

PHILIPS

Iridium Gen4

Product declaration



Environmental product declaration of the Iridium Gen4 ISO 14021, based on ISO 14040/14044

Product

Product family description/Product family definition

Products of the Iridium gen4 family are designed for a broad range of road and street applications. The Iridium gen4 product range is designed with its family heritage in mind. With the introduction of the fourth generation of Iridium products, the design language is carefully maintained. The round cover and smooth lines are a very familiar sight and this Iridium gen4 wants to be recognizable. The Integrated spigot adds to this elegance, while giving the customer a benefit of switching from Side entry to post-top in seconds. The bottom frame can be ordered in raw aluminium. This is a key feature the fourth generation continues from the third generation.

The Iridium gen4 provides guidance through the clear curved bowl placed in each luminaire along the road.

Optional is the offer with GentleBeam. This is a textured curved glass, which reduces glare and improves visual comfort, while maintaining a good lighting distribution.



The luminaire holds a new plug and play GearFlex module. This ensures a simplified maintenance and spare part repair process. The complete redesigned luminaire has a tool less opening, similar to Luma gen2, containing all electrical components in an easy to handle and accessible box inside the housing. Besides, the cable feed-through has been redesigned and access to the gear components is easy thanks to top down tool-less access.

Iridium gen4 offers all connectivity and dimming options available today. As System Ready luminaire, it can be paired with lighting management systems such as Interact City or existing and upcoming sensor innovations. Also, installation has become easier and faster, and thanks to Service tag, you have access to all relevant documentations onsite.

Product family range

The Iridium gen4 family includes 2 products, the assembly of the products is implemented on manufacturing site of Signify Poland sp. z o.o. (Kętrzyn, Poland). Manufacturing site of the product has achieved carbon neutrality as of 2019.

The EPD does not present the assessment of the impacts of the whole range, and focused on representation through the most probable worst case scenario rather than through average impacts with assessment of deviations. This approach is based on the Signify developed EPD framework.

Representative product

BGP502 is chosen as a representative product for the family as the luminaire with the highest power consumption over the lifetime. Based on multiple LCA studied of the LED based luminaires, it is defined that the use stage (and electricity consumption in particular) tends to contribute the majority of the life-cycle impacts. Thus, a product with the largest power consumption over the lifetime in the family is most likely to have largest impacts, and thus present a worst case. That choice of a product aligns with pessimistic assumptions and precautionary principle in view of the task to represent other products in the family. This approach is based on the Signify developed EPD framework.

Application

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
- 3x Ledgine O LED board
- 20 LEDs distributed in a single PCB
- Mechanical parts (metal or die-casted aluminium)
- Connectors
- Cables

Driver:

i.	Type	Xitanium Xi SR 110W 0.2-0.7A SNEMP 230V C150 sXt
ii.	Failure rate (max % @lifetime)	5%
iii.	Dimensions, mm	133 x 77 x 40

LED board

i.	Type	Ledgine O
ii.	Dimension board, mm	75 x 70
iii.	Amount of PCBA per luminaire	3
iv.	Number of LEDs per PCBA	20

Constructional data

Name	Value	Unit
Dimensions	356*885*166	Mm*mm*mm
Luminous flux	12 549	lm
Luminous efficacy	141	Lm/W
Radiation angle	120	Deg
Colour temperature	4000	K

Delivery status

Product weight: 16.07 kg (including 0.81kg packaging), dimensions of the packed product: 690mm*356mm*180mm

Base materials/Ancillary materials

Materials	Weight, kg
Metals / Aluminium	8,46
Electric Comp's / Electronic ballasts with connectors	2,46
Glass / Hard glass	1,10
Electric Comp's / Cables PTFE-ETFE-FEB-PFA	1,02
Packaging / Paper	0,80
Electric Comp's / Cables TPE	0,62
Plastics / PC (Polycarbonate)	0,52
Metals / Steel	0,20
Gaskets / Silicone	0,15
Plastics / PMMA	0,12
Electric Comp's / Connectors PA	0,11
Electric Comp's / PCBA without cables	0,11
Metals / Stainless Steel	0,10
Plastics / PA polyamide	0,08
Electric Comp's / Cables / Silicone	0,08
Electric Comp's / Mainscords	0,06
Electric Comp's / Connectors	0,05
Electric Comp's / Electronic ballasts with cables	0,01
Packaging / Labels , ink, adhesives	0,01
Product weight (including packaging)	16,07

Manufacturing

Manufacturing is conducted by Signify Poland sp. z o.o. (Kętrzyn, Poland).

Product processing/Installation

Product is mounted directly on the pole, either as post-top or side-entry.

Packaging

0.81 kg, cardboard and paper.

Condition of use

The user uses the product over its lifetime and maintains the luminaire, after which decides on its end of life destiny and dispose the unit in parts respectively. Applications may apply dimming or lighting controls to allow further energy saving. In case of failure, the electronic components can be replaced without tools as they are fitted in a GearFlex box. This includes the driver, Surge protection device and fuses,

and the LED boards. The default failure rate is 10% over the lifetime (5% for the driver). Product is used in the European market context and assumed to use average European electricity mix.

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, the equivalent of 23 years operation in a roads and streets application (4000 hours per year).

End of life

In the European Union, luminaires fall within the 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). The luminaire is 100% collected and disassembled. When possible, parts are repurposed (re-use in a Circular lighting service contract, to a second-hand market, via extraction of spare parts and eventually into recycled materials). The reusable parts count the driver and cables. The rest of the collected parts is based on a material split and respective recycling rates. Non-recycled content is disposed to the municipal waste stream where it undergoes separation, preparation and treatment according to the average European statistics.

Extraordinary effects

- Fire: effects of fire can lead to emissions of PBDD/F (brominated compounds).
- Water: no known impacts on the environment following unforeseeable influence of water, e.g. flooding.
- Mechanical destruction: no known impacts on the environment following unforeseeable mechanical destruction.

Further information

Details of the product are published on: <https://www.lighting.philips.nl/>

Calculation rules

Constructional data

Declared unit	Value	Declared unit
Iridium Gen4 (BGP502)	Unit	1 piece

Declared unit

The declared unit is a luminaire with aluminium housing, 1 driver, 3 LED boards, cables, and other plastic, metal and glass constructive components totalling a weight of 15 263 grams excluding packaging, providing a luminous flux of 12 549 lm, including luminaire losses. The luminaire, provides sufficient light for a typical roads and streets application, operated in a European context for 100 000 hours.

System boundary

Cradle to grave with options

Modules A1-A3 include raw material extraction, processing, energy and materials and manufacture of modules and packaging; energy consumption for housing cutting and bending, as well as steel material losses are included; other energy and materials consumed in the product assembly are excluded.

The following scenarios are also included:

- Transport to installation (A4)
- Disposal of packaging materials (A5)
- Replacement of drivers (5% rate), fuses (10% rate) and light source (10% rate) (B3)
- Operational energy use (B6)
- Transport to end of life (C2)
- Waste processing (C3)
- Final disposal for WEEE fraction not recycled (C4)

Benefits and loads beyond system boundary:

Recycling of cardboard packaging, electronics, cables, aluminium, steel, plastic and glass elements of luminaire. (D)

Estimates and assumptions

Background data are used for suppliers' specific processes. Foreground data are used for the assembly of the lighting unit in regards to the components of the luminaire (system). 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 European statistics. The end of life scenario

assumes recycling of the separated materials, but does not include energy recovery from incineration of the waste. Representation of the family is assumed on the worst case scenario with largest power consumption over the lifetime, and is not compliant with EN15804:A1.

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.

Period under review

The period under review is the year 2020.

Allocation

Avoided burden approach is applied to allocation of recycled and/or secondary raw materials, as well as loads and benefits beyond the system boundary from material recycling. No loads and benefits beyond the system boundary from energy recovery from the end of life of the product or packaging is included. Energy consumption, material and waste generation at the manufacturing site not attributed to bill of materials of the products, is allocated by portioning, on the basis of units produced.

Comparability

A comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to the Signify/Philips lighting framework and the building context, respectively the product specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

Transport to the site (A4)

Name	Value	Unit
Transport distance	1200	Km
Transport mode	truck, unspecified generic	-
Capacity utilisation incl. empty runs	45	%
Bulk density of transported product	359	kg/m ³

Installation at the site (A5)

Name	Value	Unit
Packaging waste	0.81	kg

Reference service life

Name	Value	Unit
Reference service life	25	Years
Operating hours per year	4000	Hours
Quality of work	L90B50	-
Environment of operation	Average European conditions	-
Usage conditions	Outdoor	-

Repair (B3)

Name	Value 1	Value 2	Value 3	Unit
Repair process	Replacement of the driver	Replacement of the light source	Replacement of the fuse	-
Repair cycle	0.05	0.1	0.1	Number/RSL
Resources	0.12	0.11	0.001	kg
Transportation distance	4.8	4.8	4.8	Km
Transportation mode	Van	Van	Van	-

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	1580	kWh
Equipment output	19	W

End of life (C1-C4)

Name	Value	Unit
Collected separately	12,97	kg
Sent to recycling	7,73	kg
Sent to energy recovery	2,76	kg
Sent to landfilling	5,82	kg
Transportation distance from collection point to recycling	100	km
Transportation distance from collection point to incineration and landfilling	30	km
Mode of transportation	Truck, unspecified	-

LCA Results

Description of the system boundary (x = included in lca; mnd = module not declared; mnr = module not relevant)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste Processing	Disposal	Reuse- Recovery- Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MNR	X	MNR	X	MND	MND	X	X	X	X

Results of the LCA - environmental impact

Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
GWP	[kg CO2Eq.]	2,8E+02	2,8E+00	1,1E-01	1,4E+01	3,6E+03	2,2E-01	1,8E+00	1,4E+01	-5,3E+01
ODP	[kg CFC11Eq.]	1,5E-03	5,2E-07	8,7E-09	1,6E-06	4,6E-04	4,0E-08	1,7E-07	9,3E-08	-6,8E-06
AP	[kg SO2Eq.]	2,1E+00	1,2E-02	9,3E-04	7,9E-02	1,8E+01	9,2E-04	9,7E-03	7,0E-03	-8,6E-01
EP	[kg (PO4)3Eq.]	2,3E-01	2,2E-03	8,9E-05	1,2E-02	2,3E+00	1,7E-04	1,9E-03	2,2E-03	-6,6E-02
POCP	[kg Ethen Eq.]	1,4E-01	3,9E-04	4,8E-05	5,5E-03	7,2E-01	3,7E-05	6,0E-04	4,5E-04	-4,0E-02
ADPE	[kg Sb Eq.]	8,9E-02	6,6E-05	1,6E-05	3,4E-03	3,2E-02	5,8E-07	3,4E-05	3,2E-04	-3,6E-02
ADPF	[MJ]	2,6E+03	4,2E+01	1,3E+00	1,7E+02	4,1E+04	3,3E+00	1,8E+01	1,0E+01	-5,9E+02
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources									

Results of the lca - resource use

Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
PERE	[MJ]	3,9E+02	6,6E-01	1,6E-01	1,4E+01	1,5E+04	3,8E-02	2,5E+00	1,8E+00	-1,3E+02
PERM	[MJ]	1,9E+01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-5,3E+00
PERT	[MJ]	4,1E+02	6,6E-01	1,6E-01	1,4E+01	1,5E+04	3,8E-02	2,5E+00	1,8E+00	-1,3E+02
PENRE	[MJ]	3,1E+03	4,5E+01	1,5E+00	2,0E+02	8,0E+04	3,6E+00	2,8E+01	1,0E+01	-7,7E+02
PENRM	[MJ]	2,7E+02	0,0E+00	0,0E+00	6,7E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-3,3E+01
PENRT	[MJ]	3,4E+03	4,5E+01	1,5E+00	2,0E+02	8,0E+04	3,6E+00	2,8E+01	1,0E+01	-8,0E+02
SM	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
RSF	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
NRSF	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
FW	[m3]	IND	IND	IND	IND	IND	IND	IND	IND	IND
Caption	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; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

Results of the lca – output flows and waste categories

Parameter	Unit	A1-A3	A4	A5	B4	B6	C2	C3	C4	D
HWD	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
NHWD	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
RWD	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
CRU	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	IND
MFR	[kg]	IND	IND	IND	IND	IND	IND	IND	IND	7,73
MER	[kg]	IND	IND	IND	IND	IND	IND	IND	2,76	IND
EEE	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
EET	[MJ]	IND	IND	IND	IND	IND	IND	IND	IND	IND
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy									

Not all background datasets support the methodical approach of the water and waste indicators. The value of the indicator is therefore subject to greater uncertainty. These indicators are thus not declared. IND is used in cases where the inventory does not support the methodological approach or the calculation of the specific indicator.

The life cycle impact assessment by stage (contribution analysis) is illustrated in the picture on the right:



Use phase of the product associated with electricity consumption for lighting (stage B6 on the chart), and sourcing and processing of the raw materials (stage A1-A3 on the chart) have the highest and most significant contribution to the overall environmental impacts of the product over its life cycle. In particular, impacts in global warming potential, acidification potential, eutrophication potential, photochemical ozone formation potential, and abiotic depletion potential (fossil) categories are driven by the use phase and could be attributed to electricity generation. Abiotic depletion potential (elements) (ADPE) and ozone layer depletion potential (ODP) impacts are dominated by the raw materials sourcing and production stage. The impact to the ADPE is mostly due to extraction of virgin materials used to make electric components

(such as gold and silver), as well as due to extraction and production of aluminium used for the housing manufacturing. For ODP, most of the negative impacts in the production stage are attributed to manufacturing of polymers used as covering material of temperature-resistant cables. End of life of the product has a marginal contribution to the reduction of overall impacts in all categories apart from ADPE. There, recycling in the end of life reduces the cumulative impact of production (A1-A3), distribution and installation (A4-A5), use (B3, B6), and end of life (C2-C4) by 28%, relating to -40% of the total ADPE over the life cycle. This is achieved by high rates of luminaires collection in the end of their service, and high rates of recycling of the metal components in the end of life of the luminaire (predominantly, aluminium).

Requisite evidence

The measurements are based on documentation and bill of materials of the product.

References

EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14021:2016, Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)

ISO 14025 DIN EN ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 14040:2006, Environmental management — Life cycle assessment — Principles and framework

ISO 14044:2006, Environmental management — Life cycle assessment — Requirements and guidelines

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

Further information Please contact:

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Collection and Recycling (brochure)

[Ecoinvent](#) (website)

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.

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.



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