PHILIPS

Luma gen2

Product declaration

Environmental Product Declaration
of the Luma gen2 LED based luminaire

ISO 14021 based on ISO 14040/14044

Product

Luma gen2 is the next generation of the Luma LED family, fully optimized to become your long-term lighting and innovation partner. While keeping the distinctive design of the first generation, Luma gen2 gives you the benefits of the latest technologies thanks to its future-proof architecture. The use of optimized Ledgine LED and optical platform ensures best in class lighting performance in a broad range of applications from cycle paths to motorways.

Installation has never been easier because, thanks to Service tag, you have access to all the relevant documentation onsite. Tool less maintenance is also now a possibility thanks to GearFlex, a box inside the housing which contains all electrical components.

As we live in a connected world we design our products to be aligned with all recent innovations and Luma gen2 is not an exception.
By being System Ready our luminaire offers connectivity and dimming options while it can be paired with lighting management systems like Interact City.

As a company we are very conscious about the impact of light on the environment so we equipped Luma gen2 with dedicated light recipes which help maintaining an optimal ecosystem for bats and preserve a dark night sky.

Application

- Motorways, inter-urban main roads, boulevards and avenues, roundabouts, pedestrian crossings
- Residential streets, side streets, squares, parks, cycle and pedestrian paths, playgrounds
- Parking areas, industrial areas, petrol stations, rail

Environmental assessment - summary

Material content

Table 1: Material use

	Weight
TOTAL	22,35
Metals / Aluminium Painted	12,66
Electric Comp's / Electronic ballasts with connectors	2,76
Glass / Hard glass	2,00
Packaging / Paper	1,90
Plastics / PC (Polycarbonate)	0,61
Electric Comp's / Connectors	0,56
Plastics / PMMA	0,45
Plastics / PA polyamide	0,45
Gaskets / Silicone	0,35
Metals / Steel	0,17
Electric Comp's / PCBA without cables	0,15
Metals / Stainless Steel	0,12
Electric Comp's / OTHERS	0,09
Electric Comp's / Cables PVC	0,05
Electric Comp's / Electronic ballasts with cables	0,02
Packaging / PE	0,01

LCA results

To measure the environmental footprint of the luminaire, a life cycle assessment was carried out based on ISO 14040/14044. Environmental impacts of the reference represent the most probable worst case scenario for the product family as defined by the highest power consumption over the lifetime.

Tables 2 and 3 below display the results of the life cycle assessment. For the use stage, the RSL is defined as 100,000 hours, the equivalent of 25 years in operation in a roadway luminaire application.

Table 2: Environmental impacts

Impact category	Total		Cradle to Gate	Use	End of Life
Abiotic depletion	2,55E-01	kg Sb eq	55,2%	51,9%	-7,1%
Abiotic depletion (fossil fuels)	1,72E+05	MJ	2,2%	98,7%	-0,9%
Global warming (GWP100a)	1,51E+04	kg CO2 eq	2,3%	98,7%	-0,9%
Ozone layer depletion (ODP)	1,99E-03	kg CFC-11 eq	4,0%	95,7%	0,3%
Photochemical oxidation	3,07E+00	kg C2H4 eq	5,2%	96,8%	-2,0%
Acidification	7,58E+01	kg SO2 eq	3,1%	98,3%	-1,4%
Eutrophication	9,76E+00	kg PO4--- eq	3,3%	97,7%	-1,0%

Table 3: Resource use

Indicator (cf glossary)	Total value	Unit	Cradle to Gate	Use	End of Life
PERE	62221	[MJ]	1%	99%	0%
PERM	14	[MJ]	203%	0%	-103%
PERT	62235	[MJ]	1%	99%	0%
PENRE	333559	[MJ]	1%	99%	0%
PENRM	414	[MJ]	107%	0%	-7%
PENRT	333974	[MJ]	1%	99%	0%

Interpretation of the LCA results

Environmental impacts of the product are dominated by the use phase associated with the electricity consumption of the luminaire system. The use phase contributes over 95% of the impact in all impact categories except for Abiotic depletion (elements) (ADPE), where the production phase contributes the majority of the negative impact. Impacts in production of the luminaire system are associated mainly with manufacturing of electronic components and large aluminium mechanical parts. Here, highest contribution is due to extraction and processing metals used to make electric components (gold, silver, copper), and the housing (aluminium, zinc). 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 7%. 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.

Environmental Assessment - input data

Product

Declared product
1x Luma gen2 luminaire
(BGP705). The luminaire is designed for outdoor road and street applications

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:

- 3x Xitanium drivers
- 3x LED boards, containing 60 LEDs disributed in 12x5 rectangular shape
- Mechanical parts made of metal or die-cast aluminium
- Connectors
- Cable

Delivery Status
Product weight: 22,35kg (including 1,91 kg packaging)

Construction data

Name	Value	Unit
Dimension driver	171x101x41	mm
Dimension LED board	319x125	mm
Luminous flux	50410	lm
Luminous efficiency	142	lm/W
Color temperature	4000	K

Manufacturing
Manufacturing of the product is done by Signify Poland (Ketzryn), including painting of the housing and luminaire system assembly.

Packaging
Packaging materials are cardboard, paper and PE film. Packaging weight is 1910g.

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, the collection rate of WEEEs via CRSOs and other officious collection systems is estimated at 85%. End of life scenario is further based on a material split and respective recycling rates. Recovery potential for steel, aluminium, and precious metals is evaluated.

Calculation rules

Declared unit
The declaired unit is a luminaire system, with a total weight of 22,35kg including packaging, and providing a luminous flux of 50410 lumens. This luminaire provides sufficient light for road and street application, operated in Europe for 100.000 hours (electricity consumption of 35.500kWh 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:

- 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 to the user, 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 Signify database and the Ecoinvent database v3.6.

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 V3.05/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)

Table 3: LCA scenarios table

Name	Value	Unit
Logistics		
Road freight of components to manufacturing site	30,38	tkm
Air freight of components to manufacturing site	0	tkm
Sea freight of components to manufacturing site	1,8	tkm
Road transport from manufacturing site to the customer	0	km
Packaging	1,91	kg
Operational energy use		
Electricity consumption	35.500	kWh
Equipment output	355	W
End of Life		
Collected separately	20,91	kg
Recycled on manufacturing site	0	kg
Sent for recycling to the third parties	20,91	kg
Reference service life		
Useful hours of work	100.000	hours
Reference service life in the example of a road and street application	25	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

Please contact:
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.

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.