



Environmental product declaration for the FlexBlend LED-based luminaire (EN-12464-1, fully office-compliant UGR <19)

Product

FlexBlend is a high-quality, office-compliant luminaire that covers a wide range of applications, from reception and corridors to open plan offices and meeting rooms. Available in square and rectangular forms with a choice of three optic concepts, it offers the flexibility to use the same luminaire model for different ceiling types. With minimized flickering and strobe light effects, FlexBlend increases visual comfort in the workplace and enables staff to perform tasks better. It also combines good efficacy of up to 144 l/W with a long and reliable service life and easy installation and maintenance for a fast return on investment. FlexBlend is ready to be connected to SpaceWise and is ready for Interact Office.

Application

- Offices
- Healthcare
- Education
- Banks



Square
version



Bandraster
version



Rectangular
version

Environmental assessment – results

Material content

Table 1. Material content (base/ancillary materials) for FlexBlend

Metals/steel	63%
Packaging (cardboard, paper, labels)	14%
Plastics/PC	10%
Plastics/PMMA	7%
Electronics (driver, LED board)	3%
Other (plastics, silicon, cables, connectors)	3%

Product weight (including rail and packaging): 6,37 kg

LCA results

To measure the environmental footprint of the luminaire, a life cycle assessment was carried out according to ISO 14040/14044. The CEN Norm EN 15804 serves as the core PCR. Environmental impacts of reference product are representative of product family.

Table 3: Environmental impacts

The table shows the results of the Life Cycle Assessment. For module B6, the RSL (Reference Service Life) is defined as 50,000 hours, equivalent to 12.5 years in operation in office applications.

Impact category	Unit	Total	Cradle to Gate	Use	End of Life	Total	Cradle to Gate	Use	End of Life
Abiotic depletion	kg Sb eq	0	0	0	0	100,00%	93,9%	83,6%	-77,5%
Abiotic depletion (fossil fuels)	MJ	11374	389	11029	-44	100,00%	3,4%	97,0%	-0,4%
Global warming (GWP100a)	kg CO2 eq	1026	34	992	1	100,00%	3,3%	96,6%	0,1%
Ozone layer depletion (ODP)	kg CFC-11 eq	0	0	0	0	100,00%	1,7%	97,5%	0,8%
Photochemical oxidation	kg C2H4 eq	0	0	0	0	100,00%	6,1%	95,4%	-1,6%
Acidification	kg SO2 eq	5	0	5	0	100,00%	3,2%	97,3%	-0,5%
Eutrophication	kg PO4--- eq	1	0	1	0	100,00%	5,3%	97,4%	-2,8%

Table 4: Resource use

Indicator	Total value	Unit	Cradle to Gate	Use	End of Life
PERE	3617	[MJ]	0%	99%	0%
PERM	7	[MJ]	301%	0%	-201%
PERT	3624	[MJ]	1%	99%	0%
PENRE	22110	[MJ]	2%	99%	0%
PENRM	106	[MJ]	120%	0%	-20%
PENRT	22215	[MJ]	2%	98%	0%

Interpretation of the LCA results

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 95% of the impact in all impact categories except for Abiotic depletion (non-fossil) (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 gold, silver and copper), as well as due to extraction and production of steel used for the housing manufacturing. 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 and use by over 43%, relating to about -77% 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.

Table 2: Life Cycle Assessment (LCA) boundaries of FlexBlend

Product stage	Raw material supply	A1
	Transport	A2
	Manufacturing	A3
Construction process stage	Transport from the gate to the site	A4
	Assembly	A5
Use stage	Operational energy use	B6
End of life stage	Transport	C2
	Waste processing	C3
	Disposal	C4
Benefits and loads beyond the system boundaries	Reuse - Recovery- Recycling potential	D

Environmental Assessment – input data

Product

Declared product

1x Flexblend LED based Luminaire (RC340B LED42S/840 PSU W60L60 VPC MLO PIP).

The luminaire is designed for application in general lighting solutions in areas where office compliancy is important, such as cell offices, open plan offices, 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
- 2x LBA LineP 2ft LED boards, containing:
 - 48x LEDs distributed in a single row
 - Mechanical parts made of metal or plastic
 - Connectors
 - Cables

Delivery

Product weight: 6,37kg (including 0,89 kg packaging)

Table 5: Construction data

Name	Value	Unit
Dimension driver	280x30x16	mm
Dimension LED board	540x40	mm
Luminous flux	4400	lm
Luminous efficiency	MLO > 100	lm/W
Color temperature	4000	K

Environment and health during manufacturin

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 (end cap, reflector, frame, gear trays). The housing is assembled at Philips production location in Poland.

Calculation rules

Declared unit

The declaired unit is a luminaire system, with a total weight of 6,37kg including packaging, and providing a luminous flux of 4400 lumens. This luminaire provides sufficient light for a general lighting solutions in areas of office compliancy and circulation areas, operated in Europe for 50.000 hours (electricity consumption of 2200kWh for the full service life).

System boundaries

Type of environmental declaration cradle to grave, including recycling benefits (avoided burdain). The following life cycle stages are included:

Packaging

Packaging materials are cardboard and paper, with minor use of ink. Packaging weight is 885g.

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, equivalent to 12.5 years in operation in the case of an office application. During the lifetime, no component is replaced.

End of Life

In the European Union, luminaires are in 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). According to Eurostat and other officious collection systems, the collection rate of WEEEs via CRSOs is estimated at 85%. End of life scenario is further based on a material split and respective recycling rates. Recovery potential for steel and precious metals is evaluated. The energy required for treatment of materials (shredding) is included.

Further information

Details of the product are published on: www.lighting.philips.com/main/prof/indoor-luminaires/recessed/flexblend-recessed

Production: raw materials extraction, processing, energy and materials, manufacture of modules, assembly and packaging.

- Operational energy use (average European energy mix).
- Component replacement (driver in case of a failure).
- Transport.
- Waste processing.
- Final disposal for WEEE fraction not recycled.
- Recycling of steel and metals from PCB and housing.

Distribution, maintenance, upgrade and reuse scenarios are not included.

Estimates and assumptions

Background data are used for suppliers' specific processes. Foreground data are used for the assembly of the lighting unit. 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 national Dutch statistics. The end of life scenario assumes recycling of the separated materials, but does not include energy recovery from incineration of the waste.

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 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 (see exceptoin further). 48 background processes within the sytem boundaries were identified to be obsolete; total contribution of obsolete processes into the life cycle impacts varies in different impact categories, starting from 0% to reaching maximum of 0.06% for eutrophication.

Allocation

In the aggregated module A1-A3, allocation of energy and auxiliaries was used for assembly of the driver and the luminaire in the Kętrzyn factory.

Methods

CML – IA baseline V3.05/EU25/Characterization. Excluding long-term emissions.

Requisite evidence

Data is based on documentation and bill of materials of the product.

References

- Ecoinvent www.ecoinvent.org
- ISO 14040-44
- DIN EN ISO 14040:2006: Environmental management – Life Cycle Assessment – Principles and Frameworks (ISO 14040:2006) and Requirements and Guidelines (ISO 14044:2006).

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Table 6: Life Cycle Assessment scenarios

Name	Value	Unit
Logistics		
Road freight of components to manufacturing site	9,165	tkm
Air freight of components to manufacturing site	0	tkm
Sea freight of components to manufacturing site	0	tkm
Road transport from manufacturing site to the customer	0	km
Packaging	0,855	kg
Operational energy use		
Electricity consumption	2165	kWh
Equipment output	44	kW
End of Life		
Collected separately	7,94	kg
Recycled on manufacturing site	0	kg
Sent for recycling to the third parties	7,94	kg
Reference service life		
Useful hours of work	50000	hours
Reference service life in the example of a retail and/or industrial application	11	a

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 Philips Linghting's knowledge. No right or claim might be derived from this. Philips Lighting disclaims any and all claims with respect thereto.

Further information

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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, 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.

ODP (Ozone Depletion Potential): Potential of emissions of chlorofluorohydrocarbons (CFCs) and chlorinated hydrocarbons (HCs) for depleting the ozone layer.

PCR: Product Category Rules.

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

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.

