

PHILIPS

GreenSpace Downlight

Product declaration



Environmental Product Declaration of the GreenSpace Downlight Circular Economy Ready luminaire

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





About

This document intends to describe the environmental performance of the GreenSpace Downlight 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 GreenSpace Downlight

Circular Economy Ready luminaire

Philips GreenSpace Downlight is the downlight family of choice for demanding retrofit and new installation jobs. GreenSpace Downlight offers exceptional quality of light with immediate economical pay-back. Embedded with the latest LED technology, the luminaire has extremely low energy consumption and a long life span of 50,000 hours with 80% lumen maintenance at 25°C. With innovative 3D printing technology GreenSpace Downlight can now be manufactured in various sizes, creating the perfect fit for retrofit installation jobs. By minimizing the use of screws and eliminating paint and glue, the luminaire can be disassembled in pure materials for re-cycling. Compared to die-cast aluminum luminaires, polycarbonate 3D printed luminaires have >45% less environmental impact in the production phase of a life cycle. With the possibility to connect the luminaire to a connected infrastructure such as Interact, it then becomes an IoT enabled device, ready for other IoT enabled services and innovation that the future brings. Philips GreenSpace Downlight is the solution to smart indoor environments.

Philips GreenSpace Downlight is future ready. The polycarbonate 3D printed luminaire is designed to use natural resources in a much more effective and regenerative way, closing the material loop according to Circular Economy design principles. Thanks to modular assembly and design, maintenance is easy, and it is simple to upgrade.

GreenSpace Downlight 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
- Compliant with office lighting norms
- Extended lifetime of 50 khrs
- Luminous efficacy up to 131 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:

- Future ready, connectable luminaire which can easily be integrated into our IoT enabled services such as Interact Pro, Interact Office & Interact Retail

Ease of customization and upgrades:

- Trim color can be changed by exchanging the trim on-site

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 and easy disassembly

Ease of disassembly:

- Possible to disassemble the product in a few steps.
- No tools are required for product disassembly

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 GreenSpace Downlight material composition in Table 1



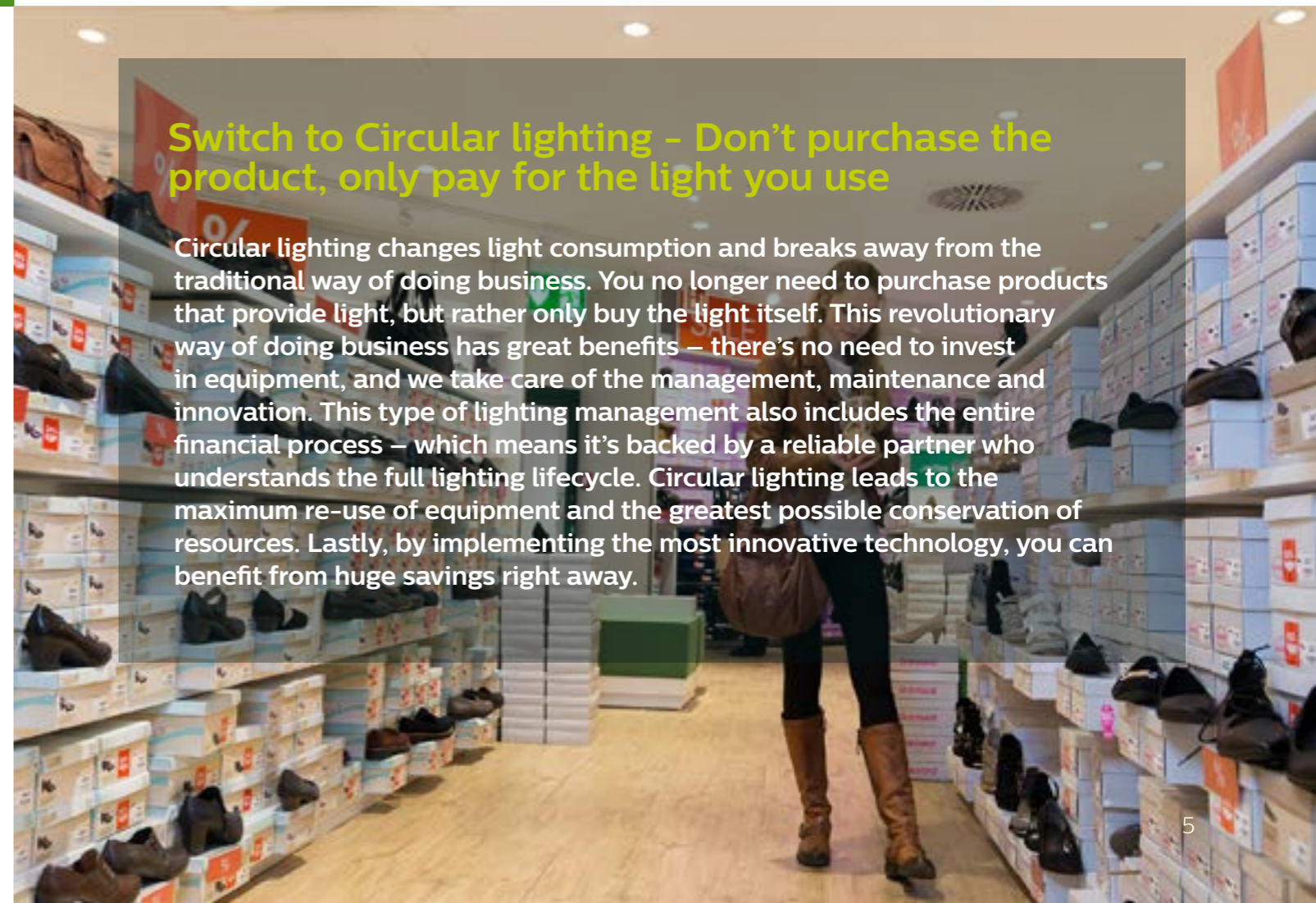
Packaging

- 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 GreenSpace Downlight

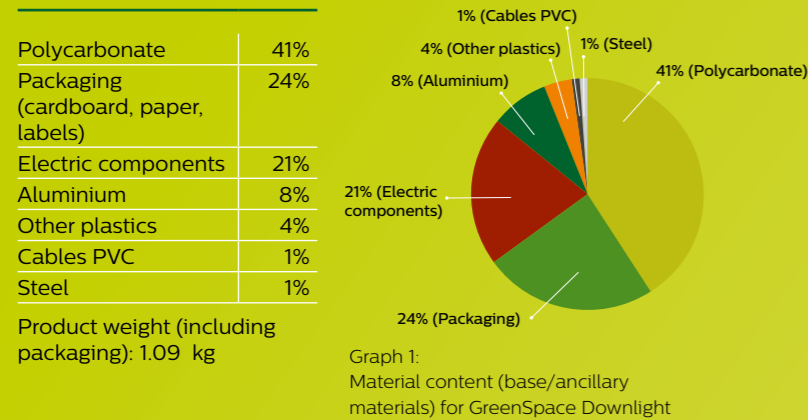
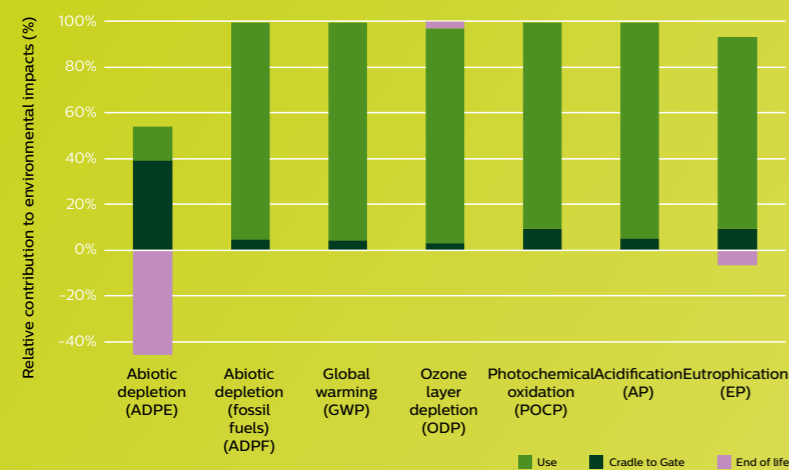


Table 2. Life Cycle Assessment (LCA) boundaries of GreenSpace Downlight

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 GreenSpace Downlight. 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 50,000 hours, equivalent to 12.5 years in operation in indoor applications (*based on maximum 4,000 burning hours per year). Environmental impacts of the product are dominated by the use phase associated with the electricity consumption of the lighting product. The use phase contributes over 90% of the impact in all impact categories except for Abiotic depletion (non-fossil) (ADPE), where the production phase contributes the majority the total impact. This impact to the ADPE is mostly due to extraction of virgin materials (mainly gold and copper followed by other metals such as tin, silver, lead and zinc) used to make electric components, as well as due to extraction and production of alloys used for the manufacturing of metal parts of the product. Circular use takes into account a 100% collection rate. With this collection rate, recycling of the polycarbonate from 3D printed parts, materials from the electric parts, and packaging in the end of life of the product constitutes the positive impact over 45% of the total ADPE, while only marginally contributing to the other impact categories.

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.

Life Cycle Assessment (input data)



Declared product

1x GreenSpace Downlight
12NC: 9125 0010 0523

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 Titanium driver
- 1x COB Fortimo SLM C LED board
- 1x polycarbonate optical cover
- Polycarbonate housing
- Mechanical parts made of metal or plastic (driver box, mounting elements etc.)
- Connectors
- Cables

Delivery

Product weight: 1.09 kg (incl. 0.29 kg packaging).

Table 3. Construction data

Name	Value	Unit
Dimension luminaire	Ø 216 94	mm
Dimension driver	188 x 46 x 32	mm
Dimension LED board	Ø 15 20 x 24	mm
Luminous flux	2200	lm
Luminous efficacy	131	lm/W
Color temperature	4000	K
Power	16.8	W
Lifetime L80	50	khrs

Environment and health during manufacturing

Manufacturing of the product is done by Signify Netherlands in Maarheeze, and suppliers located in other (non-) European countries.

Packaging

Packaging materials are cardboard and polyethylene (PE), with minor use of adhesives, inks and glue for labeling. Packaging weight is 292 g.

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 indoor applications (*based on maximum 4,000 burning hours per year). 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). Linear End-of Life scenario is based on the assumption 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 Signify. The GreenSpace Downlight 3D Circular Economy ready luminaire will be 100% collected and then repurposed. Further end of life scenario is based on a material split and respective recycling rates. Recovery potential of polycarbonate for 3D printing is estimated as 100% by the production facility intended to use the secondary material. Recovery potential for steel and precious metals is evaluated. The energy required for treatment of materials (shredding, extrusion...) is included.

Further information

Details of the product are published on: <http://www.lighting.philips.com/main/prof/indoor-luminaires/downlights/greenspace>

Life Cycle Assessment calculation rules

Declared unit

The declared unit is a luminaire system, with a total weight of 1.09 kg including packaging, and providing a luminous flux of 2200 lumens. This luminaire provides sufficient light for general indoor applications, operated in Europe for 50,000 hours with a maximum product failure rate of 2.6% (electricity consumption over the lifetime 818kWh).

System boundaries

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

- Production: raw materials 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 polycarbonate, steel and metals from electric and cast metal parts

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 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 v3.4.

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.

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)

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

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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	%
Installation into the building (A5):		
Packaging	0.29	kg
Operational energy use (B6)		
Electricity consumption	818	kWh
Equipment output	16	W
End of life (C1-C4)		
Collected separately	0.8	kg
Recycling	0.61	kg
Incineration	0.19	kg
Reference Service Life In the example of an office and/or retail application		
Reference Service Life	12.5	year

For purposes hereof "Signify" means Signify B.V. and its subsidiaries and associated companies (directly or indirectly).

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, 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 chlorofluorocarbons (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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