Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

Punta PXR

Registration number:	EPD-Kiwa-EE-161567-EN
Issue date:	01-03-2024
Valid until:	01-03-2029
Declaration owner:	Ansorg GmbH
Publisher:	Kiwa-Ecobility Experts
Program operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

Punta PXR

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-161567-EN

1.3 VALIDITY

Issue date: 01-03-2024

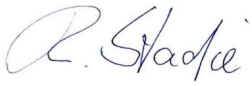
Valid until: 01-03-2029

1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: Ansorg GmbH

Address: Pilgerstraße 11, 45473 Mülheim an der Ruhr, Germany

E-mail: info@ansorg.com

Website: www.ansorg.com

Production location: Ansorg GmbH

Address production location: Pilgerstraße 11, 45473 Mülheim an der Ruhr, Germany

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☐ External

Elisabeth Amat Guasch, Greenize

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

PCR A: Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

PCR B: Institute Construction and Environment e.V. (IBU) - Part B: Requirements on the EPD for Luminaires, lamps and components for luminaires

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system

1 General information

boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.10 CALCULATION BASIS

LCA method R<THiNK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.1

Characterization method: EN 15804 +A2 Method v1.0

LCA database profiles: EcoInvent version 3.6

Version database: v3.16 (2024-02-12)

** Used for calculating the characterized results of the Environmental profiles within R<THiNK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'Punta PXR' with the calculation identifier ReTHiNK-61567.

2 Product

2.1 PRODUCT DESCRIPTION

Punta is a luminaire for versatile applications, from precise spot effects to the illumination of peripheral zones and high decorations. The housing is flexibly positioned on a ring bearing to permit maximum rotation. It pivots smoothly and alignment is easily maintained without locking. A large pivot radius provides plenty of flexibility for adaptation to shop design changes. The reflector technology employed ensures very efficient and brilliant light distribution.

- The Punta PXR delivers a maximum power level of 16W. With a light quality of 3000K and CRI 80, for example, it can achieve a luminous flux of 1780 lumens. The Punta PXR is thus the most powerful recessed spotlight in terms of size.
- Compared to the previous version (Punta NRL), efficiency has been boosted by over 40% (NRL 85lm/W vs. PXR 123lm/W with a colour temperature of warm white [830]).
- The smallest Ansorg 3D faceted reflector. The smallest Punta therefore now also has the superior lighting quality (light blending, glare suppression and high ROL) of the larger luminaires in the Punta family.
- The luminaire can be rotated by 355° and has a swing-out angle of 0°–45°.

The Punta PXR consists mainly of the following materials:

- Aluminium (46%)
- Electronic connector (26%)
- Cables (14%)
- Steel (10%)
- Plastics (1%)

Punta PXR facts

- LED technology
- Tool-free in-ceiling installation
- Floor and wall mounting not admissible
- Rotates and pivots (355°/45°)
- Including SP, MFL or FL reflector
- Including power module
- Main connection via Wieland plug GST18i3; cable length = 0.5 m
- DALI or Casambi lighting control system on request
- Colours: white, anthracite, silver

Punta PXR sustainability

- Completely sustainable packaging
- 100% recyclable luminaire in accordance with the WEEE Directive (Directive 2012/19/EU on waste electrical and electronic equipment)
- Designed in accordance with the Ecodesign Regulation (2019/2020/EU)
- High LED lifespan through efficient thermal management
- Return of light – significant reduction of connected load through targeted light guidance

Data sheets and further information about the Punta PXR can be found on the product pages of our website www.ansorg.com.

2.1.1 Photometric values

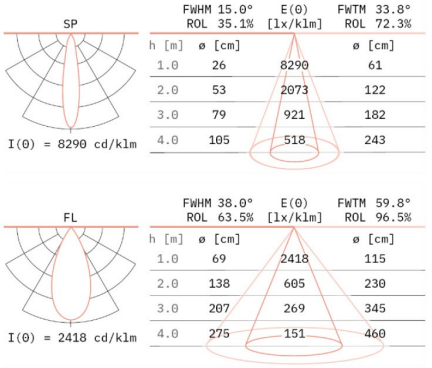
CRI Colour quality	Power level 11 W Luminous flux luminaire [lm]	11 W System efficiency [lm/W]	16 W Luminous flux luminaire [lm]	16 W System efficiency [lm/W]
830	1398	123	1783	115
840	1468	129	1873	121
927	1139	100	1452	94
930	1198	105	1528	99
940	1258	110	1605	104
Brilliant (930 = Best color/ Best White)	1111	96	1393	88

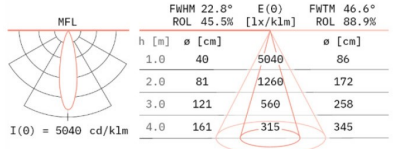
Maximum possible, optionally available connected load: 17 W.
According to IEC 62722-1 the given rated values of the total luminous flux and of the electric power must not deviate by more than 10%. The values apply to the luminaire with MFL reflector, in the case of the SP/FL reflectors the values can deviate +/- 5%. The photometric values are standard values and refer to the entire luminaire. Other light qualities on request to info@ansorg.com. This product contains two light sources of energy efficiency class D (830/840) or E (927/930/940).

There is a direct correlation between energy consumption, light colour and illuminance. The Punta PXR with 840 Kelvin and 11 W connected load achieves a luminous flux of 1468lm with a system efficiency of 129 lm/W. At 930 Kelvin and also 11 W connected load, we achieve a luminous flux of 1198lm, which corresponds to a lower system efficiency of 105 lm/Watt.

The system efficiency, therefore, indicates the relationship between the connected load and the luminous flux output. We direct this luminous flux using reflector technology (ROL) and thus achieve a higher illuminance on the goods under the same conditions.

2.1.2 Light distribution and ROL value





The commonly used key figure LOR (Light Output Ratio) represents the efficiency of the luminaire measured at the reflector. In retail, however, the decisive factor is how much light reaches the goods – and not how much light leaves the luminaire. With reflector technology developed in-house, we achieve a high level of efficiency with the best lighting effect on the goods. Scattering losses are significantly reduced, and more light reaches the goods.

This targeted light control with our reflector technology enables us to achieve a highly efficient result on the goods. Luminaires with a high system efficiency – expressed in lumens/watt, but with a significantly poorer result on the goods – must then consume more power to achieve the same result and the same efficiency on the goods. A high ROL value, therefore, indicates a high efficiency of the luminaire and offers a high potential for saving CO_2 emissions.

FWHM: 42.9% of the total lumen output of the luminaire is emitted in the FWHM cone. With a total luminous flux of 2500lm, 1072lm, for example, reach a surface of Ø79cm at a distance of 2 metres.

2 Product

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

Applications: For open ceilings. From accentuated lighting to the illumination of large areas. Various power levels and colour temperatures, e.g. for back wall illumination or highlight zones.

Sectors: All sectors.

Efficient substitute for low-voltage halogen reflector lamps. Use of different colour temperatures possible. Cold white to warm white with different colour rendering levels and excellent efficiency.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The Reference Service Life (RSL) has been calculated based on the amount of hours that the light can be used (66,000 hours). It is assumed that the light is used for 12 hours a day, for 6 days a week (excluding Sunday because the majority of companies in the retail and service sector are closed then), for 52 weeks a year. Therefore, 66,000 is divided by (6*12) and 52, which leads to a number of approximately 17.

USED RSL (YR) IN THIS LCA CALCULATION:

17

2.4 TECHNICAL DATA

· Connection data	220–240 V, 50/60 Hz (110–277 V on request)
· Weight	approx. 0.4 kg
· SDCM rating	3SDCM (MacAdam)
· Lumen maintenance	L80/B10 ≥ 50,000 h, TA 25 °C L90/B50 ≥ 50,000 h, TA 25 °C
· Failure rate	C0/B10 ≥ 50,000 h, TA 25 °C
· Photobiological safety	RG1
· Number per circuit breaker	B 16A 34
· Protection class	1
· Type of protection	IP20
· Certification mark	xxxx

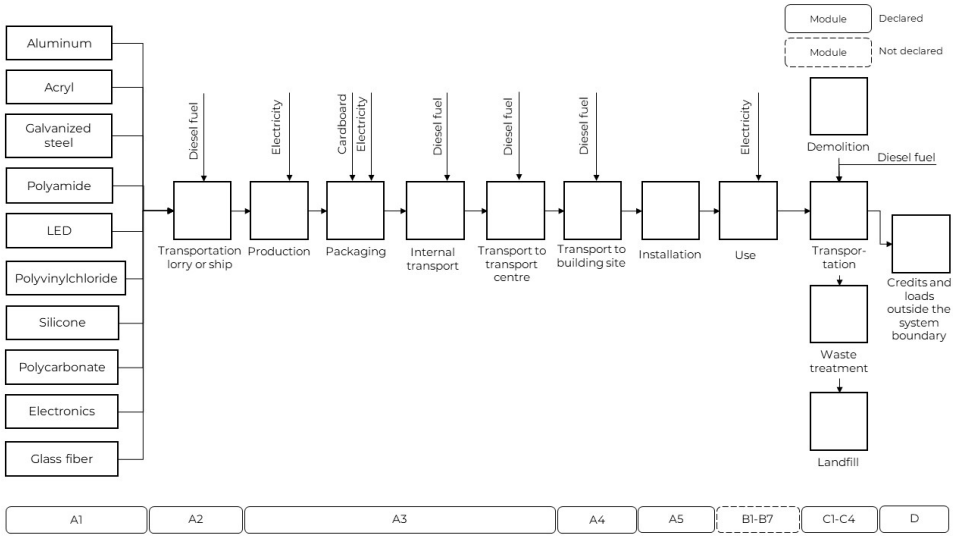
2.5 SUBSTANCES OF VERY HIGH CONCERN

The product does not contain any substances from the candidate list of substances of very high concern for authorisation (SVHC). The suppliers and Ansorg GmbH comply with the legal requirements according to REACH Directive (EU) 2023/1132 and ROHS Directive 2015/863 and 2023/1437.

The designated products also comply with the ISO 9001 and ISO 14001 standards, and with the EcoVadis Silver Medal and the SMETA 2-Pillar certifications.

2.6 DESCRIPTION PRODUCTION PROCESS

The individual materials are delivered to Ansorg and assembled at the production site. It is internally transported, packaged and stored by Ansorg. They are then brought to a distribution centre, from where it is transported to the customer.



2.7 CONSTRUCTION DESCRIPTION

This product can be mounted on a surface without tools.

3 Calculation rules

3.1 FUNCTIONAL UNIT

1 piece lighting

Provides lighting that delivers various artificial luminous fluxes during a reference lifetime of 66,000 hours.

reference_unit: piece (p)

3.2 CONVERSION FACTORS

Description	Value	Unit
reference_unit	1	p
weight_per_reference_unit	0.408	kg
Conversion factor to 1 kg	2.453386	p

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D LCA. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

The input data are representative for Lights, a product of Ansorg GmbH. The data are representative for Germany.

3.5 CUT-OFF CRITERIA

Production phase (Modules A1-A3)

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The internal transport of the products is not considered, because it falls under the cut-off criteria. The total neglected input flows do not exceed the limit of 5% of energy use and mass.

3 Calculation rules

Construction phase (Modules A4-A5)

All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy, energy use for assembly, etc.) and output flows (e.g. construction waste, packaging waste, etc.), if applicable, are considered in this LCA. The total neglected input flows do not exceed the limit of 5% of energy use and mass.

Delivery of the luminaire throughout Europe is considered.

Use phase (Module B6)

For the use phase, the input and output flows for Module B6 (operational energy use) are considered in this LCA. The total neglected input flows do not exceed the limit of 5% of energy use and mass.

End-of-Life phase (Modules C1-C4)

All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do not exceed the limit of 5% of energy use and mass.

Benefits and loads beyond the system boundary (Module D)

All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

3.6 ALLOCATION

Allocation has not been applied in this LCA.

3.7 DATA COLLECTION & REFERENCE TIME PERIOD

All product- and process-specific data were collected for the operating years 2021 and 2022. The data is based on the exact figures of this year.

3.8 ESTIMATES AND ASSUMPTIONS

For data protection reasons, various assumptions made on the data used for this EPD are only explained in the background report accompanying this EPD.

For module A4, a capacity utilization of 90% has been taken to reflect reality.

Of the use phase, only module B6 (Operational Energy Use) is declared. The numbers for this are calculated based on the formula given in the PCR. According to the PCR, the operational energy use should be calculated based on the type of product (luminaire, lamp, or lamp component). This product is a luminaire. The energy consumption of a luminaire can be calculated with the following formula:

Energy consumption [kWh] = {Pa * FCP * FO * (FD * tD + FN * tN) + Pp * ty} * 1/1000 * a

- Pa [W] = active power
- FCP = product constant illuminance factor
- FO = occupancy dependency factor
- FD = daylight dependency factor
- tD [h] = daylight operating hours per year
- FN = non-daylight dimming factor
- tN [h] = non-daylight operating hours per year
- Pp [W] = passive power
- ty [h] = 8760
- a = reference service lifetime of installation in years

The exact calculation for this product is given in the corresponding background report. For some parameters an assumption had to be made, because no information on it is available. Therefore, the numbers for B6 are conservative numbers.

The emissions calculated for module B6 are for the full reference service lifetime of 66,000 hours or approximately 17 years.

3.9 DATA QUALITY

The quality of the data is high.

In order to ensure comparability of the results, only consistent background data of the Ecoinvent database V3.6 was used in the LCA (e.g., records on energy, transportation, supplies and supplies), which refers to reference year 2019. The database is regularly reviewed and thus complies with the requirements of EN 15804 (background data not older than 10 years). All consistent datasets contained in the Ecoinvent database are documented and can be viewed in the online Ecoinvent documentation. The primary data were provided by Ansorg. The life cycle was modelled with the Nibe EPD App.

4 Scenarios and additional technical information

4.1 TRANSPORT TO CONSTRUCTION SITE (A4)

For the transport from production place to assembly/user, the following scenario is assumed for module A4 of this EPD.

	Value and unit
Vehicle type used for transport	Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	
Distance	1051 km
Capacity utilisation (including empty returns)	90%
Bulk density of transported products	
Volume capacity utilisation factor	

4.2 ASSEMBLY (A5)

The following information describes the scenarios for flows entering the system and flows leaving the system at module A5.

FLOWS ENTERING THE SYSTEM

There are no significant environment impacts as a result of materials or energy used in the construction stage (A5).

FLOWS LEAVING THE SYSTEM

The following output flows leaving the system at module A5 are assumed.

Description	Value	Unit
Output materials as result of loss during construction	0	%
Output materials as result of waste processing of materials used for installation/assembly at the building site	0.000	kg
Output materials as result of waste processing of used packaging	0.230	kg

4.3 USE STAGE (B1)

Emissions to air/soil/water are applicable, the scenario accounted in module B1 is as follows in the table below.:

Description	Cycle (yr)	Number of cycles	Amount per cycle	Total Amount	Unit
Use phase electricity	17	1	705.5	705.5	kWh

4 Scenarios and additional technical information

4.4 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.5 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
plastics, via residue (NMD ID 43)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
EoL electronics - passive components	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
PVC, pipes (NMD ID 64)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

	Value and unit
Vehicle type used for transport	Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4 Scenarios and additional technical information

4.6 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	NL	0	3	3	94	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	NL	0	0	100	0	0
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	NL	0	5	0	95	0
plastics, via residue (NMD ID 43)	NL	0	20	80	0	0
EoL electronics - passive components	DE	0	5	35	60	0
PVC, pipes (NMD ID 64)	NL	0	10	20	70	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	0.000	0.006	0.006	0.176	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000	0.004	0.000	0.000
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.000	0.002	0.000	0.038	0.000
plastics, via residue (NMD ID 43)	0.000	0.002	0.009	0.000	0.000
EoL electronics - passive components	0.000	0.007	0.050	0.085	0.000
PVC, pipes (NMD ID 64)	0.000	0.002	0.005	0.017	0.000
Total	**0.000**	**0.019**	**0.073**	**0.315**	**0.000**

4.7 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	0.176	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000
Total	**0.315**	**0.160**

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.038	0.000
plastics, via residue (NMD ID 43)	0.000	0.160
EoL electronics - passive components	0.085	0.000
PVC, pipes (NMD ID 64)	0.017	0.000
Total	**0.315**	**0.160**

5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER PIECE

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	C1	C2	C3	C4	D
AP	mol H+ eqv.	8.96E-2	1.57E-3	1.29E-3	5.24E-4	8.12E-5	1.77E+0	0.00E+0	2.24E-5	3.28E-4	2.77E-6	-2.07E-2
GWP-total	kg CO2 eqv.	6.76E+0	6.61E-2	-1.70E-1	9.05E-2	3.91E-1	3.13E+2	0.00E+0	3.87E-3	2.24E-1	1.71E-3	-2.82E+0
GWP-b	kg CO2 eqv.	-1.34E-2	-3.37E-6	-3.74E-1	4.17E-5	3.76E-1	9.09E+0	0.00E+0	1.78E-6	-7.53E-5	5.02E-6	3.78E-1
GWP-f	kg CO2 eqv.	6.75E+0	6.60E-2	2.02E-1	9.04E-2	1.56E-2	3.03E+2	0.00E+0	3.86E-3	2.24E-1	1.71E-3	-3.19E+0
GWP-luluc	kg CO2 eqv.	2.84E-2	3.86E-5	2.62E-3	3.31E-5	4.66E-6	7.04E-1	0.00E+0	1.42E-6	4.45E-5	2.77E-7	-1.22E-2
EP-m	kg N eqv.	8.52E-3	3.98E-4	3.17E-4	1.85E-4	2.89E-5	2.24E-1	0.00E+0	7.90E-6	6.94E-5	2.74E-6	-3.11E-3
EP-fw	kg P eqv.	6.84E-4	4.01E-7	1.96E-5	9.12E-7	2.26E-7	3.23E-2	0.00E+0	3.90E-8	2.11E-6	1.11E-8	-1.05E-4
EP-T	mol N eqv.	1.04E-1	4.43E-3	3.69E-3	2.04E-3	3.08E-4	2.76E+0	0.00E+0	8.71E-5	7.80E-4	8.68E-6	-3.44E-2
ODP	kg CFC 11 eqv.	3.49E-7	1.37E-8	2.32E-8	2.00E-8	2.30E-9	2.55E-5	0.00E+0	8.53E-10	7.04E-9	7.04E-11	-1.29E-7
POCP	kg NMVOC eqv.	2.93E-2	1.16E-3	9.28E-4	5.82E-4	1.03E-4	7.01E-1	0.00E+0	2.49E-5	2.13E-4	2.82E-6	-1.04E-2
ADP-f	MJ	7.28E+1	8.94E-1	3.20E+0	1.36E+0	1.72E-1	6.23E+3	0.00E+0	5.83E-2	5.85E-1	6.59E-3	-3.03E+1
ADP-mm	kg Sb-eqv.	4.74E-4	8.80E-7	1.40E-6	2.29E-6	4.79E-7	2.20E-3	0.00E+0	9.79E-8	1.26E-6	3.23E-9	7.04E-4
WDP	m3 world eqv.	1.78E+0	2.00E-3	7.86E-2	4.88E-3	9.47E-4	6.98E+1	0.00E+0	2.09E-4	1.16E-2	2.10E-4	-3.03E-1

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15084+A2

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	C1	C2	C3	C4	D
ETP-fw	CTUe	6.73E+2	6.57E-1	9.23E+0	1.22E+0	2.85E-1	4.27E+3	0.00E+0	5.20E-2	3.14E+0	3.50E+0	-7.52E+1
PM	disease incidence	5.37E-7	3.32E-9	1.65E-8	8.14E-9	1.49E-9	4.63E-6	0.00E+0	3.48E-10	3.64E-9	4.43E-11	-2.49E-7
HTP-c	CTUh	1.75E-8	3.46E-11	2.32E-10	3.94E-11	1.19E-11	1.10E-7	0.00E+0	1.69E-12	7.36E-11	3.30E-13	-4.35E-9
HTP-nc	CTUh	7.33E-7	6.11E-10	3.29E-9	1.33E-9	2.08E-10	3.76E-6	0.00E+0	5.69E-11	4.72E-9	1.29E-11	-6.16E-8
IR	kBq U235 eqv.	1.71E-1	3.80E-3	1.43E-2	5.71E-3	7.80E-4	5.39E+1	0.00E+0	2.44E-4	2.37E-3	2.47E-5	-4.00E-2
SQP	Pt	2.74E+1	3.61E-1	3.69E+1	1.18E+0	6.92E-2	1.52E+3	0.00E+0	5.06E-2	4.74E-1	1.21E-2	-1.99E+1

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	AAcidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2

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ILCD classification	Indicator	Disclaimer
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – 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.

Disclaimer 2 – 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.

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	C1	C2	C3	C4	D
PERE	MJ	9.90E+0	7.92E-3	4.21E+0	1.71E-2	5.80E-3	1.18E+3	0.00E+0	7.30E-4	5.21E-2	2.34E-4	-3.65E+0
PERM	MJ	0.00E+0	0.00E+0	3.59E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-2.79E+0
PERT	MJ	9.90E+0	7.92E-3	7.80E+0	1.71E-2	5.80E-3	1.18E+3	0.00E+0	7.30E-4	5.95E-2	2.67E-4	-6.44E+0
PENRE	MJ	7.74E+1	9.49E-1	3.33E+0	1.45E+0	1.82E-1	6.54E+3	0.00E+0	6.19E-2	5.41E-1	5.12E-3	-3.19E+1
PENRM	MJ	2.00E-1	0.00E+0	7.32E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-2.42E-1
PENRT	MJ	7.76E+1	9.49E-1	3.41E+0	1.45E+0	1.82E-1	6.54E+3	0.00E+0	6.19E-2	6.25E-1	7.01E-3	-3.21E+1
SM	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	M3	6.27E-2	6.94E-5	2.69E-3	1.66E-4	3.97E-5	5.21E+0	0.00E+0	7.10E-6	4.52E-4	6.07E-6	-1.81E-2

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

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OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	C1	C2	C3	C4	D
HWD	Kg	1.05E-3	1.35E-6	6.78E-6	3.46E-6	4.89E-7	4.15E-3	0.00E+0	1.48E-7	1.16E-3	8.29E-9	1.41E-3
NHWD	Kg	1.50E+0	2.21E-2	3.50E-2	8.65E-2	4.94E-3	2.11E+1	0.00E+0	3.70E-3	2.09E-2	1.95E-2	-6.01E-1
RWD	Kg	1.53E-4	6.09E-6	1.55E-5	8.96E-6	1.11E-6	4.42E-2	0.00E+0	3.83E-7	2.50E-6	3.33E-8	-4.69E-5

HWD=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.30E-1	0.00E+0	0.00E+0	0.00E+0	2.30E-1	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.96E-2
EEE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.88E-2

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

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5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER PIECE

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per piece:

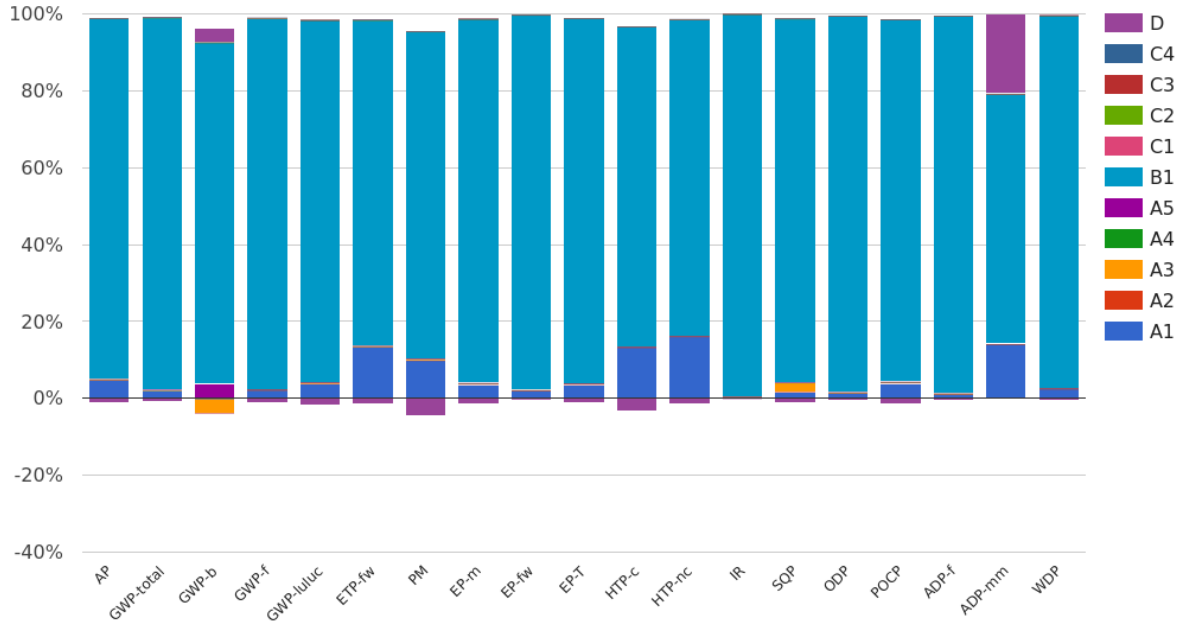
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.1025	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of uptake of carbon dioxide is account in module A1 by the main parts of the product. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	0.3757	kg CO2 (biogenic)

6 Interpretation of results



As can be seen in the graph, Module B6 (Operational energy use) has the biggest influence in all environmental impact categories. After that, Module A1 (Raw material preparation) has the biggest influence in most of the categories. In the category Resource use - minerals and metals (ADP-mm), Module D (Benefits and loads beyond the system boundary) has the biggest influence after Module B6.

7 References

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

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

EN 15804+A2
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

PCR B
Institute Construction and Environment e.V. (IBU) - Part B: Requirements on the EPD for Luminaires, lamps and components for luminaires

8 Contact information

Publisher	Operator	Owner of declaration

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