epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

MIXZ67-1500 LED 7500 HF TW PC M20

The Norwegian EPD Foundation

Owner of the declaration:
Glamox AS

Product:
MIXZ67-1500 LED 7500 HF TW PC M20

Declared unit:
1 pcs

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
IBU PCR - Part B for luminaires, lamps, and components for luminaires

Program operator:
The Norwegian EPD Foundation

Declaration number:

NEPD-8130-7801-EN

Registration number:

NEPD-8130-7801-EN

Issue date: 18.11.2024

Valid to: 18.11.2029

EPD software:
LCAno EPD generator ID: 617546

General information

Product

MIXZ67-1500 LED 7500 HF TW PC M20

Owner of the declaration:

Glamox AS
Contact person: Birger Holo
Phone: +47 97551574
e-mail: birger.holo@glamox.com

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Manufacturer:

Glamox AS
Birger Hatlebakks veg 15
6415 Molde, Norway

Declaration number:

NEPD-8130-7801-EN

Place of production:

Glamox production site Molde (Norway)
Birger Hatlebakks veg 15
6415 Molde, Norway

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
IBU PCR - Part B for luminaires, lamps, and components for luminaires

Management system:

ISO 9001, ISO 14001; Molde: ATEX, ISO 80079-34 (IECEx), ISO45001, ISO50001; Kirkenær: ISO 13485; Keila: ISO 45001, ISO 50001; Dobczyce: ATEX, ISO 80079-34 (IECEx), Module D 2014/90/EU

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Organisation no:

912007782

Declared unit:

1 pcs MIXZ67-1500 LED 7500 HF TW PC M20

Issue date:

18.11.2024

Declared unit with option:

A1,A2,A3,A4,A5,B6,C1,C2,C3,C4,D

Valid to:

18.11.2029

Year of study:

2023

Functional unit:

1 pc MIX-1500 manufactured in Glamox Molde. Transport to customer, installed and used according to a specific lighting regime. Including waste treatment in Europe at end-of-life.

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2021.09, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. NEPDT42

Developer of EPD: Marthe Gaasø

Reviewer of company-specific input data and EPD: Jonny A. Strømme

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools. Approval number: NEPDT41.

Third party verifier:

Vito D'Incognito, Take Care International

(no signature required)

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

MIX is a high quality long life Category 3 marked LED luminaire for zone 2/22. Suitable for industrial applications, ships and oil installations in areas where an explosive atmosphere occurs only exceptionally for short periods.

This environmental product declaration can be used for the following luminaires:
MIX096992 - MIXZ67-1500 LED 7500 HF TW PC 830 M20
MIX091063 - MIXZ67-1500 LED 7500 HF TW PC 840 M20
MIX105905 - MIXZ67-1500 LED 7500 HF TW PC 865 M20

Product specification

Materials	kg	%
Adhesive and sealant	0,01	0,08
Coating materials	0,15	2,05
Electronic - Auxiliaries	0,00	0,01
Electronic - Connector	0,04	0,56
Electronic - LED chip	0,00	0,03
Electronic - LED driver	0,17	2,32
Electronic - LED plate	0,18	2,43
Electronic - Wire	0,26	3,42
Plastic - Polyamide	0,05	0,68
Rubber, synthetic	0,01	0,08
Silicon products	0,23	3,09
Metal - Brass	0,02	0,24
Metal - Stainless steel	0,09	1,18
Metal - Steel	4,39	58,44
Metal - Steel with aluzinc coating	0,33	4,35
Plastic - Polycarbonate (PC)	1,58	21,05
Total	7,51	100,00

Packaging	kg	%
Packaging - Paper	0,02	3,35
Packaging - Recycled cardboard	0,71	96,65
Total incl. packaging	8,24	100,00

Technical data:

Please visit the product page on our website for more technical information.
https://www.glamox.com/global-marine/products

Market:

Nordic

Reference service life, product

100 000 hours lifetime for the luminaire according to the technical qualities for the product family.

Reference service life, building or construction works

25 years. Standard service life for installation in Marine, Offshore and Wind.

LCA: Calculation rules

Declared unit:

1 pcs MIXZ67-1500 LED 7500 HF TW PC M20

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) can be excluded. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Adhesive and sealant	EPD-FEI-20220021	EPD	2021
Coating materials	Ecoinvent 3.6	Database	2019
Electronic - Auxiliaries	Modified ecoinvent 3.6	Database	2019
Electronic - Connector	ecoinvent 3.6	Database	2019
Electronic - LED chip	Scholand et al. (2012) + Ecoinvent 3.6	Scientific literature + database	2017
Electronic - LED driver	Product composition + ecoinvent 3.6	Supplier data + database	2019
Electronic - LED plate	ecoinvent 3.6	Database	2019
Electronic - Wire	Material composition + ecoinvent 3.6	Supplier data + database	2019
Metal - Brass	ecoinvent 3.6	Database	2019
Metal - Stainless steel	ecoinvent 3.6	Database	2019
Metal - Steel	ecoinvent 3.6	Database	2019
Metal - Steel	S-P-01921	EPD	2017
Metal - Steel	SSAB	EPD (EN15804A1) + company dataset (EN15804A2)	2020
Metal - Steel with aluzinc coating	S-P-06909	EPD	2022
Packaging - Paper	ecoinvent 3.6	Database	2019
Packaging - Recycled cardboard	ecoinvent 3.6	Database	2019
Plastic - Polyamide	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Rubber, synthetic	ecoinvent 3.6	Database	2019
Silicon products	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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	MND	MND	MND	X	MND	X	X	X	X	X

System boundary:

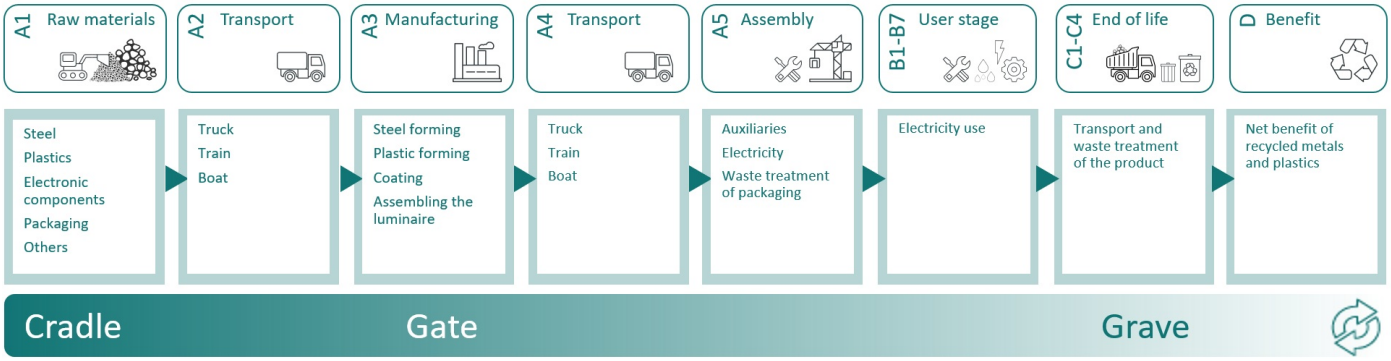
The analysis is a cradle-to-grave study of one luminaire manufactured and installed, used according to a specific lighting regime over a specific lifetime, including waste treatment at end-of-life.

A1-A5 includes the extraction and production of raw materials, transportation to the production site, the production process itself, transport to the market and assembly.

B6 is the operational energy use stage of the luminaire based on the the technical lifetime hours for the product family and the power consumption of the declared luminaire.

C1-C4 includes de-installation of the luminaire, average transport between location/application/installation site and waste treatment facility, waste processing and disposal in Europe. Waste treatment of the product follows the default values provided in EN 50693.

D shows the recyclability of metals and plastics and allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastic insulation and other parts is also calculated in module D.



Additional technical information:

Please visit our website www.glamox.com for more technical information.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Module A4:
Transport from manufacturing location in Molde to warehouse in Oslo (495 km) + average distribution into the Nordic market (500 km).

Module B6:
The operational energy use of the luminaire is calculated based on the methodology provided in IBU PCR Part B for luminaires, lamps, and components for luminaires. The energy consumption model for luminaire used in the PCR follows the application scenarios developed in EN 15193:2007. To calculate the electricity use of the luminaire, the following scenario parameters have been applied:

- Product family user scenario = Custom *
- Active power of the luminaire = 54 watt
- Passive power of the luminaire (Pp) = 0 watt
- Totally yearly time usage (tD+tN) = 6570 hours
- Standard year time (ty) = 8760 hours
- The occupancy dependency factor (FO) = 1 (factor, no unit)
- The dependency factor (FD) = 1 (factor, no unit)
- The product specific constant illuminance factor (FCP) = 1 (factor, no unit)
- The specific empiric lifetime of the luminaire in years (a) = 15,22 years **

*The custom user scenario has been developed by Glamox. This scenario is based on our long industry knowledge of the typical use of this product family and the technical lifetime for the luminaire.

**The application specific empiric lifetime is 25 years, but since the luminaire has a technical lifetime for 100 000 hours will the estimated 75 % usage yearly exceed this. We therefore use the lifetime hours divided by totally yearly time usage to find our empirical lifetime in this calculation for energy consumption.

Module C2:
Average transport to Nordic waste treatment facilities (300km).

Modules C3 and C4:
Waste treatment of the product follows the default values provided in EN 50693, Product Category Rules for life cycle assessments of electronic and electrical products and systems, table G.4. This table specified how different types of raw materials used in A1 will likely be treated during the end-of-life of the product. Waste treatments in C3 include material recycling and incineration with and without energy recovery and fly ash extraction. Disposal in C4 consist of landfilling of different waste fractions and of ashes.

Module D:
The recyclability of metals, plastics, and electronic components allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastic insulation and other parts is also calculated in module D.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km) - Europe	36,7 %	995	0,043	l/tkm	42,79

Assembly (A5)	Unit	Value			
Waste, packaging, corrugated board box, 55% recycled, to average treatment (kg) - A5, inkl. 85 km transp.	kg	0,71			
Waste, cardboard and paper, to average treatment - A5 including transport (kg)	kg	0,02			

Operational energy (B6)	Unit	Value			
Electricity, Nordic (kWh)	kWh/DU	5400,00			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km) - Europe	36,7 %	300	0,043	l/tkm	12,90

Waste processing (C3)	Unit	Value			
Waste treatment of plastic mixture, incineration with energy recovery and fly ash extraction (kg)	kg	1,05			
Waste treatment per kg used electronic components, manual seperation (kg)	kg	0,47			
Steel to recycling (kg)	kg	3,85			
Copper to recycling (kg)	kg	0,08			
Brass to recycling (kg)	kg	0,01			
Waste treatment of hazardous waste, incineration with fly ash extraction (kg)	kg	0,15			
Waste treatment per kg used PWB, shredding and separation - C3 (kg)	kg	0,30			
Waste treatment per kg electronics scrap from PWB, with components, recycling of metals - C3 (kg)	kg	0,06			
Waste treatment per kg electronics scrap from LED plate, without components, recycling of copper - C3 (kg)	kg	0,09			
Waste treatment of non-hazardous waste, incineration with energy recovery and fly ash extraction (kg)	kg	0,00			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Plastic mixture, process per kg ashes and residues (kg)	kg	0,04			
Landfilling of plastic mixture (kg)	kg	1,05			
Landfilling of steel (kg)	kg	0,96			
Landfilling of copper (kg)	kg	0,06			
Landfilling of brass (kg)	kg	0,01			
Landfilling of ashes from incineration of Hazardous waste, process per kg ashes and residues - C4 (kg)	kg	0,03			
Landfilling of hazardous waste (kg)	kg	0,16			
Landfilling of ashes from incineration of Non-hazardous waste, process per kg ashes and residues (kg)	kg	0,00			
Landfilling of non-hazardous waste (kg)	kg	0,00			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	1,65			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	24,91			
Substitution of primary steel with net scrap (kg)	kg	3,44			
Substitution of primary copper with net scrap (kg)	kg	0,06			
Substitution of primary brass with net scrap (kg)	kg	0,00			
Substitution of primary metals with net scrap from PWB, with components (kg)	kg	0,02			
Substitution of copper with net scrap from PWB, without components (kg)	kg	0,01			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact							
Indicator		**Unit**	A1	A2	A3	A4	A5
	GWP-total	kg CO_2 -eq	7,24E+01	1,38E+00	5,47E-01	1,23E+00	1,25E+00
	GWP-fossil	kg CO_2 -eq	7,30E+01	1,38E+00	5,16E-01	1,23E+00	1,18E-02
	GWP-biogenic	kg CO_2 -eq	-6,83E-01	5,70E-04	2,91E-02	5,07E-04	1,24E+00
	GWP-luluc	kg CO_2 -eq	8,34E-02	4,91E-04	1,47E-03	4,36E-04	3,90E-06
	ODP	kg CFC11 -eq	4,34E-06	3,12E-07	3,63E-08	2,78E-07	2,49E-09
	AP	mol H+ -eq	4,68E-01	4,05E-03	3,30E-03	3,52E-03	5,59E-05
	EP-FreshWater	kg P -eq	7,26E-03	1,10E-05	2,58E-05	9,79E-06	9,69E-08
	EP-Marine	kg N -eq	6,47E-02	8,06E-04	6,25E-04	6,97E-04	1,85E-05
	EP-Terrestial	mol N -eq	7,65E-01	9,01E-03	7,08E-03	7,79E-03	2,00E-04
	POCP	kg NMVOC -eq	2,33E-01	3,42E-03	1,95E-03	2,99E-03	5,75E-05
	ADP-minerals&metals[1]	kg Sb-eq	7,16E-03	3,80E-05	2,52E-05	3,38E-05	2,87E-07
	ADP-fossil[1]	MJ	9,28E+02	2,08E+01	5,35E+00	1,85E+01	1,65E-01
	WDP[1]	m^3	2,58E+03	2,01E+01	7,70E+02	1,79E+01	2,09E-01

Indicator		**Unit**	B6	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	7,87E+02	0,00E+00	3,70E-01	2,91E+00	1,81E-01	-5,08E+00
	GWP-fossil	kg CO_2 -eq	7,33E+02	0,00E+00	3,69E-01	2,91E+00	1,80E-01	-5,06E+00
	GWP-biogenic	kg CO_2 -eq	1,34E+01	0,00E+00	1,53E-04	1,64E-03	2,91E-04	-5,93E-03
	GWP-luluc	kg CO_2 -eq	4,02E+01	0,00E+00	1,31E-04	3,72E-04	3,04E-04	-8,25E-03
	ODP	kg CFC11 -eq	7,93E-05	0,00E+00	8,37E-08	4,98E-08	9,69E-09	-1,05E-02
	AP	mol H+ -eq	3,38E+00	0,00E+00	1,06E-03	1,46E-03	3,76E-04	-1,09E-01
	EP-FreshWater	kg P -eq	4,85E-02	0,00E+00	2,95E-06	1,24E-05	1,99E-06	-7,81E-04
	EP-Marine	kg N -eq	5,34E-01	0,00E+00	2,10E-04	4,36E-04	2,32E-04	-8,56E-03
	EP-Terrestial	mol N -eq	7,17E+00	0,00E+00	2,35E-03	4,65E-03	1,20E-03	-1,05E-01
	POCP	kg NMVOC -eq	1,68E+00	0,00E+00	9,00E-04	1,20E-03	4,34E-04	-3,72E-02
	ADP-minerals&metals[1]	kg Sb-eq	1,14E-02	0,00E+00	1,02E-05	2,06E-06	4,05E-07	-1,72E-03
	ADP-fossil[1]	MJ	1,98E+04	0,00E+00	5,59E+00	2,81E+00	1,01E+00	-4,81E+01
	WDP[1]	m^3	1,53E+06	0,00E+00	5,40E+00	1,57E+01	1,26E+01	1,50E+02

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

A luminaire is a product that consumes energy during the use phase. Combined with a relatively long expected lifetime and the environmental impact of generating electricity, the use phase (B6) will normally be the most contributing stage to the overall environmental impact of the declared unit. It is important to be aware that the actual calculations of the effect of B6 is particularly sensitive to which use scenario and fuel source that is chosen.

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	A5
	PM	Disease incidence	3,29E-06	8,43E-08	3,66E-08	7,50E-08	8,24E-10
	IRP[2]	kgBq U235 -eq	2,65E+00	9,10E-02	8,33E-02	8,10E-02	7,06E-04
	ETP-fw[1]	CTUe	3,38E+03	1,54E+01	2,24E+01	1,37E+01	2,20E-01
	HTP-c[1]	CTUh	6,61E-08	0,00E+00	1,12E-09	0,00E+00	6,00E-12
	HTP-nc[1]	CTUh	2,91E-06	1,69E-08	2,50E-08	1,50E-08	2,76E-10
	SQP[1]	dimensionless	2,56E+02	1,45E+01	3,00E+00	1,30E+01	1,11E-01

Indicator		Unit	B6	C1	C2	C3	C4	D
	PM	Disease incidence	1,79E-05	0,00E+00	2,26E-08	1,30E-08	6,63E-09	-5,64E-07
	IRP[2]	kgBq U235 -eq	4,52E+02	0,00E+00	2,44E-02	1,26E-02	4,31E-03	-4,86E-02
	ETP-fw[1]	CTUe	2,48E+04	0,00E+00	4,14E+00	1,39E+01	6,36E+02	-9,21E+02
	HTP-c[1]	CTUh	5,78E-07	0,00E+00	0,00E+00	1,55E-09	1,92E-10	-2,43E-08
	HTP-nc[1]	CTUh	1,52E-05	0,00E+00	4,52E-09	7,21E-08	2,07E-09	-8,38E-08
	SQP[1]	dimensionless	1,49E+04	0,00E+00	3,91E+00	8,34E-01	2,60E+00	-2,88E+01

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use							
Indicator		**Unit**	A1	A2	A3	A4	A5
	PERE	MJ	9,10E+01	2,98E-01	5,71E+01	2,65E-01	2,72E-03
	PERM	MJ	6,13E+00	0,00E+00	0,00E+00	0,00E+00	-6,71E+00
	PERT	MJ	9,71E+01	2,98E-01	5,71E+01	2,65E-01	-6,71E+00
	PENRE	MJ	9,17E+02	2,08E+01	5,36E+00	1,85E+01	1,65E-01
	PENRM	MJ	5,22E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	9,69E+02	2,08E+01	5,36E+00	1,85E+01	1,65E-01
	SM	kg	1,00E+00	0,00E+00	1,40E-02	0,00E+00	0,00E+00
	RSF	MJ	1,43E+00	1,07E-02	4,64E-02	9,49E-03	9,01E-05
	NRSF	MJ	3,29E-01	3,81E-02	1,25E-01	3,39E-02	3,72E-04
	FW	m^3	6,30E-01	2,23E-03	4,31E-01	1,98E-03	7,79E-05

Indicator		**Unit**	B6	C1	C2	C3	C4	D
	PERE	MJ	1,95E+04	0,00E+00	8,00E-02	4,36E-01	1,95E-01	-1,72E+01
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,95E+04	0,00E+00	8,00E-02	4,36E-01	1,95E-01	-1,72E+01
	PENRE	MJ	2,01E+04	0,00E+00	5,59E+00	2,82E+00	1,01E+00	-4,81E+01
	PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	-5,34E+01	0,00E+00	0,00E+00
	PENRT	MJ	2,01E+04	0,00E+00	5,59E+00	-5,06E+01	1,01E+00	-4,81E+01
	SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,38E-03	4,05E-02
	RSF	MJ	1,97E+02	0,00E+00	2,86E-03	8,73E-03	1,62E-03	1,38E-01
	NRSF	MJ	0,00E+00	0,00E+00	1,02E-02	-6,80E-05	3,10E-02	3,23E+00
	FW	m^3	8,86E+01	0,00E+00	5,97E-04	4,99E-03	1,05E-03	-3,68E-02

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 materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1	A2	A3	A4	A5
	HWD	kg	5,96E-01	1,07E-03	9,14E-02	9,55E-04	0,00E+00
	NHWD	kg	7,48E+00	1,01E+00	1,51E+00	9,01E-01	7,29E-01
	RWD	kg	5,15E-03	1,42E-04	4,25E-05	1,26E-04	0,00E+00

Indicator		Unit	B6	C1	C2	C3	C4	D
	HWD	kg	1,86E+00	0,00E+00	2,88E-04	3,15E-05	1,96E-01	-2,52E-02
	NHWD	kg	1,23E+02	0,00E+00	2,72E-01	1,97E-01	2,12E+00	-1,84E+00
	RWD	kg	2,08E-01	0,00E+00	3,80E-05	1,63E-06	3,96E-06	-4,27E-05

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1	A2	A3	A4	A5
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	1,34E+00	0,00E+00	6,78E-01
	MER	kg	0,00E+00	0,00E+00	2,55E-01	0,00E+00	5,10E-02
	EEE	MJ	0,00E+00	0,00E+00	1,56E-01	0,00E+00	4,17E-02
	EET	MJ	0,00E+00	0,00E+00	2,36E+00	0,00E+00	6,31E-01

Indicator		Unit	B6	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	0,00E+00	3,94E+00	9,37E-05	-1,74E-03
	MER	kg	0,00E+00	0,00E+00	0,00E+00	1,20E+00	2,29E-06	-2,28E-04
	EEE	MJ	0,00E+00	0,00E+00	0,00E+00	1,61E+00	1,49E-04	-6,13E-04
	EET	MJ	0,00E+00	0,00E+00	0,00E+00	2,43E+01	2,25E-03	-9,28E-03

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	3,26E-01
Biogenic carbon content in accompanying packaging	kg C	1,16E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.6	24,33	g CO2-eq/kWh

Dangerous substances

The product contains no substances on the REACH Candidate list at or above 100 ppm, 0,01 % by weight.

Indoor environment

Not relevant.

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products							
Indicator	**Unit**	A1	A2	A3	A4	A5	
GWPIOBC	kg CO_2 -eq	7,36E+01	1,38E+00	5,32E-01	1,23E+00	1,18E-02	

Indicator	**Unit**	B6	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	1,07E+03	0,00E+00	3,70E-01	2,91E+00	1,87E-01	-6,88E+00

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

ISO 14025:2010. Environmental labels and declarations - Type III environmental declarations - Principles and procedures. International Organization for Standardization.
ISO 14044:2006. Environmental management - Life cycle assessment - Requirements and guidelines. International Organization for Standardization.
EN 15804:2012+A2:2019. Environmental product declaration - Core rules for the product category of construction products. European Committee for Standardization.
ISO 21930:2017. Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products. International Organization for Standardization.
EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems. European Committee for Standardization.
Ecoinvent v3, 2019. Allocation, cut-off by classification. Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021). eEPD v2021.09, background information for EPD generator tool system verification, LCA.no. Report number: 07.21. System verification report.
Philis et al., (2022). EPD generator for IBU PCR part B for luminaires, lamps, and components for luminaires, background information for EPD generator application and LCA data, LCA.no. Report number: 04.22. PCR verification report.
EPD Norway (2022). NPCR Part A: Construction products and services. The Norwegian EPD foundation. Version 2.0 published 24.03.2021.
IBU (2017). PCR part B for luminaires, lampes and components for luminaires. Institut Bauen und Umwelt e.V. Version 1.7, published 30.11.2017.

epd-norge Global program operatør	**Program operator and publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 977 22 020 e-mail: post@epd-norge.no web: www.epd-norge.no
Glamox	**Owner of the declaration:** Glamox AS Birger Hatlebakks veg 15, 6415 Molde, Norway	Phone: +47 97551574 e-mail: birger.holo@glamox.com web: https://www.glamox.com
LCA.no	**Author of the Life Cycle Assessment** LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
LCA.no	**Developer of EPD generator** LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal