. That choice of a product aligns with pessimistic assumptions and the precautionary principle in view of the task to represent other products in the family. This approach is based on the Signify developed EPD framework.

Product application

The luminaire is designed for a broad range of indoor application, mainly as a general lighting for mid- and high-end office buildings.

Technical Data

The system comprises a set of modules that are the key building blocks for a luminaire. A typical application has the following technical features:

- 1x Xitanium driver
- 5x SlimTW LED boards
- Mechanical parts made of metal or plastic
- Connectors
- Cables
- Sensors

Delivery status

Product weight: 3,6 kg (including 0,6 kg packaging), dimensions of the packed product: 1513mm*132mm*128mm

Driver:

i.	Type	Xi 75W 0.15-0.7A 220V SR FlexTune 230V
ii.	Failure rate (max % @lifetime)	10%
iii.	Dimensions, mm	360 x 30 x 21

LED board

i.	Type	LBA SlimTW 1ft 3030 23L 24UP 927 965 H21
ii.	Dimension board, mm	279 x 20
iii.	Amount of PCBA per luminaire	5
iv.	Number of LEDs per PCBA	24

Constructional data

Name	Value	Unit
Dimensions	1450x75x76	Mm*mm*mm
Luminous flux	5000	Lm
Luminous efficacy	121	Lm/W
Radiation angle	80	Deg
Colour temperature	Tunnable White	

Base materials/Ancillary materials

Materials	Mass, kg
Metals / Steel Painted	1,589
Plastics / PMMA	0,630
Packaging / Paper	0,594
Metals / Stainless Steel Painted	0,312
Electric Comp's / Electronic ballasts with connectors	0,282
Electric Comp's / LED board (PCBA)	0,060
Electric Comp's / Cables / Silicone	0,040
Metals / Stainless Steel	0,034
Electric Comp's / Sensors	0,015
Plastic / Nylon	0,010
Plastics / PC (Polycarbonate)	0,010
Packaging / Labels , ink, adhesives	0,006
Plastics / PA polyamide	0,006
Electric Comp's / Connectors PA	0,005
Electric Comp's / Connectors	0,005
Plastics / PP	0,002
Product weight (including packaging): 3,600 kg	

Manufacturing

Manufacturing of the product is partially done by Chinese suppliers for the LED boards and by European suppliers (Poland , France, Hungary, Germany, and the Netherlands) for the driver and mechanical parts. Some mechanical parts processing (bending and cutting of reflector and painting of the end caps), as well as the final assembly of the luminaire is performed at the Pila site, Poland.

Product processing/Installation

Product can be recessed in the ceiling, as a standalone or line version.

Packaging

0,6 kg, including cardboard box and instructions.

Condition of use

Designed for Indoor use only, in temperature 10°C to 35°C. Applications may apply dimming or lighting controls to allow further energy saving. The product is used in the European market context and assumed to use the average European electricity mix.

Environment and health during use

The product is compliant with the European RoHS Directive 2011/65/EU of 8 June 2011 on Restriction of the use of certain Hazardous Substances in Electrical and Electronic equipment and with the European REACH regulation (EC) No 1907/2006 of 18 December 2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals.

Reference service life

The RSL is established as 50 000 hours operation, the equivalent of 10 years operation in a retail, or hospitality application (5 000 hours per year), or 20 years operation in a typical office application (2 500 hours per year).

End of life

In the European Union, luminaires fall within the scope of the WEEE directive. Efforts are made to improve collection, reuse and recycling of the product mainly via collective Collection & Recycling Service Organizations (CRSOs). In the end of life, the luminaire is 85% collected and disassembled. The collected parts are disassembled and steel, aluminium, glass, electronic parts, and cables and are sent to recycling. Batteries are collected and sent to treatment. The quantitative assessments are based on a material split and respective recycling rates. Non-collected and non-recycled after disassembly content is disposed to the municipal waste stream where it undergoes separation, preparation and treatment according to the average European statistics. Waste generated in installation and parts replacement are 100% collected and sent to respective treatment.

Extraordinary effects

• Fire: effects of fire can lead to emissions of PBDD/F (brominated compounds).
• Water: no known impacts on the environment following unforeseeable influence of water, e.g. flooding.
• Mechanical destruction: no known impacts on the environment following unforeseeable mechanical destruction.

Further information

Details of the product are published on:
https://www.lighting.philips.nl/

Calculation rules

Declared unit

Declared product	Value	Declared unit
RC530B LED50S/TW9 SIA W8L145 PCV U4 PI3	Unit	1 piece

The declared unit is a luminaire with 1 driver, 5 LED boards, steel and PMMA mechanical parts, cables, and other plastic, and metal constructive components totalling a weight of 3 kg excluding packaging, providing a luminous flux of 5 000 lm, including luminaire losses. The luminaire, provides sufficient light for a typical office application, operated in a European context for 50 000 hours.

System boundary

Cradle to gate with options
Modules A1-A3 include: raw material extraction, processing, energy and materials and manufacture of modules and packaging.
The following scenarios are also included:
- Transport to installation (A4);
- Disposal of packaging materials (A5);
- Replacement of driver (10% rate) (B3);
- Operational energy use (B6);
- Transport to end of life (C2);
- Waste processing (C3);
- Final disposal for WEEE fraction not recycled (C4).
- Benefits and loads beyond system boundary:

Recycling of cardboard packaging, electronics, cables, steel elements of luminaire. (D)

Estimates and assumptions

Background data are used for suppliers' specific processes. Foreground data are used for the assembly of the lighting unit in regards to the components of the luminaire (system). When necessary, generic data was generated based on averaging the data of multiple products of the same category. Data on collection and recycling are based on data of the generic European statistics. The end of life scenario assumes recycling of the separated materials, but does not include energy recovery from incineration of the waste. Representation of the family is assumed on the worst case scenario with largest power consumption over the lifetime, and is not compliant with EN15804+A1.

Cut-off criteria

Where no data was available, items that represent less than 1% of the total product weight were neglected. No excluded flows were of any known particular environmental concern.

Background data

Necessary background data are sourced from the Signify database and the Ecoinvent database v3.8.

Data quality

Specific data used is less than 5 years old. Background data is geographically representative of the production location, and is less than 10 years old.

Period under review

The period under review is the year 2022 for the product composition, RSL, and product performance and characteristics, year 2021 for the energy and material consumption at the assembly factory.

Allocation

Avoided burden approach is applied to allocation of recycled and/or secondary raw materials, as well as loads and benefits beyond the system boundary from material recycling. No loads and benefits beyond the system boundary from energy recovery in the end of life of the product or packaging is included. Energy consumption, material and waste generation at the manufacturing site not attributed to bill of materials of the products, is allocated by partitioning, on the basis of units produced.

Comparability

A comparison or an evaluation of the presented data is only possible if the data to be compared were created according to the Signify/Philips lighting framework and the building context, respectively the product specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

Transport to the site (A4)

Name	Value	Unit
Transport distance	1200	Km
Transport mode	truck, unspecified generic	-
Capacity utilisation incl. empty runs	45	%
Bulk density of transported product	141	kg/m3

Installation at the site (A5)

Name	Value	Unit
Packaging waste	0,6	kg

Reference service life

Name	Value	Unit
Reference service life	10	Years
Operating hours per year	5000	Hours
Quality of work	L90B50	-
Environment of operation	Average European conditions. No extreme exposure to chemicals or pollution is implied.	-
Usage conditions	Indoor	-

Repair (B3)

Name	Value 1	Unit
Repair process	Replacement of the driver	-
Repair cycle	0,1	Number/RSL
Resources	0,028	Kg
Transportation distance	4,8	Km
Transportation mode	Van	-

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	1633	kWh
Equipment output	41,5	W

End of life (C1-C4)

Name	Value	Unit
Collected separately	2,55	kg
Sent to recycling	1,91	kg
Sent to energy recovery	0,48	kg
Sent to landfilling	0,61	kg
Transportation distance from point of use to collection and sorting point	30	km
Transportation distance from collection point to recycling	100	km
Transportation distance from collection point to incineration and landfilling	30	km
Mode of transportation	Truck, unspecified	-

LCA Results

Description of the system boundary (X = included in lca; MND = module not declared; MNR = module not relevant)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundarys
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste Processing	Disposal	Reuse- Recovery- Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	X	MNR	MNR	X	MND	MND	X	X	X	X

Results of the LCA - environmental impact

Parameter	Unit	A1-A3	A4	A5	B3	B6	C2	C3	C4	D
GWP	[kg CO2Eq.]	3,1E+01	5,6E-01	5,0E-02	3,2E+00	6,3E+02	4,7E-02	2,3E-01	2,4E+00	-5,8E+00
ODP	[kg CFC11Eq]	9,4E-06	1,1E-07	4,5E-09	3,7E-07	3,7E-05	8,7E-09	2,0E-08	5,8E-09	-7,5E-07
AP	[kg SO2Eq.]	1,8E-01	2,4E-03	2,5E-04	1,6E-02	3,1E+00	2,0E-04	1,3E-03	8,2E-04	-6,1E-02
EP	[kg (PO4)3Eq]	2,4E-02	4,5E-04	3,2E-05	2,2E-03	4,0E-01	3,7E-05	2,5E-04	1,4E-04	-5,1E-03
POCP	[kg Ethen Eq.]	1,3E-02	7,8E-05	1,5E-05	1,1E-03	1,3E-01	6,3E-06	7,4E-05	4,1E-05	-3,7E-03
ADPE	[kg Sb Eq.]	3,5E-03	1,7E-06	1,7E-06	2,3E-04	6,0E-03	1,5E-07	6,1E-06	1,2E-05	-1,6E-03
ADPF	[MJ]	3,3E+02	8,5E+00	6,2E-01	4,0E+01	7,3E+03	7,2E-01	2,4E+00	8,7E-01	-6,5E+01
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources									

Results of the LCA - resource use

Parameter	Unit	A1-A3	A4	A5	B3	B6	C2	C3	C4	D
PERE	[MJ]	3,8E+01	1,3E-01	7,2E-02	2,6E+00	2,8E+03	1,0E-02	3,2E-01	2,4E-01	-6,9E+00
PERM	[MJ]	1,2E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-8,8E+00
PERT	[MJ]	5,0E+01	1,3E-01	7,2E-02	2,6E+00	2,8E+03	1,0E-02	3,2E-01	2,4E-01	-1,6E+01
PENRE	[MJ]	3,3E+02	9,3E+00	7,2E-01	4,6E+01	1,4E+04	7,8E-01	3,2E+00	8,5E-01	-6,5E+01
PENRM	[MJ]	8,5E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-1,2E+01
PENRT	[MJ]	4,1E+02	9,3E+00	7,2E-01	4,6E+01	1,4E+04	7,8E-01	3,2E+00	8,5E-01	-7,7E+01
SM	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
RSF	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
NRSF	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
FW	[m3]	IND	IND	IND	IND	IND	IND	IND	IND	IND
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

Results of the LCA – output flows and waste categories

Parameter	Unit	A1-A3	A4	A5	B3	B6	C2	C3	C4	D
HWD	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
NHWD	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
RWD	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
CRU	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
MFR	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	1,91
MER	[kg]	IND	IND	IND	IND	IND	IND	IND	0,48	IND
EEE	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
EET	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
Caption	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 electrical energy; EEE = Exported thermal energy									

Not all background datasets support the methodical approach of the water and waste indicators. The value of the indicator is therefore subject to greater uncertainty. These indicators are thus not declared. IND is used in cases where the inventory does not support the methodological approach or the calculation of the specific indicator.

The life cycle impact assessment by stage (contribution analysis) is illustrated on the figure on the right:

The use phase of the product is associated with electricity consumption for lighting (stage B6 on the chart) and has the highest and most significant contribution to the overall environmental impacts of the product over its life cycle, in all impact categories. In particular, impacts in global warming potential (GWP), acidification potential (AP), eutrophication potential (EP), photochemical ozone creation potential (POCP), and abiotic depletion potential (fossil) (APDF) categories are attributed to the electricity consumption at a rate above 92%. Abiotic depletion potential (elements) (ADPE) impacts and ozone layer depletion potential (ODP) impacts also have a considerable impact contribution of the product manufacturing, including sourcing and processing the raw materials (stage A1-A3 on the chart). In that stage, the impact to the ADPE is mostly due to extraction of virgin materials used to make electric components (predominantly precious metals), as well as due to use of metals in the cables. The ODP impacts of stage A1-A3 could be attributed to sourcing temperature-resistant polymers. The end of life (stage D on the chart) of the product has a marginal contribution to the reduction of overall impacts in all categories apart from ADPE. There, recycling in the end of life (stage D on the chart) reduces the cumulative impact of production (A1-A3), distribution and installation (A4-A5), use (B3, B6), and end of life treatment (C2-C4) by 16%. This is achieved by high rates of luminaires collection in the end of their service, recycling of the electronic components in the end of life of the luminaire.

Requisite evidence

The measurements are based on documentation and bill of materials of the product.

References

EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14021:2016, Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)

ISO 14040:2006, Environmental management — Life cycle assessment — Principles and framework

ISO 14044:2006, Environmental management — Life cycle assessment — Requirements and guidelines

Disclaimer

All environmental calculations are based on a luminaire used in European context. The calculations are performed on the most commonly used luminaire in the range. The implemented life cycle analysis is compliant with DIN EN ISO 14040:2006: Environmental management - Life Cycle Assessment - Principles and framework. The LCA has been performed to the best of Signify's knowledge. No right or claim might be derived from this. Signify disclaims any and all claims with respect thereto.

Further information Please contact:

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Collection and Recycling (brochure)

Ecoinvent (website)

Glossary

ADP (Abiotic Depletion Potential): Impact related to the depletion of non-renewable resources, i.e. fossil fuels (ADPF), metals and minerals (ADPE).

AP (Acidification Potential): Contributions of SO2, NOx, HCl, NH3 and HF to the potential acid deposition, causing a wide range of impacts on soil, groundwater, surface water, organisms, ecosystems and buildings.

EP (Eutrophication Potential): Potential to cause over-fertilization of water and soil, which can result in increased growth of biomass.

GWP (Global Warming Potential): Relative measure of how much heat a greenhouse gas (CO2, N2O, CH4...) traps in the atmosphere. It is calculated over a specific time interval, commonly 20, 100 or 500 years.

LCA: Life cycle assessment.

PCR: Product Category Rules.

PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw materials.

PERM: Use of renewable primary energy resources used as raw materials.

PERT: Total use of renewable primary energy resources.

PENRE: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials.

PENRM: Use of non-renewable primary energy resources used as raw materials.

PENRT: Total use of non-renewable primary energy resources.

POCP (Photo-chemical Oxidation Potential or photochemical smog): Formation of reactive substances (mainly ozone) which are injurious to human health and ecosystems and which also may damage crops.

RSL: Reference service life.

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