

PHILIPS

KeyLine

Product declaration



Environmental product declaration

KeyLine

ISO 14021, based on ISO 14040/14044

These days, many office owners and office lighting designers prefer lines of light. The reason is simple. Not only do light lines come in a minimalistic design; they also offer far more choice and flexibility. Short or long lines and luminaires, standalone luminaires, different shapes and even a variety of colors; anything is possible. And with KeyLine, all these benefits come at a competitive price while still complying with office lighting norms.

KeyLine is a superb light line range with a slim, minimalistic design and a high lumen output to illuminate the brightest office spaces. But with comfortable, low levels of glare it's also easy on the eye and complies with UGR19. That makes KeyLine ideal for linear applications, as well as standalone suspended or surface-mounted luminaires. A range that offers the ultimate flexibility and unlimited possibilities. KeyLine design flexibility comes in the form of different lengths, colors and light outputs -

including L-shapes, as well as straight lines. All with high efficiency up to 141 lm/W, and the option to upgrade with wireless connectivity and control. Add to that attractive pricing, and with KeyLine you can also enjoy excellent value that ensures a superb total cost of ownership.



Product

Product family description

Luminaires of the KeyLine family's technical features include:

- Comfortable, low glare: <UGR19 for the full range
- High lumen output, up to 4000lm for 1.2m version
- Interact Connectivity ready with wireless drivers
- Standard options in different lengths, colors and light outputs
- Customization options

The luminaires are designed for a broad range of indoor applications such as offices, retail, and education spaces.

Product family range

The KeyLine family includes 200 products, the assembly of the products is implemented on manufacturing site of Signify Poland sp. z o.o. (Kętrzyn, Poland). Manufacturing site of the product has achieved carbon neutrality as of 2019.

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

KEY LINE SM350C 50S/840 PSD PCS L1500 ALU PI5 is chosen as a representative product for the family as the luminaire with the highest power consumption over the lifetime. Based on multiple LCA studied 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 largest impacts, and thus present a worst case. That choice of a product aligns with pessimistic assumptions and 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 applications such as office, retail, and education spaces.

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 aluminium housing (profile)
- 2x steel end caps
- 1x steel reflector (gear tray)
- 1x Xitanium driver
- LED panel
- internal connectors
- cables (wiring)
- metal brackets and fasteners

Delivery status

Product weight: 3,9 kg (including 0,5 kg packaging), dimensions of the packed product: 1500mm*80mm*80mm

Driver:

i.	Type	Xitanium 35W PSD
ii.	Failure rate (max % @lifetime)	10%
iii.	Dimensions, mm	280 x 30 x 21

LED board

i.	Type	Fortimo LED Strip OC 2ft 2200lm 840 BC HV5
ii.	Dimension board, mm	2ft: 559,2*20*1,6(7,35), 1ft: 279,2*20*1,6(7,35)
iii.	Amount of PCBA per luminaire	3
iv.	Number of LEDs per PCBA	24

Constructional data

Name	Value	Unit
Dimensions	1402x70x70	Mm*mm*mm
Luminous flux	5000	lm
Luminous efficacy	133	Lm/W
Radiation angle	76	Deg
Colour temperature	4000	K

Base materials/Ancillary materials

Materials	Mass, kg
Metals / Alloys	2,12
Metals / Steel Painted	0,47
Plastics / PC (Polycarbonate)	0,40
Electric Comp's / Electronic ballasts with connectors	0,18
Electric Comp's / PCB board without components	0,10
Metals / Steel	0,05
Electric Comp's / Cables / Silicone	0,04
Metals / Stainless Steel	0,02
Electric Comp's / Connectors	0,01
Plastic / PA	0,01
Plastics / POM	0,01
Plastic / Silicone	0,01
Packaging / Paper	0,51
Packaging / Labels , ink, adhesives	0,01
Product weight (including packaging)	3,93

Manufacturing

Manufacturing is conducted by Signify Poland sp. z o.o. (Kętrzyn, Poland).

Product processing/Installation

Product can be mounted on the ceiling as surface mounted and suspended, stand-alone product and connected in lines and L-corners.

Packaging

0,51 kg, including cardboard box, paper-printed instructions, and plastic wrapping.

Condition of use

The luminaire is designed for use in indoor conditions, with ambient temperatures from -10°C up to 35°C . No extreme exposure to chemicals or pollution is implied. The user uses the product over its lifetime and maintains the luminaire, after which decides on its end of life destiny and dispose the unit in parts respectively. Applications may apply dimming or

lighting controls to allow further energy saving. In case of failure, the driver can be replaced by installer in workshop. The default driver failure rate is 10% over the lifetime.

Product is used in the European market context and assumed to use average European electricity mix.

Environment and health during use

The product is compliant with CE, European ENEC certificate, ROHS directive, REACH regulation, EMC compliancy.

Reference service life

The RSL is established as 50 000 hours operation, the equivalent of 20 years operation in an office application (2500 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). The luminaire is 85% collected and disassembled. The collected parts are disassembled and steel, aluminium, glass, electronic parts, and cables are sent to recycling. 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.

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.com/>

Calculation rules

Declared unit

Declared product	Value	Declared unit
KEY LINE SM350C 50S/840 PSD PCS L1500 ALU PI5	Unit	1 piece

The declared unit is a luminaire with aluminium housing, 1 driver, 3 LED boards, cables, and other plastic, and metal constructive components totalling a weight of 3 420 grams 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 drivers (10% rate) (B4)
- 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, aluminium, 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 readily available data taken from 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 v3.6.

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 2021 for the product composition, RSL, and characteristic, year 2019 for the energy and material consumption and waste generation 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	399	kg/m ³

Installation at the site (A5)

Name	Value	Unit
Packaging waste	0.51	kg

Reference service life

Name	Value	Unit
Reference service life	20	Years
Operating hours per year	2500	Hours
Quality of work	L90B50	-
Environment of operation	Ambient temperature from 10°C up to 35°C. No extreme exposure to chemicals or pollution	-
Usage conditions	indoor	-

Replacement (B4)

Name	Value 1	Unit
Replacement process	Replacement of the driver	-
Replacement cycle	0.1	Number/RSL
Resources	0.18	kg
Transportation distance	4.8	Km
Transportation mode	Van	-

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	1666	kWh
Equipment output	37.5	W

End of life (C1-C4)

Name	Value	Unit
Collected separately	3,36	kg
Sent to recycling	2,83	kg
Sent to energy recovery	0,53	kg
Sent to landfilling	0,59	kg
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 boundaries
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	MNR	X	MNR	X	MND	MND	X	X	X	X

Results of the LCA - environmental impact

Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
GWP	[kg CO2Eq.]	9,3E+01	6,2E-01	6,8E-02	1,1E+00	7,0E+02	4,7E-02	4,4E-01	2,2E+00	-1,2E+01
ODP	[kg CFC11Eq.]	5,6E-05	1,1E-07	5,4E-09	9,6E-08	8,9E-05	8,8E-09	4,2E-08	1,8E-08	-1,3E-06
AP	[kg SO2Eq.]	5,3E-01	2,7E-03	5,8E-04	6,7E-03	3,5E+00	2,0E-04	2,4E-03	1,5E-03	-9,4E-02
EP	[kg (PO4)3Eq.]	8,9E-02	4,9E-04	5,5E-05	9,5E-04	4,5E-01	3,8E-05	4,7E-04	1,2E-04	-9,0E-03
POCP	[kg Ethen Eq.]	2,9E-02	8,7E-05	3,0E-05	5,6E-04	1,4E-01	8,0E-06	1,5E-04	9,7E-05	-5,8E-03
ADPE	[kg Sb Eq.]	4,2E-02	1,5E-05	9,9E-06	2,7E-04	6,1E-03	1,3E-07	9,4E-06	8,0E-05	-7,5E-03
ADPF	[MJ]	1,0E+03	9,3E+00	7,8E-01	1,2E+01	8,0E+03	7,2E-01	4,4E+00	2,3E+00	-1,3E+02
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	B4	B6	C2	C3	C4	D
PERE	[MJ]	1,4E+02	1,5E-01	1,0E-01	1,3E+00	2,9E+03	8,3E-03	5,4E-01	3,1E-01	-2,4E+01
PERM	[MJ]	1,3E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-9,3E+00
PERT	[MJ]	1,5E+02	1,5E-01	1,0E-01	1,3E+00	2,9E+03	8,3E-03	5,4E-01	3,1E-01	-3,3E+01
PENRE	[MJ]	1,2E+03	1,0E+01	9,2E-01	1,5E+01	1,6E+04	7,8E-01	6,7E+00	2,2E+00	-1,6E+02
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	-1,7E+01
PENRT	[MJ]	1,3E+03	1,0E+01	9,2E-01	1,5E+01	1,6E+04	7,8E-01	6,7E+00	2,2E+00	-1,7E+02
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	B4	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	2,83
MER	[kg]	IND	IND	IND	IND	IND	IND	IND	0,53	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; EET = 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 in the picture on the right:



Use phase of the product associated with electricity consumption for lighting (stage B6 on the chart), along to sourcing and processing of the raw materials (stage A1-A3 on the chart) have the highest and most significant contribution to the overall environmental impacts of the product over its life cycle. In particular, impacts in global warming potential (GWP), ozone depletion potential (ODP), acidification potential (AP), eutrophication potential (EP), photochemical ozone formation potential (POCP), and abiotic depletion potential (fossil) (ADPF) categories are driven by the use phase and could be attributed to electricity generation. Abiotic depletion potential (elements) (ADPE) impacts are dominated by the raw materials sourcing and production stage. The impact to the ADPE is mostly due to extraction of virgin materials used to make electric components (such as gold, silver,

and zinc), as well as due to extraction and production of aluminium used for the housing manufacturing. Raw materials sourcing and production stage shows also considerable contribution into the ODP impacts, which is attributed to the impacts of the temperature-resistant polymers used. End of life 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 reduces the cumulative impact of production (A1-A3), distribution and installation (A4-A5), use (B3, B6), and end of life (C2-C4) by 15%, relating to -18% of the total ADPE over the life cycle. This is achieved by high rates of luminaires collection in the end of their service, and high rates of recycling of the metal components in the end of life of the luminaire (predominantly, aluminium).

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)

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, NO_x, 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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