ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Tridonic GmbH & Co KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	IBU-ZGR-TRI-2410725-EU202528004237-ISUG1200000-EN
Issue date	2025-09-08
Valid to	2030-09-08

basicDIM Wireless OTD

Tridonic GmbH & Co KG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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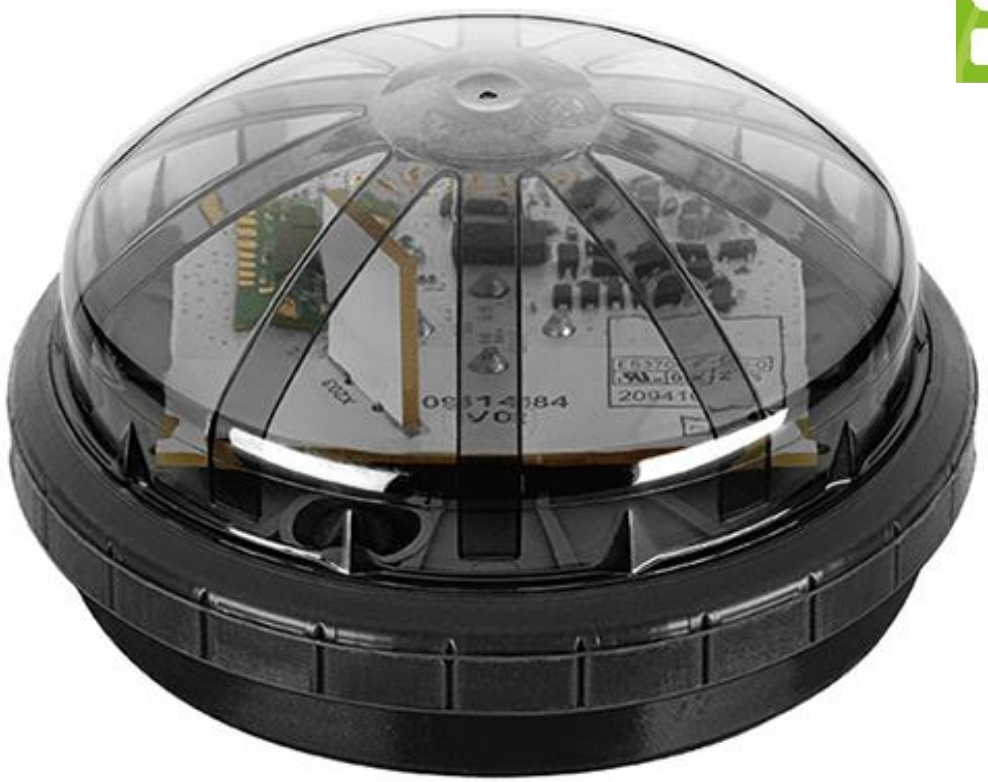

TRIDONIC

1. General Information

Tridonic GmbH & Co KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

IBU-ZGR-TRI-2410725-EU202528004237-ISUG1200000-EN

This declaration is based on the product category rules:

PCR-B: Requirements on the EPD for
Luminaires, light sources and control gears v10 (30.04.2024)

Issue date

2025-09-08

Valid to

2030-09-08

basicDIM Wireless OTD

Owner of the Declaration

Tridonic GmbH & Co KG
Färbergasse 15
6851 Dornbirn
Österreich

Declared product / declared unit

1 piece of luminaire component

Scope:

The declaration applies to luminaire component basicDIM Wireless OTD (article number: 28004237).

The product is manufactured at a site in Austria, Dornbirn. The basis for the LCA calculations is a representative, averaged mix of the energy expenditures (thermal and electrical) per component of all manufacturing sites of Tridonic for the production (A3) in 2024, as well as a product-specific bill of materials of the declared product.

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

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as EN 15804.

Verification

The standard EN 15804 serves as the core PCR	
Independent verification of the declaration and data according to ISO 14025:2010	
☐ internally	☒ externally

Dipl.-Ing.Hans Peters
(Chairman Executive Board of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.))

Therese Daxner
(Independent verifier)

2. Product

2.1 Product description/Product definition

• Can be integrated in Casambi systems (Casambi Ready)

• Wireless controllable with an Android / iOS smart device

• No need for an external gateway device

• Forms automatically a wireless communication network with up to 250 nodes

• Digital output to control DALI compatible drivers

• Supplied via DALI compatible power supply

• Integrated light sensor

• Support for Tridonic PSensor and DALI MSensor

• Ready for Zhaga book 18 receptacle for easy and flexible installation to luminaire

• Device firmware can be updated over-the-air

• Can be used as repeater to extend the coverage of the wireless signal

• Lifetime up to 100,000 h at tc = 72 °C

• 5 years guarantee (conditions at https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions)

• We will provide security updates for the next five years after the date of purchase of this product

For the placing on the market of luminaires/luminaire components in the EU/EFTA (with the exception of Switzerland), the following EU harmonisation provisions applies, among others:
• Radio Equipment Directive 2014/53/EU (RED)
• Low Voltage Directive 2014/35/EU (LVD)
• Electromagnetic Compatibility Directive 2014/30/EU (EMCD)
• Ecodesign requirements for energy-related products (EU) 2019/2020
• Restriction of hazardous substances 2011/65/EU (RoHS)

and their standards harmonised on this basis:
• Luminaires: EN 60598
• Luminaires: EN 55015
• Lightsoureces: EN 62031
• Control gears: EN 61347

This excerpt is based on a standard text module and covers not all, but the most common regulations and standards for luminaires and luminaire components. Product-specific details can be found in the CE declaration of conformity: https://www.tridonic.com/28004237

2.2 Application

Components of Tridonic offer lighting technology for professional applications, including office buildings, and retail outlets, hotels and restaurants, the education industry and outdoor lighting sectors.

2.3 Technical Data

Constructional data

The relevant technical specifications can be found under the link below. Test values for power values are subject to EN 60598, while photometric values are determined in accordance with EN 13032-4: https://www.tridonic.com/28004237

Performance data of the product according to the harmonised standards, based on provisions for harmonization.

2.4 Delivery status

The declared product as delivered has the dimensions described in chapter 2.1.

Note: Product description is generated by an automated system. Essential information like product weight and/or dimensions of the product may be missing. In this case of missing information follow the link to the product website in chapter 2.1.

2.5 Base materials/Ancillary materials

Base materials

All material components with a weight share >1% are summarized in the following table:

Name	Weight [kg]	Weight [%]
Epoxy resin	0,00	1,9
Silicon dioxide (SiO_2)	0,00	1,5
Tin	0,00	6,0
Copper	0,00	5,5
PC	0,05	61,8
Silicone rubber	0,01	10,4
Cardboard/Paper	0,01	11,4
Total Weight	0,08	100,0

The total weight in this table is based on the individual weights of all components in the bill of materials and may differ from the declared weight in section 2.1. The calculation of the LCA results is based on the weight in this table.

The value in the last column indicates the percentage of secondary material in the material component. The values for the percentage of secondary material come from the MLC datasets used, which already contain an input of secondary materials based on industry data for the selected manufacturing process.

Substances of very high concern (SVHC) / carcinogenic, mutagenic, reprotoxic substances (CMR) / biocides

1) This product/article/at least one partial article contains substances listed in the candidate list (date: 2025-09-08) exceeding 0.1 percentage by mass:
Product-specific information is not possible due to the automated creation of this EPD. Instead, generic information can be provided on typical substances contained in luminaires/luminaire components.

Substance	CAS-Nr.	Intended use
Diboron trioxide	1303-86-2	Voltage Dependant Resistors
Lead	7439-92-1	Diodes, Transistors
Lead titanium zirconium oxide	12626-81-2	ferroelectric RAM
Imidazolidine-2-thione	96-45-7	Vulcanization accelerator in elastomers
Cadmium	7440-43-9	Nickel Cadmium Accumulators
Dodecamethylcyclohexasiloxane	540-97-6	Zhaga Rainskirt
4,4'-isopropylidenediphenol	80-05-7	Passive Infrared Sensors
Hexahydromethylphthalic anhydride	25550-51-0	Passive Infrared Sensors, leaded LED
2-(2-Hydroxy-5-tertoctylphenyl)benzotriazol	3147-75-9	Polycarbonate housing consisting UV-Blockers
Lead monoxide (lead oxide)	1317-36-8	Crystals, Voltage Dependant Resistors
Bis(α, α-dimethylbenzyl) peroxide	80-43-3	Transistors, Plastic Housings
Perfluorobutane sulfonic acid (PFBS) and its salts	375-73-5	Special Terminals
Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide	75980-60-8	Special SMD Chokes

Detailed information on the substances concerned can be requested here: https://z.lighting/en/group/sustainability/?contact=corporate

2) The product/product/at least one sub-product contains other CMR substances of category 1A or 1B that are not on the candidate list, above 0.1% by mass in at least one sub-product:
As with SVHC, no product-specific information can be provided and reference can only be made to typical substances.

3) "Biocidal products have been added to this construction product or it has been treated with biocidal products (it is therefore a treated product within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): no"

2.6 Manufacture

The manufacturing process includes production technologies such as PCB assembly (SMD and THT), reflow and wave soldering, as well as the operation of highly automated systems for testing and installing the products in the enclosures.

The manufacturing plant is certified according to ISO9001.

2.7 Environment and health during manufacturing

The Zumtobel Group is committed to an active occupational health and safety policy. Transparent and periodic reporting, as well as regular audits on the effectiveness and further development of the system, are carried out in accordance with ISO EN 45001.

Internal environmental targets provide for a permanent reduction in harmful greenhouse gases, waste and water consumption, as well as a reduction in energy consumption and an increase in the share of renewable energy.

The manufacturing plant is certified according to ISO14001.

Current details on the Zumtobel Group's sustainability activities:
https://www.z.lighting/en/group/sustainability/

2.8 Product processing/Installation

Luminaire components are installed during the production of luminaires. This is usually done via screw or clamping mechanisms, so screwdrivers and side cutters are usually used. To prevent electrostatic discharge (ESD), grounding straps, table mats and tools with dissipative handles can be used to ground people and for equipotential bonding.

2.9 Packaging

The packaging is composed of the following materials:

Name	Weight [kg]	Weight [%]
Cardboard/Paper	3,56E-02	100,00
Total Weight	3,56E-02	100,00

Paper/corrugated board is used as packaging material and usually includes a mix of recycled and virgin fibres. Similarily, waste paper arising in the product life cycle is assumed to be recycled.

2.10 Condition of use

No material changes are expected during the use phase.

2.11 Environment and health during use

The product does not release any liquids, vapors or chemical substances when used under the recommended conditions and when maintenance is performed regularly and properly.

2.12 Reference service life

The reference service life according to EN 15193 defines the annual operating hours and the empirical service life in years per building type (=application). Depending on the application, the annual operating hours vary from 2,500 hours to 5,000 hours and the service life from 5 to 25 years. In the case of a customised application scenario, the reference service life can be selected according to the intended application.

Aging

Temperature management significantly determines the service life of luminaire components. As the temperature rises, the expected service life can be expected to decrease.

2.13 Extraordinary effects

Fire

A specification of the building material class according to EN 13501-1 for the declared product is not applicable.

According to standard EN 60598-1 "Luminaires - Part 1: General requirements and tests", when luminaires are mounted on parts of buildings, their marking must be observed with regard to fire protection. For luminaires without labeling, it is ensured that a temperature of 180° is not exceeded on the mounting surface even in the event of a fault.

Thermal load

Name	Value	Unit
Net calorific value	1,467	MJ

Water

The IP protection class indicates, among other things, the protection of the product against water. No effects on the environment are expected in the event of unforeseen exposure of the product to water.

Mechanical destruction

The IK protection class (see 2.1) indicates the resistance to impact and shock stress. No effects on the environment are expected in the event of unforeseen mechanical destruction of the product.

2.14 Re-use phase

Luminaires/electrical luminaire components consist to a large extent of metals and plastics, which means that there is a high potential for recycling the materials or for thermal recovery.

Increasingly, luminaires/electrical luminaire components are being developed in the sense of the circular economy (reuse, remanufacturing, refurbishment), which increases the proportion of components and materials that can be reused and recycled.

2.15 Disposal

Luminaires/electrical luminaire components are subject to EU Directive 2012/19/EU on the prevention of waste from electrical and electronic equipment (WEEE). Disposal obligations are transferred to regional collection and recovery service providers, which feed the different material fractions to appropriate end-of-life processes (recycling, thermal recovery or landfilling). According to the European Waste List 2014/955/EU, luminaires/lighting components are to be assigned to waste category 16 02 (waste from electrical and electronic equipment).

2.16 Further information

More information at: https://www.tridonic.com/28004237

3. LCA: Calculation rules

3.1 Declared Unit

This environmental product declaration refers to one pcs of luminaire component basicDIM Wireless OTD (Artikelnummer: 28004237), which is operated with a use-scenario (B6) described in tables ‘Reference service life’ and ‘Operational energy use (B6)‘ (both chapter 4).

Declared unit

Name	Value	Unit
Declared unit	1	System involving a luminaire, a light source or a luminaire control component
Conversion factor [Mass/Declared Unit]	8,00E-02	-

3.2 System boundary

EPD type: from cradle to grave and module D (A + B + C + D)

The LCA covers the entire life cycle, with all modules declared:

Production phase (A1-A3):

• Consideration of the supply chain of raw materials and their processing, the processing at the responsible production site, the production of the product and the packaging.
• A2: the transport of the material is not taken into account
• A3: for the production of the product, an annual average value of the electr. and therm. Energy of all production sites is used

For the environmental impact in the manufacturing phase A3, the use of green electricity was taken into account. The share of electricity demand in A3 covered by green electricity is 100%.

Construction phase A4, A5:

• A4: the distance of the transport of the products can be chosen individually and is assumed to be 700km by default
• A5: the effort of installation is not taken into account. The packaging material is disposed during installation. Installation losses are not taken into account. The effort (energy and material) and emissions for incineration and landfill of the packaging are given. No further activities are taken into account.

Use stage B:

• B1, B4, B5 and B7: No direct emissions to the environment are associated in any use-scenario.
• B2: Planned actions during the service life that lead to the replacement of parts of a luminaire; these actions are due to rechargeable batteries installed in luminaires that need to be replaced
• B3: Unplanned actions during the service life that lead to the replacement of defective or worn parts of a luminaire; in the case of luminaires, this may be caused by defective LED drivers with a service life shorter than that of the luminaire
• B6: The operational energy consumption according to the scenario of the utilization phase [PCR Part B] is taken into account. By default, the European grid mix is selected. In the case of an EPD created for a specific customer, the national grid mix at the customer's site can be selected.

Disposal Phase C:
• C1: Dismantling, including disassembly or demolition, of the product from the building, including initial sorting of materials on site
• C2: A standard end-of-life transportation scenario with a distance of 100km is selected for all products
• C3: The environmental impact of preparatory work (shredding) prior to recycling is specified. A standard scenario for shredding is assumed. The incineration of some components and the resulting emissions are also taken into account.
• C4: Waste sent to landfills is taken into account.

Benefits and loads beyond the system boundaries D:
• considered are the amount of electrical and thermal energy generated by the incineration of packaging, spare parts and product material.
• The end of waste status is reached for several material fractions after the shredding process
• The effort required to recycle the material and the avoided burden of new materials are summed up and reported

3.3 Estimates and assumptions

Production (A3)
An annual, averaged energy consumption value (electr. and therm.) of all Tridonic production plants weighted according to the unit numbers produced at the individual sites is used to determine the process energy. A representative mix of a Tridonic-specific electricity grid mix for Europe and a Chinese electricity grid mix is used. The mix is determined by the production volume of European sites vs. Chinese sites.

Material losses during production processes are taken into account. Material benefits, energy benefits and recycling processes are neglected.

Transport (A4)
For the transport scenario, the transport distance can be set individually (default value: 700km), while all other settings (truck: 20t EURO5 with an average load of 17.3t) are assumed fixed. No other scenario than truck as vehicle is possible.

Transport (C2)
For the hauling distance within the end-of-life scenario, a default value of 100 km per truck (payload 17,3 t, EURO 5) is assumed.

Waste processing (C3)
Combustible material consists mainly of different types of plastics and/or renewable materials. The thermal load is calculated using assumptions of average calorific values of these materials.

100% separability of all parts is assumed. Hence the MLC model assumes that 100% of recyclable materials (packaging, spare part and product) are recycled according to the legal requirements of the WEEE Directive. Statistical losses during material recycling are taken into account in the EoL modeling.

The customer-specific database for the Zumtobel Group, from which the EPDs are generated, contains assumed processes. The assumptions made are specified in the documentation for each respective LCI.

3.4 Cut-off criteria

In the assessment of the manufacturing phase (A1-A3), all available data from production are taken into account, i.e. all raw materials used according to the specification, the thermal energy used, as well as the electricity consumption. Thus, material and energy flows that contribute less than 1% of mass or energy are partially considered. Transportation of materials (A2) by truck is neglected because the contribution to the total environmental impact per category is less than 0.1%.

The production of machinery and equipment required for manufacturing (A3) are not considered. The production of labels, insulating tapes and adhesives is also not taken into account.

Energy consumption for spare parts (e.g. LED drivers) is neglected.

It can be assumed that the total sum of the processes not taken into account does not exceed 5% of the energy use and mass per module A, B, C or D.

3.5 Background data

Background data, such as material and energy production, are taken from Sphera's MLC database. The cut-off criteria for each LCI are given in the documentation for each data set (https://lcadatabase.sphera.com/)

3.6 Data quality

Representativeness
Technological: All primary and secondary data are modeled specifically, according to the technologies or technology mixes under study. When technology-specific data are not available, proxy data are used. Technological representativeness is considered good.

Geographic: all primary and secondary data are collected specifically for the countries/regions studied. If country/region specific data are not available, proxy data are used. More than 80% of the 8 most frequently purchased material groups at Zumtobel (metals, plastics, packaging, cables) come from Europe, whereas over 50% of the top 7 material groups at Tridonic (metals, PWBs, plastics, packaging, chemicals) are sourced from China. Geographic representativeness is rated as good.

Temporal: All primary data are collected from the current ERP system and/or from suppliers in a specific format (in case of TPP). All

secondary data are from the MLC databases. Temporal representativeness is rated good.

Completeness
All relevant process steps are considered and modelled to represent the specific situations. The process chain is considered sufficiently complete with regard to the goal and scope of this study.

Reliability
Primary data are collected by using BOMs of the ERP system of the Zumtobel Group. Plausibility of the data is checked by the trained EPD creators at Zumtobel Group. Overall the data quality can be described as good.

Consistency
To ensure consistency, all primary data are collected from the ERP system, while all background data are sourced from the MLC databases. Allocation and other methodological choices are made consistently throughout the model. The data quality can be regarded as high. The datasets which contribute most to the final results are based on representative datasets. In cases where data are completed by assumptions and/or estimations, these material and energy flows have been assessed as having a minor influence on the end result.

3.7 Period under review

The bill of material of the product contains essential information for the creation of the EPD. It results from a specific query of the ERP system. The data is created, checked, verified during the product development process and does not change over time.

The energy values for manufacturing are average values derived from an analysis of the energy consumption of the production sites over a 12-month period. This data is taken from the mandatory annual Environmental Reporting Reports. The energy mix to be applied is derived from a weighting of the number of units produced at the individual sites. This method takes into account the geographical representativeness of the production sites.

3.8 Geographic Representativeness

Country or region in which the declared product system is manufactured and, if applicable, used and treated at the end of life: Europe

3.9 Allocation

Allocation of upstream data
In the background data records, corresponding allocations are applied in accordance with the documentation. For refinery products, an allocation was made according to mass and specific calorific value. For each refinery product, the manufacturing path is modeled individually and the modeled and the impacts associated with the production impacts are calculated individually.

Materials and chemicals used in the manufacturing process used in the manufacturing process are modeled using the rule that is best product in question.

Allocation of foreground data
No by-products are generated during the manufacturing process.

Average values are given for electricity and thermal energy consumption during the manufacturing process.

Allocation of waste material
Material flows resulting from production residues are not associated with an EoL scenario. The EoL scenario provides for a general shredding process of the product and its spare parts resulting in different material fractions:
• Metal streams are included in the respective recycling processes, including recycling losses; the environmental impacts of the recycling processes, as well as the avoided impacts for secondary materials, are reported as a total value in Module D
• Plastic fractions are fed into a waste incineration process (B4 / C3)
• Non-combustible material streams are fed to an average landfill process (B4 / C4)

Approach for packaging
The effort (energy and material) and emissions for the incineration of carton packaging are assigned to module A5.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account.

The background data is taken from Sphera’s 'Managed LCA Content' (MLC) (former: GaBi database) content.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0,0	kg C
Biogenic carbon content in accompanying packaging	0,0	kg C

The following technical information is the basis for the declared modules:

Transport to the building site (A4)
The standard scenario includes delivery by 20t EURO 5 truck within Europe with a distance plant to site of 700 km. The weight of the transported unit includes the product with packaging.

Name	Value	Unit
Fuel	1,06E-04	l/100km
Transport distance	700	km
Transport route	Europe	-
Capacity utilisation (including empty runs)	55	%
Gross density of products transported	not available	kg/m3
Capacity utilisation volume factor	not available	-

Installation into the building (A5)
The effort for the installation is not considered. The packaging material with a total weight of 3,56E-02 kg is disposed of during installation (see table in chapter 2.9).

Use or application of the installed product (B1) see section 2.12 Use
No emissions are exchanged with the environment during use.

Replacement (B4) / Refurbishment (B5)
The replacement (B4) or refurbishment (B5) of a defective product is not taken into account.

Usage scenarios / reference service life
The reference service life of the declared product is based on the manufacturer's information on the product service life in compliance with the given product and application specifications (see data sheet or product brochure). In particular, the permissible limit values for temperatures and voltages must not be exceeded.

Reference service life

Name	Value	Unit
Total active time	100 000	hours
Total passive time	100 000	hours
Correction factors FCP/FD for dimming	1/1	-
Energy mix	EU	-

The Constant Illuminance Factor F_{CP} and the Daylight Dependency Factor F_D are considered according to EN 15193.

Operational energy use (B6) and Operational water use (B7)

Name	Value	Unit
Nominal Power	0,16	W
Passive Power	0,00	W
Constant Illuminance Control	False	-
Dimmable	False	-
Total Energy Consumption	16,00	kWh
Primary energy demand due to power consumption	160,19	[MJ]

No water consumption takes place during use.

End of life (C1-C4)
The end-of-life scenario is based on the respective recycling rates of the different materials. In the scenario applied, it is assumed that metals are fully recycled, glass is 70% recycled and plastics are thermally recycled. The remaining parts of the product are landfilled.

Only net flows are considered for recycling.

Name	Value	Unit
Collected separately (WEEE)	0,080	[kg]
Collected as mixed construction waste	0,000	[kg]
Reuse	0,000	[kg]
Recycling	0,000	[kg]
Energy recovery	0,065	[kg]
Landfill	0,000	[kg]

Reuse, recovery and/or recycling potentials (D), relevant scenario information
The total amount of recycled material, recovered electricity and recovered heat are shown in the table below.

Name	Value	Unit
Recycling of copper	0,004	[kg]
Incineration of plastic	0,059	[kg]
Incineration of paper and cardboard	0,045	[kg]

The amount of recycled materials is determined by multiplying the mass of the respective materials by the percentage that is recycled. Recycling quantities <1g are not reported.

5. LCA: Results

The evaluation is conducted according to characterization factors of EN 15804+A2 (and essential addenda).

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)																
Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ Demolition	Waste processing	Waste processing	Disposal	Reuse- Recovery- Recycling- Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: basicDIM Wireless OTD																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2-Equiv.]	4,10E+00	4,78E-03	6,16E-02	0	0	0	0	0	6,60E+00	0	1,20E-03	6,83E-04	1,78E-01	2,77E-04	-2,87E-01
GWP-fossil	[kg CO_2-Equiv.]	4,16E+00	4,70E-03	5,60E-03	0	0	0	0	0	6,60E+00	0	1,18E-03	6,71E-04	1,63E-01	2,72E-05	-2,86E-01
GWP-biogenic	[kg CO_2-Equiv.]	-6,01E-02	6,05E-05	5,60E-02	0	0	0	0	0	3,90E-03	0	1,07E-05	8,65E-06	1,43E-02	2,50E-04	-6,13E-04
GWP-luluc	[kg CO_2-Equiv.]	1,53E-03	2,65E-05	1,15E-06	0	0	0	0	0	4,28E-04	0	2,51E-07	3,78E-06	4,62E-06	6,69E-09	-9,04E-05
ODP	[kg R_{11}-Equiv.]	8,42E-11	2,85E-16	6,97E-14	0	0	0	0	0	6,52E-11	0	1,73E-14	4,07E-17	1,92E-13	1,59E-17	-7,43E-13
AP	[mol H+- Equiv.]	3,15E-02	1,47E-05	2,36E-05	0	0	0	0	0	9,69E-03	0	2,60E-06	2,10E-06	5,30E-05	6,41E-08	-7,09E-03
EP-freshwater	[kg P eq.]	1,08E-05	1,42E-08	1,45E-08	0	0	0	0	0	2,96E-06	0	3,46E-09	2,03E-09	4,05E-08	4,90E-09	-1,56E-07
EP-marine	[kg N-Equiv.]	3,80E-03	6,76E-06	7,22E-06	0	0	0	0	0	2,65E-03	0	5,83E-07	9,66E-07	1,31E-05	5,86E-08	-4,02E-04
EP-terrestrial	[mol N-Equiv.]	4,08E-02	7,56E-05	8,58E-05	0	0	0	0	0	2,83E-02	0	6,12E-06	1,08E-05	1,99E-04	2,37E-07	-4,38E-03
POCP	[kg NMVOC eq.]	1,17E-02	1,33E-05	1,92E-05	0	0	0	0	0	7,48E-03	0	1,58E-06	1,90E-06	3,56E-05	1,40E-07	-1,44E-03
ADPE	[kg Sb-Equiv.]	3,91E-04	3,97E-10	1,33E-09	0	0	0	0	0	7,85E-07	0	3,23E-10	5,67E-11	3,80E-09	8,14E-13	-1,07E-04
ADPF	[MJ]	6,09E+01	6,35E-02	9,48E-02	0	0	0	0	0	1,40E+02	0	2,15E-02	9,07E-03	2,49E-01	1,63E-04	-3,80E+00
WDP	[m^3 world- equiv. deprived]	6,68E-01	4,26E-05	7,26E-03	0	0	0	0	0	4,93E-01	0	2,70E-04	6,09E-06	1,87E-02	9,74E-07	-5,55E-02

GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: basicDIM Wireless OTD																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	1,33E+01	3,61E-03	4,76E-02	0	0	0	0	0	2,02E+01	0	1,19E-02	5,15E-04	1,22E-01	1,39E-05	-6,31E-01
PERM	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	[MJ]	1,33E+01	3,61E-03	4,76E-02	0	0	0	0	0	2,02E+01	0	1,19E-02	5,15E-04	1,22E-01	1,39E-05	-6,31E-01
PENRE	[MJ]	5,99E+01	6,36E-02	9,48E-02	0	0	0	0	0	1,40E+02	0	2,15E-02	9,09E-03	1,72E+00	1,63E-04	-3,80E+00
PENRM	[MJ]	1,47E+00	0	0	0	0	0	0	0	0	0	0	0	-1,47E+00	0	0
PENRT	[MJ]	6,14E+01	6,36E-02	9,48E-02	0	0	0	0	0	1,40E+02	0	2,15E-02	9,09E-03	2,49E-01	1,63E-04	-3,80E+00
SM	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2,21E+01	4,08E-03	1,89E-01	0	0	0	0	0	3,06E+01	0	1,14E-02	5,83E-04	4,87E-01	2,76E-05	-1,64E+00

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

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: basicDIM Wireless OTD																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	5,35E-07	3,05E-13	8,41E-12	0	0	0	0	0	1,00E-08	0	1,86E-12	4,35E-14	2,17E-11	2,46E-14	-2,60E-10
NHWD	[kg]	1,16E-01	9,12E-06	1,64E-03	0	0	0	0	0	2,97E-02	0	1,62E-05	1,30E-06	1,69E-02	1,69E-04	-2,77E-02
RWD	[kg]	2,49E-03	7,84E-08	1,35E-05	0	0	0	0	0	2,33E-02	0	3,44E-06	1,12E-08	3,10E-05	2,06E-09	-1,22E-04
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	[MJ]	0	0	2,77E-01	0	0	0	0	0	0	0	0	0	1,12E+00	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: basicDIM Wireless OTD																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	3,03E-07	8,40E-11	1,56E-10	0	0	0	0	0	8,66E-08	0	2,16E-11	1,20E-11	5,17E-10	6,37E-13	-5,82E-08
IRP	[kBq U_{235}-Equiv.]	2,67E-01	1,15E-05	2,28E-03	0	0	0	0	0	3,40E+00	0	5,82E-04	1,64E-06	5,08E-03	3,04E-07	-1,80E-02
ETP-fw	[CTUe]	3,77E+01	4,41E-02	4,22E-02	0	0	0	0	0	4,29E+01	0	9,41E-03	6,30E-03	1,06E-01	3,05E-04	-8,18E-01
HTP-c	[CTUh]	1,16E-09	8,88E-13	1,40E-12	0	0	0	0	0	7,89E-10	0	2,70E-13	1,27E-13	4,80E-12	8,52E-15	-9,75E-11
HTP-nc	[CTUh]	6,73E-08	5,31E-11	5,39E-11	0	0	0	0	0	4,01E-08	0	9,89E-12	7,58E-12	3,14E-10	9,21E-13	-3,54E-09
SQP	dimensionless	1,44E+01	2,18E-02	3,29E-02	0	0	0	0	0	1,28E+01	0	7,75E-03	3,12E-03	8,54E-02	1,32E-05	-4,84E-01
ADPE (Fr)*	[kg Sb-Equiv.]	3,93E-04	4,38E-10	2,32E-09	0	0	0	0	0	9,80E-07	0	3,69E-10	6,25E-11	2,48E-08	2,14E-12	-1,07E-04
Water Pollution	[m^3]	8,10E-01	1,04E-03	1,64E-03	0	0	0	0	0	5,13E-01	0	3,29E-04	1,49E-04	4,46E-03	1,48E-05	-2,19E-02
Air Pollution	[m^3]	2,82E+02	2,07E-01	4,27E-01	0	0	0	0	0	2,00E+02	0	7,51E-02	2,96E-02	2,46E+00	5,91E-02	-3,17E+01

PM = Potential incidence of disease due to PM emissions; IRP = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 - for indicators: "Potential for depletion of abiotic resources - non-fossil resources",
"Potential for depletion of abiotic resources - fossil fuels", "Water depletion potential (user)", "Potential toxicity comparison unit for ecosystems", "Potential toxicity comparison unit for humans - carcinogenic effect",
"Potential toxicity comparison unit for humans - non-carcinogenic effect", "Potential soil quality index".

The results of this environmental impact indicator must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

This EPD was created with a software tool.

6. LCA: Interpretation

The primary energy demand and environmental impact of the product are largely determined by the stage of use. This is due to the electricity consumption associated with the production of light and the related upstream processes for electricity generation.

The production stage has a lesser impact on the environmental impact with regard to the entire life cycle. The transport processes considered are not significant.

The calorific value resulting from the plastic content determines the energy gain in the course of the disposal stage. Recycled material can be reused in subsequent systems. Energy from incineration processes and material from recycling for subsequent systems is presented in Module D.

The results and conclusions of the EPD are limited by the geographical representativeness of the LCI background datasets used. Mainly European data sets were included for the calculations. In view of the Zumtobel Group's global procurement, the representativeness is therefore assessed as fair.

7. Requisite evidence

There is no evidence required by the PCR Part B.

8. References

EN 15804
EN 15804:2012+A2:2019 Sustainability of construction works - Environment Product declarations - Basic rules for the product category of construction products

EN 15193-1
EN 15193-1:2017 Energy performance of buildings. Energy requirements for lighting

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

EN ISO 14040
EN ISO 14040:2006: Environmental management – Life cycle assessment – Principles and framework

MLC DB
Sphera MLC database (former "GaBi") version2025.2: https://lcadatabase.sphera.com/

EPD SW Tool
GaBi BOM Import (Custom Zumtobel) v10.7.2.5

PCR part B
PCR-B: Requirements on the EPD for
Luminaires, light sources and control gears v10 (30.04.2024)

Pilot LCA 2010
LCA of Luminaires and Components for Luminaires, PE INTERNATIONAL, on behalf of Zumtobel Group, 2010

REACH
Regulation (EC) No 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

RoHS 2011
Directive 2011/65/EU of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

WEEE 2012
Directive 2012/19/EU of 4 July 2012 on waste of electric and electronic equipment (WEEE)

EN 50698-1
Luminaires -- Part 1: General requirements and tests (EN IEC 60598-1:2021)

EN 13032-4
Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 4: LED lamps, modules and luminaires; German version EN 13032-4:2015+A1:2019

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