PHILIPS

FlexBlend

Product declaration

Environmental product declaration

of the FlexBlend Surface and Suspended

Based on reference product SP342P 60S/940 PSD PCS SMT L150 WH

ISO 14021, ISO 14040/14044 and where possible EN15804+A1

Product

Product family description/Product family definition

This indoor luminaire can be suspended on the ceiling or mounted on the ceiling surface and has a modular design. The luminaire is made of pre-painted steel housing closed with plastic endcaps, and the light module is made out of plastic with three different optics (MLO, PCS and OPAL). Luminaire can be mounted as stand-alone version, but also can be connected in line. There are 2 different lengths offered in the family: 1,2 m and 1,5m.

Product family range

The FlexBlend Surface and Suspended family includes multiple product types and is asembled on the manufacturing site of Signify Poland sp. z o.o. (Kętrzyn, Poland). Manufacturing site of the product uses renewable electricity for manufacturing processes, is carbon neutral and all manufacturing waste is recovered.

The EPD represents the Flexblend family via the most probable worst case scenario rather than average impacts with assessment of deviations. This approach is based on the Signify developed EPD framework.

Representative product

SP342P 60S/940 PSD PCS SMT L150 WH is chosen as a representative product for the family as the luminaire with the highest power consumption over the lifetime. 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 most 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 conservative assumptions and precautionary principle in view of the task to represent other products in the family.

Application

The luminaire is designed for a broad range of indoor applications such as cell offices, open plan offices and meeting rooms of different sizes.

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 LBA LineP 1ft 1500lm 940 L9 LED boards (containing 24x LEDs distributed in a single row on each led board) and 3x Fortimo LED Strip 1ft 1100lm 940 FC HV4 boards (containing 24x LEDs distributed in a single row on each led board)
- Mechanical parts made of metal or plastic
- Connectors
- Cables

Driver:

i.	Type	Xitanium 60W 0.08-0.35A 300V TD16 230V
ii.	Failure rate (max % @lifetime)	Max 10% @ 50khrs @ 80 °C Tc
iii.	Dimensions, mm	280 x 30 x 16

LED board (direct light)

i.	Type	LBA LineP 1ft 1500lm 940 L9
ii.	Dimension board, mm	269 x 40
iii.	Amount of PCBA per luminaire	5
iv.	Number of LEDs per PCBA	24

LED board (indirect light)

i.	Type	Fortimo LED Strip 1ft 1100lm 940 FC HV4
ii.	Dimension board, mm	279,2 x 20
iii.	Amount of PCBA per luminaire	3
iv.	Number of LEDs per PCBA	24

Constructional data

Name	Value	Unit
Dimensions	1470*200*70	Mm*mm*mm
Luminous flux	6000	lm
Luminous efficacy	129	Lm/W
Radiation angle	82	Deg
Colour temperature	4000	K

Delivery status

Product weight: 6.44 kg (including 0,65kg packaging), dimensions of the packed product: 1576mm*202mm*76mm

Base materials/Ancillary materials

Materials	Weight, kg	Weight, %
Metals / Steel Painted	2,91	45.2%
Metals / Steel	0,58	9.0%
Metals / Stainless Steel	0,18	2.8%
Plastics / PC (Polycarbonate)	0,95	14.8%
Plastics / PMMA	0,54	8.4%
Electric Comp's / Connectors PA	0,02	0.3%
Electric Comp's / Sensors	0,03	0.5%
Plastics / PA polyamide	0,01	0.2%
Electric Comp's / Electronic ballasts with connectors	0,28	4.3%
Electric Comp's / PCB board without components	0,27	4.2%
Electric Comp's / Cables PVC	0,03	0.5%
Packaging / Plastic Wrapping	0,01	0.2%
Packaging/ Cardboard box	0,64	9.9%
Product weight (including packaging)	6,44	100.0%

Manufacturing
Manufacturing of the product is partly done by Chinese suppliers for the LED boards and partly by Philips Poland (in Pila) for the driver. Mechanical parts are made in Poland (reflector, frame, gear trays) and in Hungary (endcaps). The final assembly of the luminaire is implemented by Signify Poland sp. z o.o. (Kętrzyn, Poland).

Product processing/Installation
Mounted on the ceiling, suspended from the ceiling. Can be connected in lines.

Packaging
0,65 kg, packaging materials are cardboard and polyethylene (PE).

Condition of use
Designed for use indoor in average European conditions. Applications may apply dimming or lighting controls to allow further energy saving.

Environment and health during use
The product is compliant with the European Directive 2015/863 of 31 March 2015 on Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic equipment (RoHS) and regulation (EC) No 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

Reference service life
The Reference Service Life is established as 55 000 hours operation, the equivalent of 22 years operation in an office and schools indoor 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). Luminaire is disposed by the user (assumed 85% of products is collected and 15% end up in general municipal waste). The collected luminaires are disassembled with steel, cable and electronic parts going to recycling. Non-recycled content is disposed to the municipal waste stream where it undergoes separation, preparation and treatment according to the average European statistics.

Extraordinary effects
Effects of fire can lead to emissions of PBDD/F (brominated compounds). No known impacts on the environment following unforeseeable influence of water, e.g. flooding.

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
The declared unit is a luminaire with steel housing, 2 drivers, 2 LED boards, cables, sensors and other plastic, metal and glass constructive components totalling a weight of 5 784 grams excluding packaging, providing a luminous flux of 6 000 lm, including luminaire losses. The luminaire, provides sufficient light for a typical indoorapplication, operated in a European context for 55 000 hours.

Constructional data

Declared unit	Value	Declared unit
SP342P 60S/940 PSD PCS SMT L150 WH	Unit	1 piece

System boundary
Cradle to grave with options
Modules A1-A3 include raw material extraction, processing, energy and materials and manufacture of modules and packaging; energy consumption for housing cutting and bending, as well as steel material losses are included; other energy and materials consumed in the product assembly are excluded.
The following scenarios are also included:
- Transport to installation (A4)
- Disposal of packaging materials (A5)
- Replacement of drivers (10% rate) and light modules (10% rate) and fixtures (cables and bracket) (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, aluminium, steel, plastic and glass 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 partly 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 v3.5.

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 2020. Factory material losses (steel) are taken on the level of year 2019.

Allocation
In the aggregated module A1-A3, material losses (steel) in the assembly of the luminaire system in the factory are defined on the averaged specific values for the site. There, allocation was made based on partitioning (per unit manufactured).
Avoided burden approach is applied in the use 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 from the end of life of the product or packaging is included.

Comparability
A comparison or an evaluation of EPD data is only possible if all the data sets 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	266	Kg/m3

Installation at the site (A5)

Name	Value	Unit
Packaging waste	0,65	kg

Reference service life

Name	Value	Unit
Reference service life	22	years
Operating hours per year	2500	hours
Quality of work	L90B50	-
Environment of operation	Average European conditions	-
Usage conditions	Indoor	-

Repair (B3)

Name	Value	Unit
Repair process	Replacement of drivers, light modules and fixtures	-
Repair cycle	0,1	Number/RSL
Resources	0,067	kg
Transportation distance	4,8	Km
Transportation mode	Van	-

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	2430	kWh
Equipment output	46,6	W

End of life (C1-C4)

Name	Value	Unit
Collected separately	5,62	kg
Sent to recycling	4,29	kg
Sent to energy recovery	0,94	kg
Sent to landfilling	1,26	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 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	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.]	4,8E+01	1,0E+00	8,3E-02	2,5E+00	1,1E+03	7,8E-02	2,9E-01	4,0E+00	-7,2E+00
ODP	[kg CFC11Eq]	2,9E-06	1,9E-07	7,4E-09	2,0E-07	1,3E-04	1,5E-08	2,5E-08	1,5E-08	-7,2E-07
AP	[kg SO2Eq.]	2,5E-01	4,3E-03	6,5E-04	1,5E-02	5,8E+00	3,3E-04	1,7E-03	7,8E-04	-7,5E-02
EP	[kg (PO4)3Eq]	5,8E-02	8,1E-04	1,0E-04	4,3E-03	8,1E-01	6,2E-05	3,3E-04	3,6E-04	-2,4E-02
POCP	[kg Ethen Eq.]	1,9E-02	1,7E-04	3,6E-05	1,2E-03	2,2E-01	1,3E-05	9,4E-05	4,7E-05	-5,6E-03
ADPE	[kg Sb Eq.]	3,0E-03	2,7E-06	2,6E-06	2,8E-04	1,8E-03	2,1E-07	8,5E-06	1,8E-07	-9,4E-04
ADPF	[MJ]	5,5E+02	1,5E+01	9,6E-01	2,7E+01	1,2E+04	1,2E+00	3,2E+00	8,8E-01	-8,6E+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	B4	B6	C2	C3	C4	D
PERE	[MJ]	4,3E+01	1,8E-01	1,2E-01	2,7E+00	4,0E+03	1,4E-02	4,2E-01	3,6E-02	-4,2E+00
PERM	[MJ]	7,7E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-5,1E+00
PERT	[MJ]	5,1E+01	1,8E-01	1,2E-01	2,7E+00	4,0E+03	1,4E-02	4,2E-01	3,6E-02	-9,3E+00
PENRE	[MJ]	5,2E+02	1,7E+01	1,2E+00	3,7E+01	2,4E+04	1,3E+00	4,1E+00	1,0E+00	-7,7E+01
PENRM	[MJ]	1,8E+02	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-2,5E+01
PENRT	[MJ]	7,0E+02	1,7E+01	1,2E+00	3,7E+01	2,4E+04	1,3E+00	4,1E+00	1,0E+00	-1,0E+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	4,29
MER	[kg]	IND	IND	IND	IND	IND	IND	IND	0,94	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 in the picture on the right:

Environmental impacts of the product are dominated by the use phase associated with the electricity consumption of the light product. The use phase contributes over 93% of the impact in all impact categories except for Abiotic depletion potential (elements) (ADPE), where the production phase contributes the majority of the negative impact. This impact to the ADPE is mostly due to extraction of virgin materials used to make electric components (such as copper, gold and tin). End of life of the product has a marginal contribution to the reduction of overall impacts in all categories apart from ADPE, where recycling in the end of life reduces the cumulative impact of production (A1-A3), distribution and installation (A4-A5), use (B3, B6), and waste treatment (C2-C4) by over 18%, relating to 22% of the total impact over the life cycle in category ADPE. This is achieved by high rates of disposed luminaires collection, and high rates of recycling of the metal components in the end of life of the luminaire.

LCA Results

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 14025 DIN EN ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

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 the luminaire with the highest power consumption over the lifetime. 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 all claims with respect thereto.

Further information Please contact:

sustainability@signify.com

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, 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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