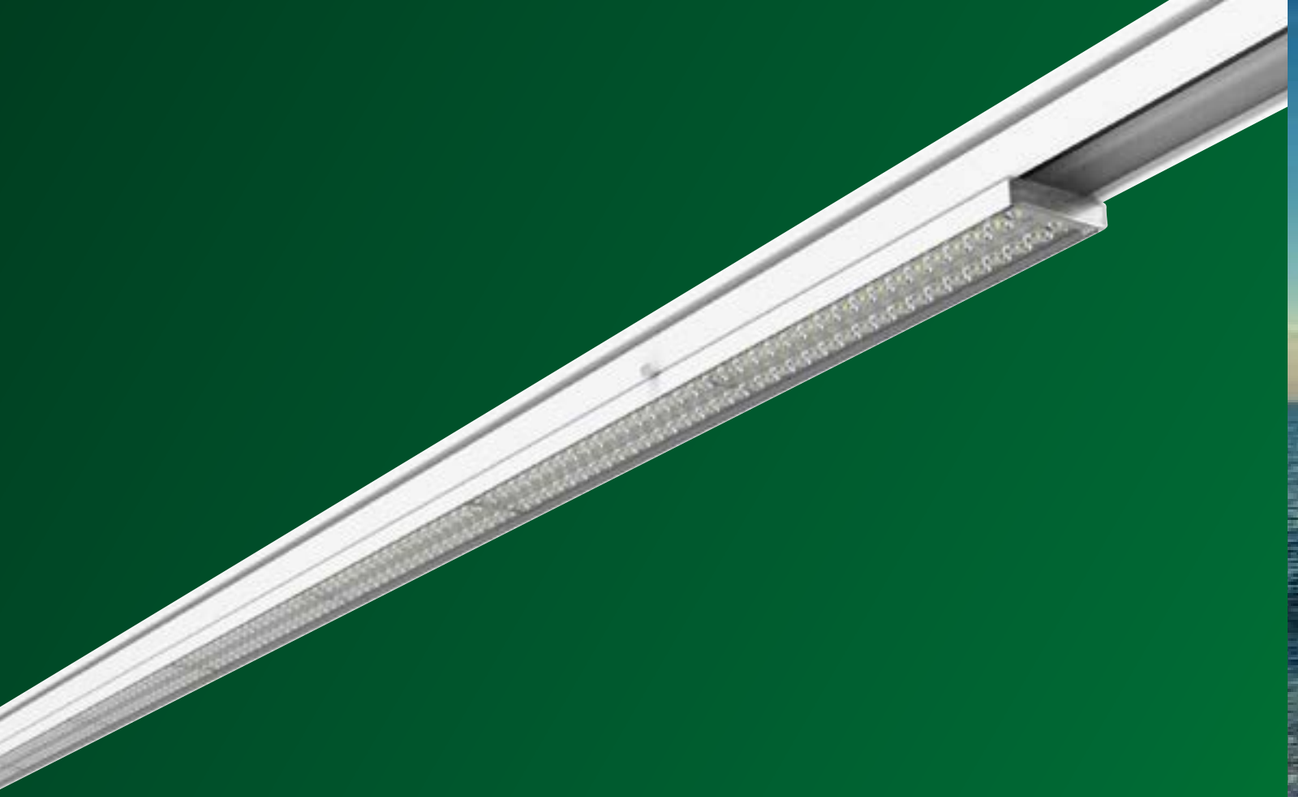
PHILIPS

Maxos fusion

Product declaration

Environmental Product Declaration of the Maxos fusion Circular Economy Ready luminaire

(ISO 14021, based on ISO 14040/14044, EN 15804)



About

This document intends to describe the environmental performance of the Maxos fusion Circular Economy Ready luminaire. The LCA (Life Cycle Assessment) is carried out according to ISO 14040/14044. The CEN Norm EN 15804 serves as the core PCR.

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“A Circular Economy is one that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles.”

(www.ellenmacarthurfoundation.org)

Introduction to

Circular Economy

For a sustainable world, the transition from a linear to a Circular Economy is essential. A Circular Economy is an economic system that maximizes the re-usability of products and raw materials and minimizes value destruction.

Why Circular?

The current, linear method of production is using up raw materials and producing ever more waste. This is exhausting the planet’s resources, driving up the price of materials, and generating more polluting landfills. But simply using fewer raw materials is not enough. We need to change from the linear system to a circular one, to ensure that raw materials, components and products are kept in circulation.

Introduction to **Maxos fusion** Circular Economy Ready luminaire

Building on the strengths of its predecessors, the Philips Maxos fusion LED trunking system offers excellent quality of light and high application efficiency. Philips Maxos fusion enables the seamless integration of linear light panels, non-linear modules, spotlights and projectors, as well as new types of integration options with both lighting and non-lighting modules. The latter modules make the new trunking system a flexible, future-ready device, ready to be used for Internet of Things (IoT) integrations.

The freedom of positioning of the panels lets you create the ideal lighting plan in any layout, which makes the trunking system suitable for both industrial and retail spaces. In retail spaces you can think of adding further spot and non-linear luminaires to the panel and further optimizing the lighting to match the objectives of branding and promotional strategies.

Philips Maxos fusion is also compliant with all relevant lighting norms and regulations in warehouse, food & beverage, and automotive spaces. It is designed to use natural resources in a much more effective and regenerative way, closing the materials loop according to Circular Economy design principles.

Maxos fusion is designed for Circular Economy

The product introduces a range of environmental features that make it ideally suited to the Circular Economy.

Optimized performance:

- Improved optical performance, excellent quality of light and superior application efficiency
- Extended lifetime of 100 khrs
- Luminous efficacy up to 150 lm/W
- Reduced failure rate of 0.5%
- Over 60% savings when combined with lighting controls compared to conventional lighting

Extended product life through ease of upgradability and integration options:

- Track system with up to 13 wires enabling future component integrations, thus making the track fully reusable and future ready
- The trunking system can be combined with ActiLume controls, connected to the Philips GreenWarehouse system and to cloud-based lighting management systems such as Interact Industry and Interact Retail
- Linear fixtures, non-linear fixtures and spots can be easily installed and repositioned on the trunk

Ease of serviceability and maintenance:

- Components are modular in design and leverage platform building blocks to maximize reuse in the portfolio
- Spare part tracking and accessing information at factory level enabled by the Philips Service tag

The **Philips Service tag** application enables smoother maintenance and installation by:

- Providing access to critical lighting component information where and when you need it. By simply scanning the QR code on a luminaire, you can view relevant troubleshooting information
- Providing relevant luminaire configuration information and identifying spare parts needed
- Allowing digital spare parts such as LED drivers to be programmed to factory settings using Near Field Communication (NFC) technology
- Enabling you to create your own digital library of lighting assets installed

Ease of recycling:

- No glue, no potted drivers
- Re-usable gear tray, clips and brackets

Ease of disassembly:

- Possible to disassemble the product in a few steps
- Individual spare parts such as drivers can be detached and replaced

Designed for **Circular Economy**

Many terms are used in the market to describe sustainable or so-called Circular Economy Ready products. Below are the key building blocks of design features that Philips' Circular Economy Ready luminaires are measured against. Each Circular Economy Ready product is designed with these product features in mind.

Key environmental features

Energy

- Increased energy efficiency, at least 10% higher than EU EE Class A product (66 lm/W)

Substances

- EU RoHS and REACH compliance

Weight and Materials

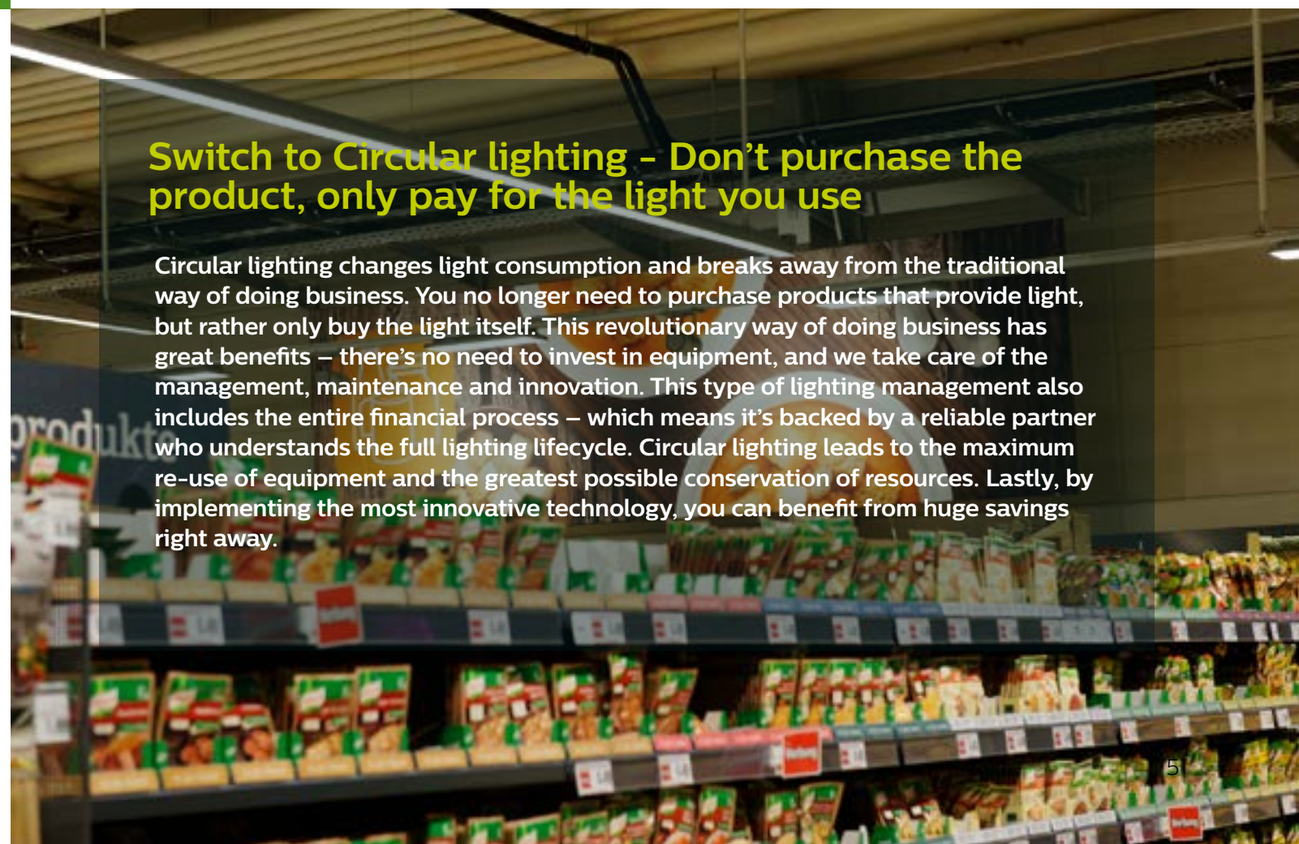
- Reduced product weight; use of renewable materials
- Composition: See Maxos fusion's material composition in Table 1

Packaging

- Reduced packaging weight or volume through the use of at least 80% recycled paper and 25% recycled plastics

Circularity

- Increased ability to contribute to the Circular Economy through extended useful life



Switch to Circular lighting - Don't purchase the product, only pay for the light you use

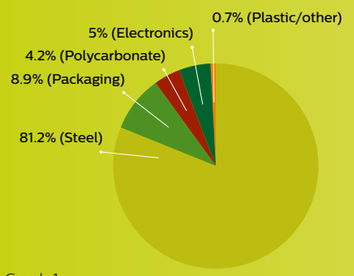
Circular lighting changes light consumption and breaks away from the traditional way of doing business. You no longer need to purchase products that provide light, but rather only buy the light itself. This revolutionary way of doing business has great benefits – there's no need to invest in equipment, and we take care of the management, maintenance and innovation. This type of lighting management also includes the entire financial process – which means it's backed by a reliable partner who understands the full lighting lifecycle. Circular lighting leads to the maximum re-use of equipment and the greatest possible conservation of resources. Lastly, by implementing the most innovative technology, you can benefit from huge savings right away.

Life Cycle Assessment results

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

Steel	81.2%
Packaging (cardboard, paper, labels)	8.9%
Polycarbonate optical cover	4.2%
Electronics (driver, LED board)	5%
Other (plastics, silicon, cables, connectors)	0.7%

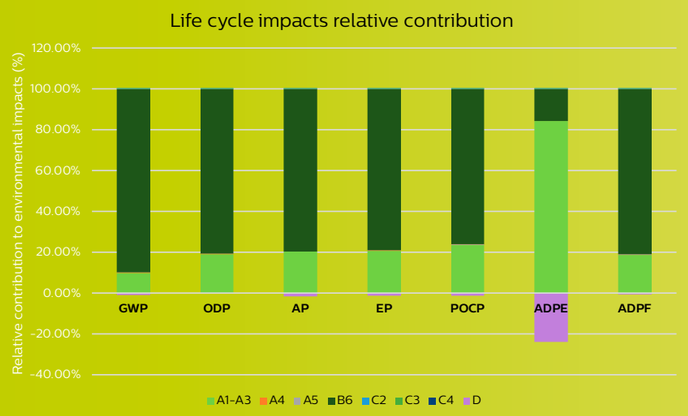
Product weight (including rail and packaging): 7.4 kg



Graph 1:
Material content (base/ancillary materials) for Maxos fusion

Table 2: Life Cycle Assessment (LCA) boundaries of Maxos fusion

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



Graph 2: Life cycle impacts, relative contribution

Life Cycle Assessment 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 products are representative of the product family.

Graph 1 features the original material composition of Maxos fusion. It shows the composition of material content with the biggest environmental impact.

Graph 2 shows the results of the Life Cycle Assessment. For module B6, the RSL (Reference Service Life) is defined as 100,000 hours, equivalent to 25 years in operation in an indoor environment under standard conditions with annual operating hours not exceeding 4000 hours. The graph demonstrates that all impact categories with the exception of the Abiotic Depletion Potential (ADPE, non-fossil), have an environmental impact during their use or once they are put in an application. In particular, the contribution to global warming potential (GWP) is for 90% associated with the use phase and 10% with the production phase. The production phase has a minor contribution to the overall environmental impact, but is nevertheless the main contributor to the ADPE. This arises from the extraction of virgin material, mainly gold, silver and copper used to make electronic components. The graph also shows the positive effect of recycling of the metal parts (reducing the need for virgin metals).

Improved collection is secured (from 85% to 100%) as part of a Circular lighting contract and results in a higher material recovery rate at the end of life of the luminaire.

Life Cycle Assessment (input data)

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 reusable rail
- 1x replaceable LED panel containing:
  - 1x built-in Xitanium driver
  - 8x slim LED boards, containing 36 LEDs
  - 1x polycarbonate optical cover
  - Steel housing
  - Mechanical parts made of metal or plastic (driver box, mounting elements etc.)
  - Connectors
  - Cables

Delivery

Rail weight: up to 6.4 kg
Panel weight: up to 2.4 kg

Table 3. Construction data

Name	Value	Unit
Dimension luminaire	2276 x 78.5 x 55 1138 x 78.5 x 55 (incl. panel connector and scissor lock)	mm
Dimension driver	360 x 30 x 21	mm
Dimension LED board	560 x 20 x 2.6	mm
Luminous flux	12300	lm
Luminous efficacy	150	lm/W
Color temperature	4000	K
Power	82	W
Lifetime L80	100	khrs

Environment and health during manufacturing

Manufacturing of the product is divided between Signify Poland in Pila (for the drivers), Signify Poland in Kętrzyn (for the LED boards and the final assembly of the product), and suppliers located in other European countries.

Packaging

Packaging materials are cardboard and polyethylene (PE). Packaging weight is 0.66 kg (with a recycled paper content > 80%).

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 100,000 hours operation, equivalent to 25 years in operation in the case of a retail and/or industrial application. During the lifetime, no component is replaced.

End of Life

In the European Union, luminaires are in scope of the Waste Electrical and Electronic Equipment Directive (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 official collection systems, the collection rate of WEEEs via CRSOs is 85% at maximum. 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. If Maxos fusion is used as part of a Circular lighting contract, end-of-contract management is secured by Signify.

Further information

Details of the product are published on:
www.philips.com/maxosfusion

Life Cycle Assessment calculation rules

Declared unit
The declared unit is a luminaire system that provides a luminous flux of 12,300 lumens. This luminaire provides sufficient light for retail and/or industrial applications, operated in Europe for 100,000 hours (electricity consumption of 8,200 kWh).

System boundaries
Type of environmental declaration: cradle-to-grave, including recycling benefits (avoided burden).
The following life stages are included:
- Production: raw material extraction, processing, energy and materials; manufacture of modules; assembly and packaging
- Operational energy use (average European energy mix)
- Transport to the area of the user
- Waste processing
- Final disposal for WEEE fraction not recycled
- Recycling of metals from PCBs

Estimates and assumptions
- Background data are used for suppliers' specific processes
- Foreground data are used for the assembly of the luminaire and drivers
- Data on collection and recycling are based on readily available data taken from generic national statistics
- Captive (100%) collection by Signify in case part of Circular lighting contract

Cut-off criteria
Where no data was available, items that represented 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 v3.3.

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.

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 V3.04/EU25 /Characterization/ Excluding long-term emissions.
Cumulative energy demand V1.1.

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

References
- Ecoinvent www.ecoinvent.org
- Life Cycle Assessment - Principles and framework (ISO 14040:2006)
- Life Cycle Assessment - Requirements and guidelines (ISO 14044:2006)

Disclaimer
All environmental calculations are made in a European context. The calculations are performed on the most commonly used luminaire in the range. The LCA has been performed in accordance with the processes as used by Signify. Note that the information provided herein is subject to change. Signify does not give any representation or warranty as to the accuracy or completeness of the information included herein and shall not be liable for any action in reliance thereon. The information presented in this document is not intended as any commercial offer and does not form part of any quotation or contract. Signify assumes no legal liability or responsibility for any loss or damage resulting from the use of the information thereto given here. For purposes hereof "Signify" means Signify B.V. and its subsidiaries and associated companies (directly or indirectly).

Table 4. Life Cycle Assessment scenarios

Name	Value	Unit
Transport to the building site (A4): Road transport from manufacturing plant to the customer		
Transport distance	2200	km
Capacity utilization (including empty runs)	90	%
Packaging	0.66	kg
Operational energy use (B6)		
Electricity consumption	8,200	kWh
Equipment output	0.082	kW
End of life (C1-C4)		
Collected separately	6.8	kg
Recycling	6.8	kg
Reference Service Life In the example of a retail and/or industrial application		
Reference Service Life	25	a

Further information
Please contact: lighting.sustainability@signify.com
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.

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

PCR: Product Category Rules.

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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lighting.philips.com