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

APOLLO G2

Registration number:	EPD-Kiwa-EE-181105-EN
Issue date:	19-02-2025
Valid until:	19-02-2030
Declaration owner:	PRACHT Industry GmbH
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

APOLLO G2

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-181105-EN

1.3 VALIDITY

Issue date: 19-02-2025

Valid until: 19-02-2030

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
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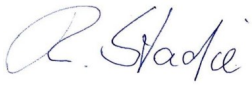
13355 Berlin
DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: PRACHT Industry GmbH

Address: Am Seerain 3 , 35232 Dautphetal-Buchenau an der Lahn, Germany

E-mail: j.scholz@pracht.com

Website: https://www.pracht.com/

Production location: PRACHT Industry GmbH

Address production location: Am Seerain 3, 35232 Dautphetal-Buchenau an der Lahn, 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

Lucas Pedro Berman, Senda

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

EN 50693
EN 50693:2022-08: Product category rules for life cycle assessments of electronic and electrical products and systems

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

Additional PCR
Institute Construction and Environment e.V. (IBU) - Part B: Requirements on the EPD for Luminaires, lamps and components for luminaires (30.09.2024, v12)

1 General information

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, 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 'APOLLO G2' with the calculation identifier ReTHiNK-81105.

2 Product

2.1 PRODUCT DESCRIPTION

The APOLLO G2 is an advanced moisture-proof reflector luminaire. The housing is made of white, glass-fiber-reinforced, flame-retardant polyester resin that is largely acid and alkali resistant. The luminaire is equipped with an electronic converter that ensures thermal decoupling of the LED and converter. The integrated stainless steel clips and the age-resistant silicone seals ensure a long service life and low maintenance.

Material	Composition
Plastics	75 %
Electronics	18 %
Cables	4 %
Galvanized steel	2 %
Silicone	> 1 %

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The APOLLO G2 weather-proof reflector luminaire is ideal for use in demanding environments where moisture, acids or alkalis may occur. It can be used for industrial applications, warehouses and parking garages. With the option of DALI-2 dimming, it also offers a lighting solution that can be adapted to different lighting requirements.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

Based on the PCR, the reference service life of the product is 20 years.

B6 - Operational Energy Use is the only module of the Use phase declared in this EPD. To calculate a value for the product, the formula given by the PCR was used. The formula is as follows:

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] = standard year time (8760)
- a = reference service lifetime of installation in years

The exact values for each of the variables will only be presented in the background report, as they include confidential data.

The service lifetime was assumed to be 100.000 hours according to company data.

USED RSL (YR) IN THIS LCA CALCULATION:

20

2.4 TECHNICAL DATA

Technical property	Value for APOLLO G2

2 Product

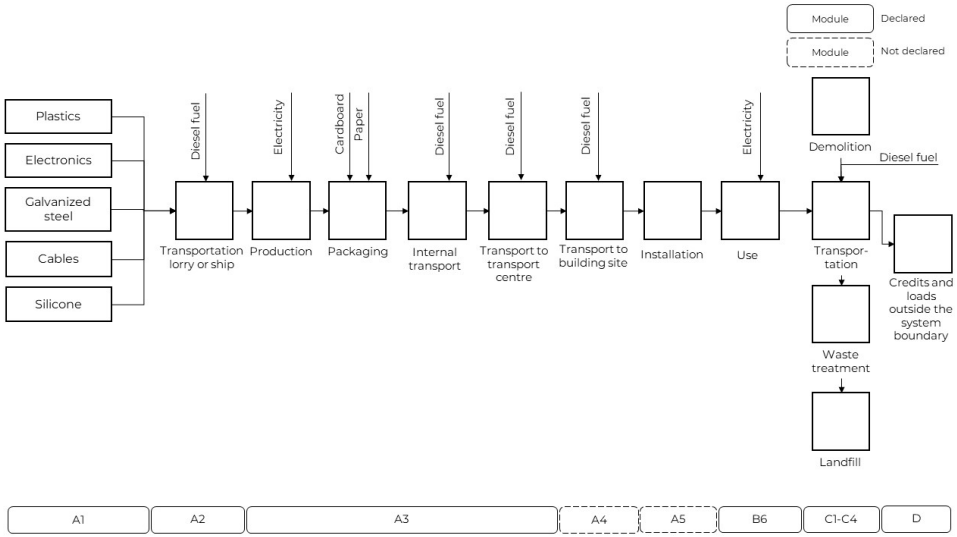
Width x length (mm)	105 x 1560
Power (W)	14 - 198
Luminous energy (lm/s)	7200
Luminous intensity (cd)	3912
Luminance (cd/m²)	27073
Effective luminous flux (lm)	2600 - 30000
Luminous efficacy of radiation (lm/W)	145 - 186
Ingress protection code (IP code)	IP65
Impact protection code (IK code)	IK06/IK08
Ambient temperature (°C)	-20 - 45

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 Alfred PRACHT Lichttechnik GmbH comply with the legal requirements according to REACH Directive (EU) 2023/1132 and ROHS Directive 2015/863 and 2023/1437.

2.6 DESCRIPTION PRODUCTION PROCESS

The raw materials/components for APOLLO G2 are delivered to the Pracht production location in Germany, and processed where necessary, before it can be incorporated into the product. During the production process, the different components are then put together, forming the luminaire. After that, they are packaged in paper, and made ready for transportation.



3 Calculation rules

3.1 DECLARED UNIT

1 piece of lighting

1 piece of lighting, which provides light 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	3.417	kg
Conversion factor to 1 kg	0.292655	p

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options EPD. 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	ND	ND	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 APOLLO G2, a product of PRACHT Industry GmbH. The results of this EPD are representative for European Union.

3.5 CUT-OFF CRITERIA

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

3 Calculation rules

Excluded processes are:

- Long-term emissions
- The manufacture of equipment used in production, buildings or any other capital goods;
- The transport of personnel to the plant;
- The transportation of personnel within the plant;
- Research and development activities;
- Disposal of the packaging waste

Use stage (module 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 (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 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

Allocation was avoided as far as possible. No by-products or co-products are produced during the production process of the product. The energy requirements of production were allocated to the individual products based on energy consumption measurements. Specific information on allocation within the background data can be found in the documentation of the Ecoinvent data sets.

The “polluter pays” principle to the use of waste as substitute for primary fuels or materials applies.

3.7 DATA COLLECTION & REFERENCE PERIOD

All product and process-specific data was collected for the 2023 operating year. The quantities of raw materials, consumables and supplies used and the energy consumption were recorded and averaged over the entire 2023 operating year. The reference area is Germany.

3.8 ESTIMATES AND ASSUMPTIONS

Some values used in the calculation of the operational energy use had to be assumed, as no specific information was available.

All scenarios included are currently in use and are representative for one of the most likely scenario alternatives.

3.9 DATA QUALITY

The quality level of geographical representativeness can be considered “good”.
The quality level of technical representativeness can be considered “good”.
The time representativeness can also be regarded as “good”.

The overall data quality for this EPD can, therefore, be described as “good”. All relevant process-specific data were collected during data collection.

In all possible cases, primary data from PRACHT was used, which has very good data quality because it comes directly from the source. In addition, secondary data from the EcoInvent database (2019, version 3.6) was used when no primary data could be supplied. The database is checked regularly and, therefore, meets the requirements of DIN EN ISO 14040/44 (background data not older than 10 years). The background data meets the requirements of EN 15804+A2. The quantities of raw materials, consumables and supplies used and the energy consumption were recorded and averaged over the entire operating year.

The general rule that specific data from certain production processes or average data derived from certain processes must take precedence when calculating an EPD or LCA was adhered to. Data for processes over which the manufacturer has no influence were assigned to generic data/scenarios. When selecting these, care was taken to always choose the data set/scenario that most realistically represents the processes.

3 Calculation rules

3.10 POWER MIX

For this LCA, the “market-based approach” was chosen for the electricity used during the production process, which means that a company specific electricity mix has been created based on Guarantees of Origin (GOs).

The electricity used has a Global Warming Potential (GWP-total) of 0.0553 kg CO_2-eq per kilowatt-hour (kWh).

For the electricity used in module B6 (use phase), the “location-based approach" was used. As Pracht is not limited to the German market, a European electricity mix has been used.

4 Scenarios and additional technical information

4.1 OPERATIONAL ENERGY USE (B6)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit
Operational energy use	20	1.00	8480	8,480.00	kWh

4.2 DE-CONSTRUCTION, DEMOLITION (C1)

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

4.3 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]
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	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
EoL electronics - passive components	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
copper, mixed (electricity cables) (NMD ID 42)	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
plastics, via residue (NMD ID 43)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
plastics, reinforced (i.a. profiles, sheets, pipes) (NMD ID 46)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
		0	100	150	50	0

4 Scenarios and additional technical information

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45)	Lorry (Truck), unspecified (default) | market group for (GLO)					

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

4.4 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 [%]
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	NL	0	10	85	5	0
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	NL	0	5	0	95	0
EoL electronics - passive components	DE	0	5	35	60	0
copper, mixed (electricity cables) (NMD ID 42)	NL	0	10	5	85	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	NL	0	0	100	0	0
plastics, via residue (NMD ID 43)	NL	0	20	80	0	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	NL	0	10	85	5	0
plastics, reinforced (i.a. profiles, sheets, pipes) (NMD ID 46)	NL	0	0	100	0	0
plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45)	NL	0	0	90	10	0

4 Scenarios and additional technical information

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	0.000	0.068	0.582	0.034	0.000
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.000	0.025	0.000	0.466	0.000
EoL electronics - passive components	0.000	0.010	0.070	0.119	0.000
copper, mixed (electricity cables) (NMD ID 42)	0.000	0.015	0.008	0.131	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000	0.024	0.000	0.000
plastics, via residue (NMD ID 43)	0.000	0.360	1.441	0.000	0.000
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.000	0.003	0.000	0.000
plastics, reinforced (i.a. profiles, sheets, pipes) (NMD ID 46)	0.000	0.000	0.031	0.000	0.000
plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45)	0.000	0.000	0.025	0.003	0.000
Total	**0.000**	**0.479**	**2.185**	**0.753**	**0.000**

4.5 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]
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	0.034	17.587
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.464	0.000
EoL electronics - passive components	0.119	0.000
copper, mixed (electricity cables) (NMD ID 42)	0.131	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.666
plastics, via residue (NMD ID 43)	0.000	2.274
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.144
plastics, reinforced (i.a. profiles, sheets, pipes) (NMD ID 46)	0.000	0.954
plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45)	0.003	0.000
Total	**0.752**	**21.626**

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	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	1.23E+2	8.87E-2	3.67E+0	1.27E+2	3.76E+3	0.00E+0	5.58E-2	6.07E+0	5.82E-2	-1.82E+0
GWP-f	kg CO_2 eq.	1.23E+2	8.86E-2	4.40E+0	1.28E+2	3.64E+3	0.00E+0	5.58E-2	6.07E+0	5.81E-2	-1.83E+0
GWP-b	kg CO_2 eq.	1.68E-1	3.69E-5	-7.37E-1	-5.68E-1	1.09E+2	0.00E+0	2.57E-5	6.22E-4	6.42E-5	6.06E-3
GWP-luluc	kg CO_2 eq.	4.57E-2	3.42E-5	5.78E-3	5.15E-2	8.47E+0	0.00E+0	2.04E-5	3.36E-4	2.46E-6	2.33E-4
ODP	kg CFC 11 eq.	1.54E-6	1.95E-8	9.57E-8	1.65E-6	3.07E-4	0.00E+0	1.23E-8	1.26E-7	1.57E-9	-1.52E-7
AP	mol H+ eq.	1.29E+0	6.53E-4	4.06E-2	1.34E+0	2.12E+1	0.00E+0	3.23E-4	2.13E-3	4.42E-5	-1.30E-2
EP-fw	kg P eq.	2.44E-2	8.63E-7	7.66E-4	2.52E-2	3.89E-1	0.00E+0	5.63E-7	1.27E-5	9.07E-8	-1.01E-4
EP-m	kg N eq.	9.54E-2	2.12E-4	3.60E-3	9.92E-2	2.70E+0	0.00E+0	1.14E-4	6.16E-4	3.52E-5	-1.61E-3
EP-T	mol N eq.	1.02E+0	2.34E-3	3.63E-2	1.06E+0	3.32E+1	0.00E+0	1.26E-3	6.84E-3	1.63E-4	-2.19E-2
POCP	kg NMVOC eq.	3.41E-1	6.57E-4	1.16E-2	3.53E-1	8.43E+0	0.00E+0	3.59E-4	1.79E-3	5.93E-5	-7.73E-3
ADP-mm	kg Sb-eq.	1.34E-3	2.15E-6	3.24E-5	1.38E-3	2.65E-2	0.00E+0	1.41E-6	5.55E-6	5.31E-8	-1.60E-4
ADP-f	MJ	1.37E+3	1.32E+0	4.79E+1	1.42E+3	7.49E+4	0.00E+0	8.41E-1	3.30E+0	1.20E-1	-2.42E+1
WDP	m3 world eq.	3.05E+1	4.60E-3	1.01E+0	3.15E+1	8.39E+2	0.00E+0	3.01E-3	2.26E-1	4.77E-3	-4.22E-1

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

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	B6	C1	C2	C3	C4	D
PM	disease incidence	3.83E-6	7.66E-9	1.37E-7	3.98E-6	5.56E-5	0.00E+0	5.02E-9	1.57E-8	8.32E-10	-7.57E-8
IR	kBq U235 eq.	2.04E+0	5.56E-3	7.79E-2	2.13E+0	6.47E+2	0.00E+0	3.52E-3	1.34E-2	4.81E-4	-8.11E-3
ETP-fw	CTUe	1.40E+3	1.16E+0	5.92E+1	1.46E+3	5.13E+4	0.00E+0	7.50E-1	5.46E+1	4.17E-1	-1.93E+2
HTP-c	CTUh	5.03E-8	3.93E-11	1.59E-9	5.20E-8	1.32E-6	0.00E+0	2.43E-11	8.69E-10	3.65E-12	-3.87E-9
HTP-nc	CTUh	2.16E-6	1.26E-9	5.80E-8	2.22E-6	4.52E-5	0.00E+0	8.20E-10	2.16E-8	1.58E-10	-1.41E-7
SQP	Pt	8.16E+1	1.10E+0	2.18E+1	1.05E+2	1.83E+4	0.00E+0	7.29E-1	1.18E+0	2.84E-1	-4.20E+0

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (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	Acidification 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

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ILCD classification	Indicator	Disclaimer
	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	B6	C1	C2	C3	C4	D
PERE	MJ	1.59E+2	1.62E-2	9.94E+0	1.69E+2	1.42E+4	0.00E+0	1.05E-2	3.25E-1	2.49E-3	-8.45E-1
PERM	MJ	0.00E+0	0.00E+0	7.07E+0	7.07E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	1.59E+2	1.62E-2	1.70E+1	1.76E+2	1.42E+4	0.00E+0	1.05E-2	3.35E-1	2.53E-3	-8.37E-1
PENRE	MJ	1.49E+3	1.41E+0	5.21E+1	1.54E+3	7.86E+4	0.00E+0	8.93E-1	3.40E+0	1.25E-1	-2.53E+1
PENRM	MJ	2.53E+1	0.00E+0	7.28E-1	2.61E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.06E+0
PENRT	MJ	1.51E+3	1.41E+0	5.28E+1	1.57E+3	7.86E+4	0.00E+0	8.93E-1	3.51E+0	1.28E-1	-2.64E+1
SM	Kg	1.63E-3	0.00E+0	4.88E-5	1.67E-3	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
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
FW	m^3	1.38E+0	1.57E-4	4.50E-2	1.43E+0	6.27E+1	0.00E+0	1.02E-4	8.43E-3	1.27E-4	-8.67E-3

PERE=Use of renewable primary energy excluding renewable primary energy resources used as raw materials | **PERM**=Use of renewable primary energy resources used as raw materials | **PERT**=Total use of renewable primary energy resources | **PENRE**=Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | **PENRM**=Use of non-renewable primary energy resources used as raw materials | **PENRT**=Total use of non-renewable primary energy resources | **SM**=Use of secondary material | **RSF**=Use of renewable secondary fuels | **NRSF**=Use of non-renewable secondary fuels | **FW**=Net use of fresh water

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OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	B6	C1	C2	C3	C4	D
HWD	Kg	3.85E-3	3.25E-6	1.24E-4	3.98E-3	4.99E-2	0.00E+0	2.13E-6	7.47E-6	1.80E-7	-1.02E-4
NHWD	Kg	6.46E+0	7.99E-2	3.34E-1	6.87E+0	2.53E+2	0.00E+0	5.34E-2	1.14E-1	4.80E-1	-2.42E-1
RWD	Kg	1.55E-3	8.72E-6	6.48E-5	1.62E-3	5.32E-1	0.00E+0	5.52E-6	1.18E-5	7.18E-7	-1.67E-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	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
MFR	Kg	0.00E+0	0.00E+0	2.41E-2	2.41E-2	0.00E+0	0.00E+0	0.00E+0	6.34E-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
EET	MJ	0.00E+0	0.00E+0	-2.01E-1	-2.01E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-6.70E+0
EEE	MJ	0.00E+0	0.00E+0	-1.17E-1	-1.17E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.89E+0

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:

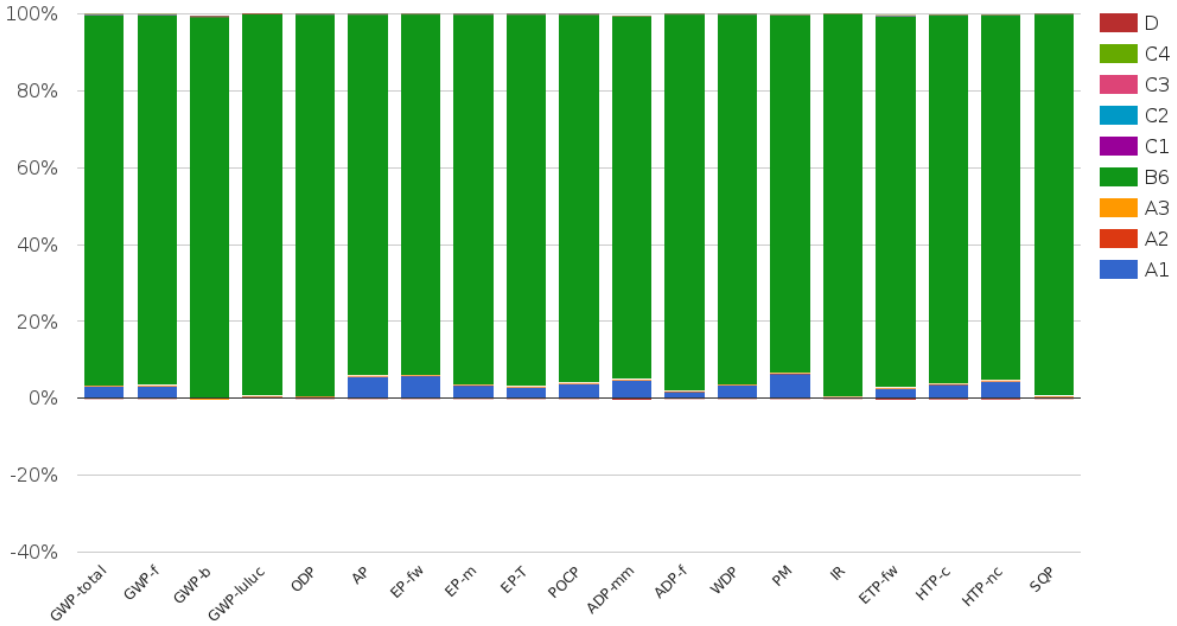
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.2018	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of 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. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	0.74	kg CO2 (biogenic)

6 Interpretation of results



The majority of the emissions in all environmental impact categories stem from the operational energy use of the product (module B6). The raw material preparation (module A1) has the second highest influence in most of the environmental impact categories (where a second highest influence can be noticed).

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 14044:2006

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

EN 50693
EN 50693:2022-08: Product category rules for life cycle assessments of electronic and electrical products and systems

NMD Waste Scenarios
Lump sum values for processing end-of-life scenarios belonging to: Method of Determination Environmental Performance of Buildings (March 2022)

REACH Directive (EU) 2023/1132
Commission Regulation (EU) 2023/1132 of 8 June 2023 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council as regards carcinogenic, mutagenic or reproductive toxicant substances subject to restrictions

ROHS Directive 2015/863
Commission Delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

ROHS Directive 2023/1437
Commission Delegated Directive (EU) 2023/1437 of 4 May 2023 amending, for the purposes of adapting to scientific and technical progress, Annex IV to Directive 2011/65/EU of the European Parliament and of the Council as regards an exemption for mercury in melt pressure transducers for capillary rheometers under certain conditions

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

Additional PCR
Institute Construction and Environment e.V. (IBU) - Part B: Requirements on the EPD for Luminaires, lamps and components for luminaires (30.09.2024, v12)

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