

PHILIPS

Pacific LED

Product declaration



Environmental Product Declaration of the Pacific LED Circular Economy ready luminaire (ISO 14021)





About

This document intends to describe the environmental performance of the Circular Economy ready luminaire used in combination with Circular lighting. Assessment is carried out according to ISO14021.

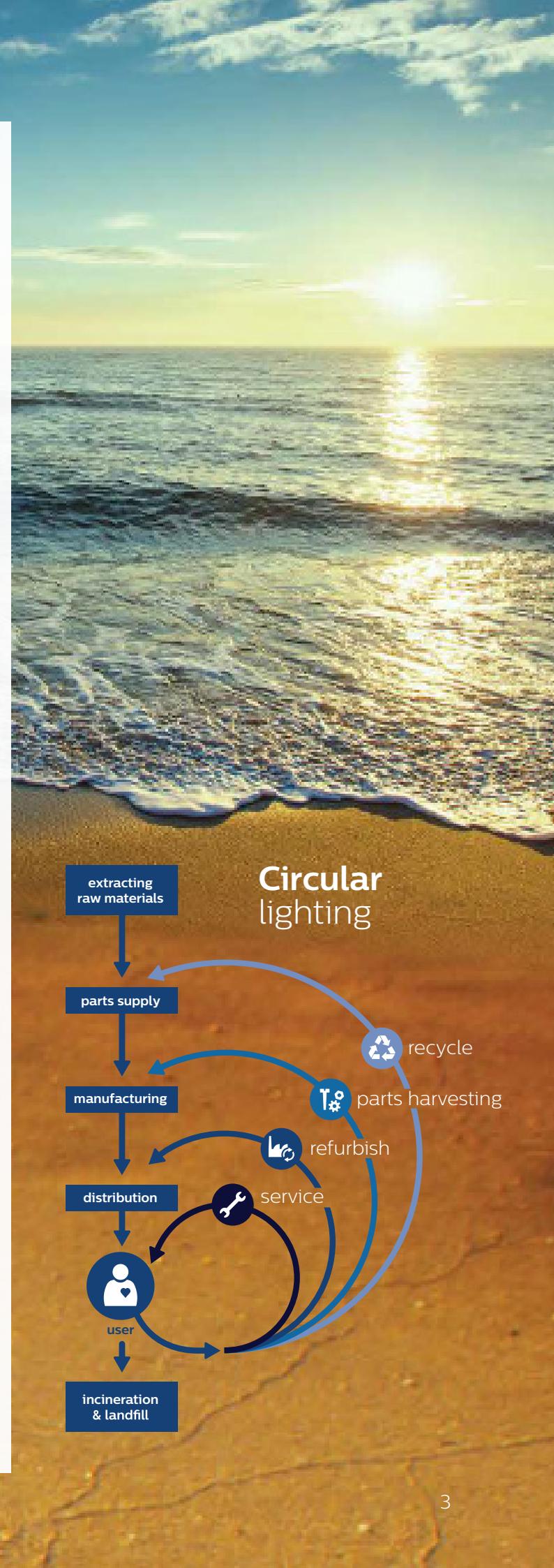
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Introduction to **Circular** lighting

For a sustainable world, the transition from a linear to a Circular Economy is essential. A Circular Economy aims to decouple economic growth from the use of natural resources by using these resources more effectively. With that goal in mind, at Philips Lighting we offer our customers circular lighting solutions.

Circular lighting changes light consumption and breaks away from the traditional way of doing business. Use, not ownership, is now the key element – 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.



Product introduction

Philips Pacific LED Circular Economy ready luminaire

The Philips Pacific LED Circular Economy ready luminaire is a high efficiency luminaire that complies with the strictest environmental regulations in existence. It is a 1:1 replacement for fluorescent waterproof luminaires, saving up to 60% on energy costs. Developed to suit very demanding environments – such as cold storage facilities, parking garages (typically low ceilings) and warehouses (typically high ceilings) – it is also an ideal solution for the food & beverage industry because it does not contain glass and is easy to clean.

It is the first luminaire in a series of products optimized for the circular lighting service model. It's designed to use natural resources in a much more effective and regenerative way, closing the materials loop according to Circular Economy design principles (see page 5). Thanks to modular assembly and design, maintenance is easy, and it is simple to upgrade (see page 5). It also offers optimal performance throughout its lifetime. End-of-contract management is straightforward since the luminaire can be repurposed in several ways: in a circular lighting contract; to a second-hand market; via extraction of spare parts; and eventually into recycled materials.



Key product features of the Pacific LED

- High-quality mechanical structure delivering IP66 proof and IK09 ratings
- High-end optics delivering excellent quality of light
- High efficiency up to 140 lm/W
- Long lifetime of typically 70,000 hrs
- Easy installation and maintenance
- Screwless access and gear tray slide, to reach parts quickly
- Versatility of product use in diverse and demanding applications
- Fast installation of the product and no risk of components falling into the production processes

Additional advantages of the Pacific LED Circular Economy ready luminaire

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

Easy to service:

- Prepared sensor slot and driver space for upgrade to "GreenParking" (connected lighting system)
- Philips Service tag for additional service information how to upgrade, remaining lifetime and spare parts ordering

Easy to refurbish:

- Driver can be easily replaced in the prepared slot and in future with a generic driver, which only requires a software upgrade to make it compatible

Possible parts harvesting and reuse:

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

Smooth end-of-contract management:

- Accessible information on who to contact and where to send it back
- Asset tracking and product return service via Philips Service tag
- Easy disassembly and use of materials suited for high material recovery

Optimized performance: (see Circularity, in next column)

- Low failure rate
- Dedicated long lifetime LED boards
- Dedicated long lifetime up to 100k hrs
- Even higher energy saving of up to 80% compared to conventional fluorescent lighting via GreenParking upgrade (73 kWh per year instead of 374 kWh per year)

Other benefits in combination with Circular lighting

The combination of the luminaire and the Circular lighting service contract provides hassle-free, future-proofed light without investment costs. Tangible benefits include:

- Predictable cost structure
- Lowest total cost of performance
- Philips Lighting organizes the repurposing of the luminaire at the end of the contract

Key sustainable focal areas



Energy

- Nominal power: 46.5 W
- Luminous efficacy: 140 lm/W



Substances

- EU RoHS compliant
- EU REACH compliant



Weight and Materials

- Weight of product: 3.2 kg
- Composition: see graph 1 on page 6



Packaging

- Composition of packaging: paper, labels, adhesives, polyethylene (PE)
- Weight of paper/cardboard: 490 g
- Weight of plastics: 1 g



Circularity

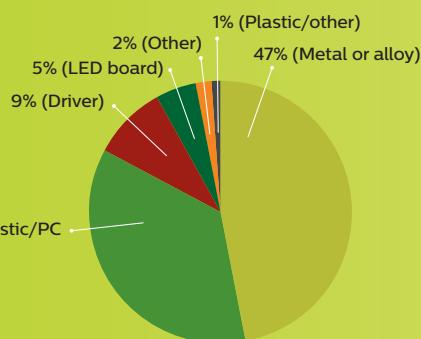
- **Upgradeability:** Upgradable to connected lighting system
- **Maintenance:** Lower failure rate of <0.5% (@5000 hrs) and >30% longer lifetime than standard version
- **Modular design:** Includes standardized components
- **Disassembly:** Non-destructive, less than five steps
- **Recycling:** Product breakdown into separated materials' waste streams (no potted drivers, glued connections, difficult interlocks...)



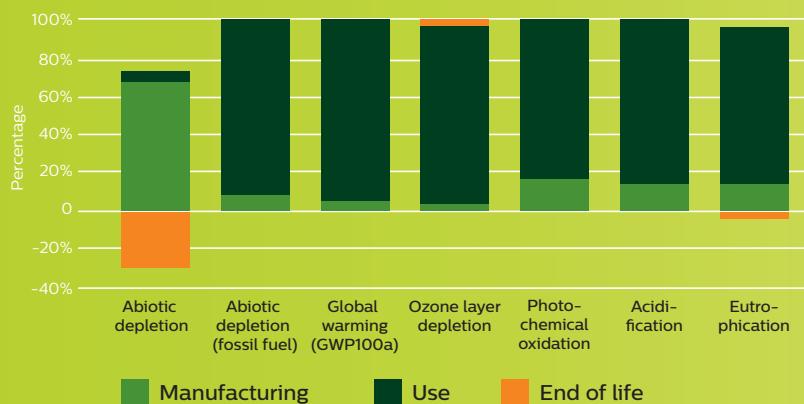
Environmental Assessment (summary)

Graph 1: Material content (base/ancillary materials)

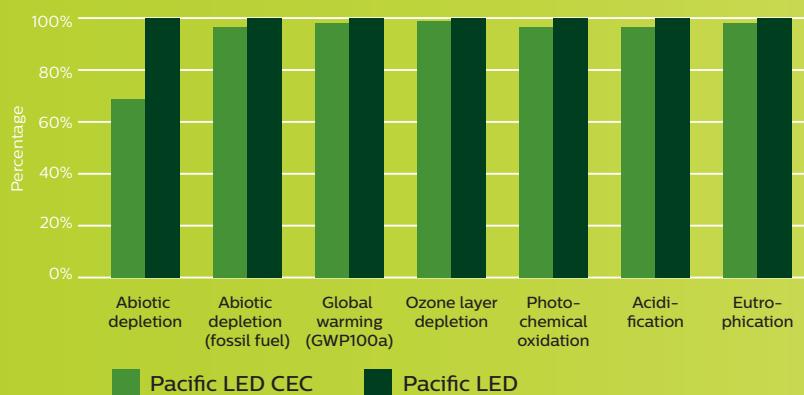
Metal or alloy	1,54kg	47%
Plastic/PC	1,19kg	36%
Driver	0,28 kg	9%
LED board	0,17kg	5%
Other	0,05 kg	2%
Plastic/other (PP, PA, silicone)	0,03kg	1%
Cable	0,02 kg	0%



Graph 2: Life cycle impacts, relative contributions



Graph 3: Advantages of the Circular Economy ready luminaire



Life Cycle Assessment results (Graph 2)

To measure the environmental footprint of the luminaire, a Life Cycle Assessment was carried out.

For all impact categories except the Abiotic Depletion Potential (ADPE, non-fossil), the dominant phase is the use phase, associated with electricity consumption and its related generation. In particular, the contribution to global warming potential (GWP) is for 95% associated with the use phase and 5% 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. Recycling the system provides a significant reduction in ADPE by the recovery of precious metals.

Advantages of the Circular Economy ready luminaire (graph 3)

A comparative study shows that the Pacific LED Circular Economy ready version outperforms its linear reference on all impact categories, in particular on ADPE, where benefits exceed 30%.

This is due to two combined effects:

- Increased lifetime (from 70,000 hrs to 100,000 hrs) leads to reduced resource consumption to produce the same amount of light during 100,000 hrs.
- Improved collection (from 85% to 100%) results in a higher material recovery rate at the end of life.

Environmental Assessment (input data)



Product

Declared product

1x Pacific LED Circular Economy ready

The luminaire is designed for a broad range of applications such as parking garages, cold storage facilities, industrial halls, food production centers and car washes.

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 SlimP LED boards, containing 36 LEDs distributed in a single row
- Mechanical parts made of metal or plastic
- Connectors
- Cables

Construction data

Name	Value	Unit
Dimension driver	360 x 30 x 21	mm
Dimension LED board	560 x 20	mm
Luminous flux	1700	lm
Luminous efficiency	140	lm/W
Radiation angle	120	deg
Color temperature	4000	K

Delivery

Product weight: 3.7 kg (incl. 0.49 kg packaging).

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 Slovakia (end cap and tube), Turkey and Poland (gear trays).

Packaging

Packaging materials are cardboard and polyethylene (PE). Packaging weight is 490 g.

Use 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 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.

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 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.

Circular lighting includes end-of-contract management by Philips Lighting. The Pacific LED Circular Economy ready luminaire will be 100% collected and then repurposed (re-use in a Circular lighting service contract, to a second-hand market, via extraction of spare parts and eventually into recycled materials).

Life Cycle Assessment calculation rules

Declared unit

The declared unit is a luminaire system, with a total weight of 3.7 kilograms including packaging, and providing a luminous flux of 6400 lumens. This luminaire provides sufficient light for a typical industrial application, operated in Europe for 100,000 hours (electricity consumption of 4650 kWhr).

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
- Waste processing
- Final disposal for WEEE fraction not recycled
- Recycling of steel and metals from PCBs

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 driver
- Data on collection and recycling are based on readily available data taken from generic national statistics

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 v3.1.

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.

Method

CML - IA baseline V3.03/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 framework (ISO 14040:2006) and Requirements and guidelines (ISO 14044:2006)

Disclaimer

All environmental calculations are based on a Circular Economy ready luminaire used in combination with Circular Lighting, in a European context. The calculations are performed on the most commonly used luminaire in the range. Circular Economy ready luminaires are identified by means of a design element. The LCA has been performed to the best of Philips Lighting's knowledge. No right or claim might be derived from this. *Philips Lighting disclaims any and all claims with respect thereto.*

Further information

Please contact:
lighting.sustainability@philips.com

[Circular Lighting \(website\)](#)

[Collection and Recycling \(brochure\)](#)

[Repurposing \(brochure\)](#)

[Ecoinvent \(website\)](#)

[Circular Economy design principles \(website\)](#)

Glossary

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

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.

Circular Economy ready luminaire (CEC): Luminaire designed to keep its components and materials at its highest utility and value at all times.

Circular lighting contract: performance contract including End of Life management by Philips Lighting

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

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.

GreenParking: A smart lighting system designed to save costs and reduce energy consumption.

LCA: Life Cycle Assessment.

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

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.

