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

RS PRO 5100/5150 SC

Registration number:	EPD-Kiwa-EE-175737-en
Issue date:	26-06-2024
Valid until:	26-06-2029
Declaration owner:	Steinel GmbH
Publisher:	Kiwa-Ecobility Experts
Program operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

RS PRO 5100/5150 SC

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-175737-en

1.3 VALIDITY

Issue date: 26-06-2024

Valid until: 26-06-2029

1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
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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: Steinel GmbH

Address: Dieselstraße 80-84, 33442 Herzebrock Clarholz

E-mail: info@steinel.de

Website: https://www.steinel.de/de/steinel-group/

Production location: Steinel Romania

Address production location: DN73C 79, 115300 Curtea de Arges

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

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

IBU PCR - Part B 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+A2. 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 boundary, declared modules, data selection (primary or secondary data,

1 General information

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 EPD program operators 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: v3.17 (2024-05-22)

** Simapro is 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 'RS PRO 5100/5150 SC' with the calculation identifier ReTHiNK-75737.

2 Product

2.1 PRODUCT DESCRIPTION

The RS PRO 5100-Serie is an LED luminaire with a high-frequency sensor. Ideal for parking lots, basements, garages and halls.

This Environmental product declaration can be used for the following products of the RS PRO 5100-Series:

Materialname	EAN-Code
RS PRO 5100 SC	4007841078881
RS PRO 5150 SC	4007841058739
RS PRO 5100 SC 5C	4007841079185
RS PRO 5150 SC 5C	4007841079338

The RS PRO 5150 SC was used as the reference product for this EPD.

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the following legal provisions apply:

- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU
- RED Directive 2014/53/EU
- RoHS Directive 2011/65/EU
- ERP Directive 2009/125/EC

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal provisions above.

For the application and use the respective national provisions apply.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

parking space / hall / hallway / garage

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The reference service life for the product was taken from the IBU PCR "Luminaires, lamps and components for luminaires" for the industry use. The service life is therefore 20 years.

USED RSL (YR) IN THIS LCA CALCULATION:

20

2.4 TECHNICAL DATA

Technical data	RS PRO 5100 SC	RS PRO 5150 SC
Dimensions	1370 x 87 x 58 mm (L x B x H)	1500 x 87 x 58 mm (L x B x H)
With motion detector	Yes	Yes
Polycarbonate variant	warm white	warm white
Application, location	Indoor area	Indoor area
Color	grey	grey
Mounting location	Wall, ceiling	Wall, ceiling
Impact resistance	IK07	IK07
IP Rating	IP65	IP65
Color temperature	4000 K	4000 K
Twilight setting	2 - 2000 lx	2 - 2000 lx
Protection class	II	II
Ambient temperature	-20 - 40 °C	-20 - 40 °C
Housing material	PC	PC
Cover material	PC	PC
Mains connection	220 - 240 V / 50-60 Hz	220 - 240 V / 50-60 Hz
Power consumption	0.41 W	0.41 W
Mounting height	max 4.00 m	max 4.00 m
Radial range	Ø 10 m (79 m²)	Ø 10 m (79 m²)

2 Product

Tangential range	Ø 10 m (79 m²)	Ø 10 m (79 m²)
Luminous flux total product	4250 lm	5940 lm
Total product efficiency	137 lm/W	142 lm/W
Output	31 W	42 W
Inrush current, maximum	14,8 A	14,8 A

*Detailed Information: https://www.steinel.de/de/leuchten-professional/produkte/leuchten/innenleuchten/5100er-serie/

Materials	**RS PRO 5100 SC**		**RS PRO 5150 SC**	
	kg	%	kg	%
Plastic - Polycarbonat	0,933	58,50	0,998	55,14
Metal - Aluminium	0,425	26,65	0,605	33,43
Metal - Steel	0,02	1,25	0,013	0,72
Electronic Components	0,058	3,64	0,06	3,31
Electronic PCB	0,074	4,64	0,08	4,42
Paper	0,019	1,19	0,019	1,05
others	0,066	4,14	0,035	1,93
total	1,595	**100**	**1,81**	**100**

Packaging Materials	**RS PRO 5100 SC**		**RS PRO 5150 SC**	
	kg	%	kg	%
Packaging – Cardboard	0,417	99	0,417	99
Packaging - Paper	0,003	1	0,003	1
total	0,420	100	0,420	100

2.5 SUBSTANCES OF VERY HIGH CONCERN

Information about the SVHC are available on the following website: https://www.steinel.de/de/leuchten-sensoren/service/unser-serviceangebot/reach/

2.6 DESCRIPTION PRODUCTION PROCESS

Country	**City**	**Business**
Germany	Herzebrock-Clarholz	Warehouse / Development
Germany	Leipzig Mölkau	Production plastic parts
Switzerland	Einsiedeln	Electronic production
Romania	Curtea de Arges	Assembly

The LED luminaires are produced at three locations and then stored in herzebrock clarholz and shipped to customers.

The Injection molded parts are produced at the Leipzig-Mölkau site. The resulting production waste, which averages 5%, can normally be reground and reused. However, we consider the 5% to be production waste in our calculation.

The Printed circuit boards are produced in Einsiedeln. Here, the PCBs are fitted with electronic components using THT and SMD processes. at the Swiss site in Einsiedeln.

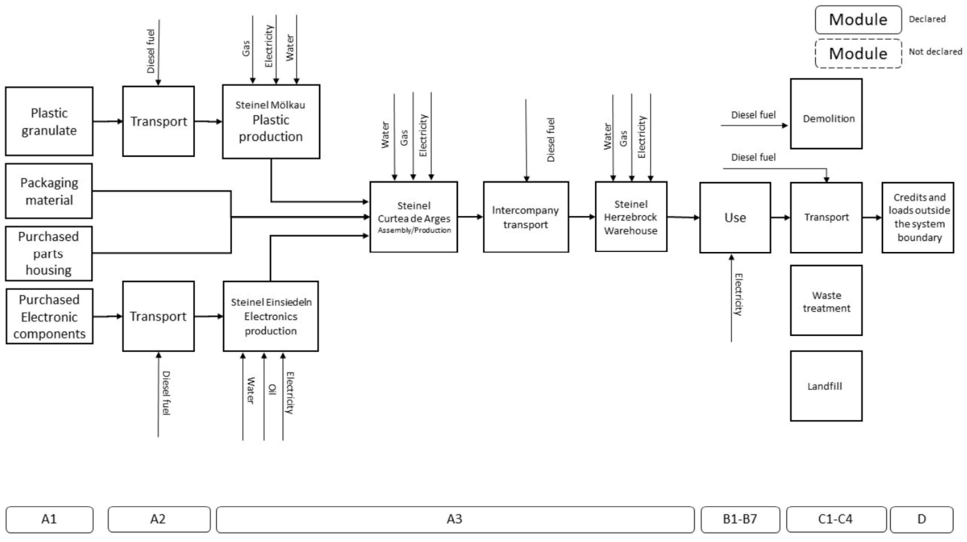
The preproducts manufactured in Mölkau and Einsiedeln are assembled and packaged in Curtea de Arges together with other purchased preproducts and then transported to the dispatch warehouse in Herzebrock-Clarholz.

Steinel determined the electricity, gas, oil and water consumption per product for the sites by dividing the annual consumption by the production figures. The activity data collected by the company related to the year 2022.

The country-specific electricity mixes (electricity market, low voltage) from the ecoinvent database were used for the locations in Switzerland, Romania and Moldova.

The electricity for both German locations is calculated by using the location-based approach.

2 Product



2.7 CONSTRUCTION DESCRIPTION

To install the luminaires, holes must be drilled in the ceiling or wall. A drill is required for the construction. The luminaire is then mounted to the ceiling or wall by using screws and a screwdriver.

Due to the short use of the drill, It is assumed that construction waste during installatioin is negligible.

3 Calculation rules

3.1 DECLARED UNIT

1 LED Luminaire

The environmental product declaration refers to an LED luminaire from the 5100 and 5150 with Sensor

Reference unit: piece (p)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	p
Weight per reference unit	1.726	kg
Conversion factor to 1 kg	0.579330	p

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options 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	ND	ND	ND	ND	ND	X	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

This EPD is representative for RS PRO 5100/5150 SC, a product of Steinel GmbH. The results of this EPD are representative for European Union.

3.5 CUT-OFF CRITERIA

Product stage (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 total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Construction process stage (A4-A5)

3 Calculation rules

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

Use stage (B6)

All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the building fabric are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

End of life stage (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 therefore 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

Steinel determined the electricity, gas, oil and water consumption per product for the sites by dividing the annual consumption by the production figures for all products manufactured at the site.

No other allocation rules were applied.

3.7 DATA COLLECTION & REFERENCE TIME PERIOD

The energy consumption data was collected in 2022.

The data for the products are current data from 2023.

3.8 ESTIMATES AND ASSUMPTIONS

Generic data from the ecoinvent v.3.6 database (system model allocation, cut-off) were used for primary products, raw materials and supplies as well as energy generation and disposal processes. Purchased parts for which no generic data was available were accounted for on the basis of the material composition, which leads to a neglect of production costs and transportation.

The highest proportion of environmental impacts is caused by the use phase, which is, however, based on assumptions about the daily usage time. This assumption is therefore of great importance. For this reason, an average period of use was selected. However, even with a minimum daily usage time, the contribution of the usage phase would dominate.

Transport to construction:

The customers of Steinel are B2B as well as B2C customers. This means that either partners with their own storage space or customers can be supplied directly.

This calculation is very complex.

In order to calculate the environmental impact, the example of a building site in Dresden was selected. This meant that the distance to a construction site in Dresden was assumed in the calculation. The distance between our warehouse in Herzebrock-Clarholz and Dresden is 500 km. This calculation and the scenario make it possible to calculate the environmental impact for the distance to your own construction site.

Use stage:

Unlike described in PCR Part B, the full load hours were determined with the help of an analysis by an external project.

Taking the formula into account would make luminaires with sensors look worse in terms of environmental performance.

Therefore, in one project,the use phase and full load hours were determined with the help of an analysis by an external project.

In this project, the intelligent lighting of the 5100 series was installed in a parking garage. The measurements were used to determine the full load hours of 1009 h/a with sensor. The electricity consumption was balanced for the use phase.

Origin of electricity: A European electricity mix was assumed for the usage scenario (market for electricity low voltage - RER).

3.9 DATA QUALITY

The data quality can be rated as medium to good. For the most part, the materials could be assigned directly to a generic data set, although substitutes had to be used in some cases. If no direct assignment was possible, preliminary products were balanced on the basis of their material composition. Assumptions were made for the associated masses.

3 Calculation rules

However, as the highest proportion of environmental impacts is caused by the use phase, data quality plays a key role here. However, as an assumption had to be made for the service life of the luminaire, no data quality can be assessed at this point. The data quality for electricity consumption in the use phase is again very good.

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	not available
Distance	500 km
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

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	0.420	kg

4.3 OPERATIONAL ENERGY USE (B6)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit
Electricity (EU) - low voltage (max 1kV) - Electricity consumption (kWh/a)	1	20.00	41.369	827.38	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]
Plastic waste	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
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
Steel, fasteners (NMD ID 69)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Electronic waste	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Paper	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 [%]
Plastic waste	DE	0	0	9	91	0
Aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	DE	0	3	3	94	0
Steel, fasteners (NMD ID 69)	DE	0	1	0	99	0
Electronic waste	DE	0	5	35	60	0
Paper	DE	0	0	0	100	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
Plastic waste	0.000	0.000	0.092	0.928	0.000
Aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	0.000	0.018	0.018	0.571	0.000
Steel, fasteners (NMD ID 69)	0.000	0.000	0.000	0.012	0.000
Electronic waste	0.000	0.001	0.006	0.009	0.000
Paper	0.000	0.000	0.000	0.016	0.000
Total	**0.000**	**0.019**	**0.116**	**1.536**	**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]
Plastic waste	0.928	2.820
Aluminium, cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4)	0.121	0.000
Steel, fasteners (NMD ID 69)	0.010	0.000
Electronic waste	0.009	0.099
Total	**1.085**	**2.919**

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
Paper	0.016	0.000
Total	**1.085**	**2.919**

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

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
AP	mol H+ eqv.	2.45E-1	9.05E-3	1.33E-2	2.68E-1	8.40E-4	1.94E-4	2.07E+0	0.00E+0	7.90E-5	1.85E-3	5.21E-6	-1.89E-2
GWP-total	kg CO2 eqv.	2.76E+1	5.47E-1	3.58E+0	3.18E+1	1.45E-1	6.99E-1	3.67E+2	0.00E+0	1.36E-2	8.42E-1	1.22E-3	-3.52E+0
GWP-b	kg CO2 eqv.	2.46E-2	8.23E-5	-6.72E-1	-6.47E-1	6.69E-5	6.86E-1	1.07E+1	0.00E+0	6.29E-6	2.42E-2	9.52E-6	1.47E-2
GWP-f	kg CO2 eqv.	2.76E+1	5.46E-1	4.25E+0	3.24E+1	1.45E-1	1.25E-2	3.55E+2	0.00E+0	1.36E-2	8.18E-1	1.21E-3	-3.53E+0
GWP-luluc	kg CO2 eqv.	3.56E-2	2.77E-4	6.65E-3	4.26E-2	5.31E-5	8.39E-6	8.26E-1	0.00E+0	4.99E-6	3.03E-4	6.96E-7	-1.12E-2
EP-m	kg N eqv.	4.35E-2	2.24E-3	2.18E-3	4.80E-2	2.96E-4	8.16E-5	2.63E-1	0.00E+0	2.78E-5	4.34E-4	2.15E-6	-3.27E-3
EP-fw	kg P eqv.	8.16E-3	3.59E-6	7.19E-5	8.24E-3	1.46E-6	3.40E-7	3.79E-2	0.00E+0	1.37E-7	1.13E-5	2.63E-8	-1.16E-4
EP-T	mol N eqv.	5.32E-1	2.49E-2	2.45E-2	5.81E-1	3.26E-3	9.12E-4	3.24E+0	0.00E+0	3.07E-4	4.85E-3	1.40E-5	-3.50E-2
ODP	kg CFC 11 eqv.	1.38E-6	1.17E-7	7.48E-7	2.25E-6	3.20E-8	3.62E-9	2.99E-5	0.00E+0	3.01E-9	4.43E-8	9.39E-11	-1.39E-7
POCP	kg NMVOC eqv.	1.42E-1	6.69E-3	7.63E-3	1.57E-1	9.32E-4	2.36E-4	8.22E-1	0.00E+0	8.76E-5	1.48E-3	4.24E-6	-1.15E-2
ADP-f	MJ	3.33E+2	7.69E+0	5.83E+1	3.99E+2	2.18E+0	1.40E-1	7.31E+3	0.00E+0	2.05E-1	4.85E+0	1.12E-2	-6.77E+1
ADP-mm	kg Sb-eqv.	2.76E-2	9.97E-6	2.18E-4	2.78E-2	3.67E-6	1.97E-7	2.58E-3	0.00E+0	3.45E-7	7.58E-6	5.99E-9	2.29E-3
WDP		6.95E+0	1.84E-2	3.39E-1	7.31E+0	7.82E-3	5.60E-3	8.19E+1	0.00E+0	7.35E-4	9.04E-2	3.01E-4	-9.34E-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

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
	m3 world eqv.												

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)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
ETP-fw	CTUe	3.69E+3	5.80E+0	5.46E+1	3.75E+3	1.95E+0	1.09E+0	5.00E+3	0.00E+0	1.83E-1	1.13E+1	1.13E+1	-9.00E+1
PM	disease incidence	1.89E-6	2.89E-8	1.15E-7	2.03E-6	1.30E-8	1.58E-9	5.43E-6	0.00E+0	1.23E-9	2.70E-8	7.25E-11	-2.26E-7
HTP-c	CTUh	1.99E-8	2.49E-10	1.05E-9	2.12E-8	6.32E-11	1.44E-10	1.29E-7	0.00E+0	5.94E-12	5.13E-10	6.73E-13	-2.93E-9
HTP-nc	CTUh	8.87E-7	5.64E-9	3.09E-8	9.23E-7	2.13E-9	1.02E-9	4.41E-6	0.00E+0	2.00E-10	1.17E-8	1.94E-11	-4.23E-8
IR	kBq U235 eqv.	1.12E+0	3.31E-2	2.47E-1	1.40E+0	9.15E-3	5.27E-4	6.32E+1	0.00E+0	8.61E-4	1.64E-2	3.84E-5	-6.23E-2
SQP	Pt	1.40E+2	3.83E+0	7.18E+1	2.16E+2	1.89E+0	6.80E-2	1.78E+3	0.00E+0	1.78E-1	4.01E+0	1.49E-2	-2.24E+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
		None

5 Results

ILCD classification	Indicator	Disclaimer
ILCD type / level 3	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	
	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
	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
	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

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	MJ	2.41E+1	8.41E-2	7.52E+0	3.17E+1	2.73E-2	8.47E-3	1.38E+3	0.00E+0	2.57E-3	3.23E-1	6.05E-4	-3.38E-1
PERM	MJ	2.22E-1	0.00E+0	6.55E+0	6.77E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-6.90E+0

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

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERT	MJ	2.43E+1	8.41E-2	1.41E+1	3.85E+1	2.73E-2	8.47E-3	1.38E+3	0.00E+0	2.57E-3	3.27E-1	6.22E-4	-7.24E+0
PENRE	MJ	3.25E+2	8.16E+0	6.19E+1	3.95E+2	2.32E+0	1.49E-1	7.67E+3	0.00E+0	2.18E-1	5.12E+0	1.09E-2	-4.60E+1
PENRM	MJ	3.16E+1	0.00E+0	3.68E-1	3.20E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-2.64E+1
PENRT	MJ	3.56E+2	8.16E+0	6.22E+1	4.27E+2	2.32E+0	1.49E-1	7.67E+3	0.00E+0	2.18E-1	5.17E+0	1.19E-2	-7.24E+1
SM	Kg	4.51E-1	0.00E+0	2.26E-2	4.74E-1	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	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	0.00E+0
FW	M3	2.23E-1	6.70E-4	1.50E-2	2.38E-1	2.66E-4	3.17E-4	6.11E+0	0.00E+0	2.50E-5	2.89E-3	8.68E-6	-2.28E-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

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	Kg	3.16E-3	1.47E-5	6.03E-4	3.78E-3	5.54E-6	3.32E-7	4.87E-3	0.00E+0	5.20E-7	3.78E-3	1.14E-8	4.63E-3
NHWD	Kg	2.20E+0	2.48E-1	2.24E-1	2.67E+0	1.39E-1	7.60E-3	2.47E+1	0.00E+0	1.30E-2	2.14E-1	2.22E-2	-4.47E-1
RWD	Kg	7.57E-4	5.25E-5	3.50E-4	1.16E-3	1.43E-5	6.11E-7	5.19E-2	0.00E+0	1.35E-6	1.96E-5	4.60E-8	-6.70E-5

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

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	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	0.00E+0

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

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
MFR	Kg	0.00E+0	0.00E+0	7.70E-2	7.70E-2	0.00E+0	3.10E-3	0.00E+0	0.00E+0	0.00E+0	1.53E+0	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	0.00E+0
EET	MJ	0.00E+0	0.00E+0	-4.41E-2	-4.41E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-8.74E-1
EEE	MJ	0.00E+0	0.00E+0	-2.56E-2	-2.56E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-5.08E-1

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

5 Results

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:

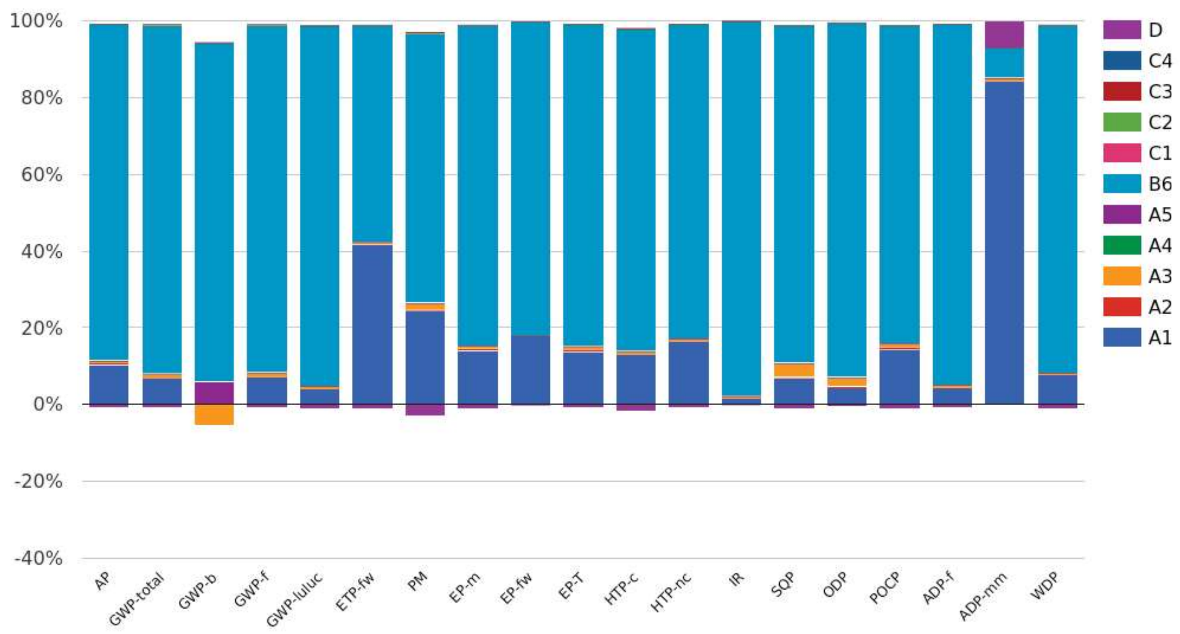
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.1858	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount carbon dioxide uptake is taken into account. 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	0.6811	kg CO2 (biogenic)

6 Interpretation of results



Luminaires are products that consume energy in the form of electricity during the usage phase. This has the highest impact on the environment during the product's long service life. The actual impact in B6 depends on the usage scenario, luminaire settings and the energy mix. The impact can therefore vary depending on the usage scenario.

The chart shows the environmental influences of the individual phases. It can be seen very clearly that the use phase(B6) dominates all environmental influences and has the highest environmental influence. The raw materials (A1) have the next highest environmental impact. The remaining phases have only a minor influence on the environment.

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

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

PCR B
IBU PCR - Part B for luminaires, lamps, and components for luminaires

8 Contact information

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