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Product Environmental Profile of luminaires for indoor lighting Light Shed family

Reference product: Light Shed R918

Registration N°	IGUZ-00001-V01.01-EN	Drafting rules	PCR-ed3-EN-2015 04 02
		Supplemented by	PSR-0014-ed1.0-EN-2018 07 18
Verifier accreditation N°	VH23	Information and reference documents	www.pep-ecopassport.org
Date of issue	09-2021	Validity period	5 years

Independent verification of the declaration and data, in compliance with ISO 14025:2010

Internal		External	x	

The PCR review was conducted by a panel of experts chaired by Philippe Osset (SOLINNEN)

PEP is compliant with XP C08-100-1:2016
The elements of the present PEP cannot be compared with elements from another program.

Document in compliance with ISO 14025 : 2010 « Environmental labels and declarations. Type III environmental declarations »

General information

Reference product
Light Shed R918

The product range is covering indoor lighting luminaires for indoor application from the Light Shed range of luminaires. The luminaires are used for the lighting of indoor environments, such as offices, commercial spaces and museums.

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Functional unit
"Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours"

Homogeneous enviromental family
The reference product represents Light Shed luminaires family, which differ in terms of power and useful output flux (lumen) of the integrated LED installed.

Light Shed family	Unit	Value for the reference product
Electrical power	W	47.8
Useful output flux	Lumen	6,930

The present PEP declaration is valid for all the products in this homogenous environmental family. The spreadsheet provided as annex shall be used by the PEP user to extrapolate the impact of a product from the Light Shed range, based on technical parameters of the product considered.
The impacts of raw material depletion can be extrapolated to other products in the homogeneous environmental family by applying a rule of proportionality to the mass of the reference product.

Description of reference product

The reference product is Light Shed R918 luminaire for indoor lighting. Main technical features are described in the table below.

Information	Unit	Light Shed Family
Product code	-	R918
Light source	-	Integrated LED module
LED module code		279X279 C/112 LED NEUTRAL WHITE
Power supply		54W LT2 + NFC
Colour temperature	K	4,000
Protection index for water and dust (IP)	-	IP20/43 (20 over the false ceiling, 43 from the room)
Impact resistance index (IK)	-	IK02
Nominal operating voltage	V	220-240
Assigned and declared lifetime	hours	50,000
Luminaries life time in years	years	10
Useful output flux	Lumen	6,930
Electrical power	W	47.8
Luminous efficiency	Lumen/W	145
Dimension	mm	1,200 x 1,200

Luminaire R918, 1196 x 1196 mm for lay-on installation on modular panels, in 4000K neutral white color. Body made of ABS material derived from 45% recycled materials and screen in 100% recyclable PMMA. Product with high efficiency LED complete with MPO screen for UGR emission <19 L <3000 cd / m2 > 65 °, compliant with EN 12464-1, for use in environments with use of video terminals. Possibility of installation on plasterboard ceilings using a frame.
The electric cables used are made of "halogen free" PVC material.

Reference flows:

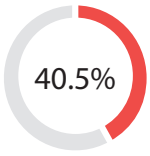
According to the PSR, the functional unit for the study is defined as:
"Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours"

Consequently, the reference flow is calculated as:
(1,000/outgoing luminous flux of the analyzed product in lumens) x (35,000/declared product lifetime of the analyzed product in hours)

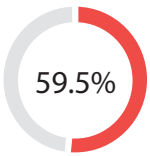
The reference factor for the reference product Light Shed R918 corresponds to:
(1,000/6,930) x (35,000/50,000) = 0.101

Constituent materials

METALS	kg	%
Steel	0.0076	< 0.1
Aluminium	0.00080	< 0.1
Metal	0.0084	< 0.1



PLASTICS	kg	%
Acrylonitrile butadiene styrene (ABS)	5.8	33.3
Polymethyl methacrylate (PMMA)	1.2	6.9
Polyethylene terephthalate (PET)	0.045	0.3
Silicone	0.0012	< 0.1
Nylon	0.00060	< 0.1
Plastic	7.05	40.5



OTHERS	kg	%
Cardboard packaging	5.74	32.9
Pallet	3.75	21.5
Electronic components	0.81	4.6
Plastic packaging	0.063	0.4
Others	0,000371	< 0.1
Paper packaging	0.0000032	< 0.1
Others	10,36	59.5
Total including packaging	17.41	100
Total without packaging	7.86	45.2

The list above includes also materials with a certain amount of recycled content, in order to reduce the impacts linked to production of virgin materials.

In particular:
- the ABS of the main body has 40% of recycled content;
- the external paperboard box of packaging is made of 84% of recycled content;
- the internal paperboard partition is made from 100% recycled material;
- the amount of recycled content of the paper adhesive tape is equal to 65%;
- the amount of recycled content of the LDPE is equal to 100%.

Manufacture

Product components are manufactured and assembled by iGuzzini S.p.A. in Recanati (Italy) manufacturing site. iGuzzini applies an environmental management system, certified according to ISO 14001:2015 and an energy management system certified according to ISO 50001:2018 (the certificates are available at: https://www.iguzzini.com/it/certificazioni/).

In 2021 iGuzzini gained the silver medal in the EcoVadis platform. In the same year, iGuzzini disclosed its sustainability performances within the Fagerhult Group Sustainability Report.

All lighting products manufactured by iGuzzini comply to the European directive "2011/65/EU ROHS 2 - Restriction of dangerous substances in electrical and electronical equipment".

Distribution

There is no hub for the distribution. Products leaving the production site in Recanati (MC), Italy, are delivered directly to the final clients. The distribution of the final destinations is the following:

Destination	Share (%)	Type transport considered
Italy	25%	Local
France	25%	Intracontinental
Germany	25%	Intracontinental
Great Britain	25%	Intracontinental

Installation

Luminaires are provided to the client with the power supply, the fixing elements and the assembly elements, fittings and other electrical connectors needed for installation. Therefore, the installation of the luminaire does not require additional components and the product is easily installed using manual tools. In the installation phase, only the contribution of the end of life (EoL) of the packaging of the final product in included.

Use

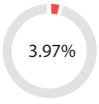
Energy efficient light sources (LED lighting) are integrated (LED module code 279X279 C/112 LED NEUTRAL WHITE, Power supply 54W LT2 + NFC). The use phase consists of electricity use during the whole lifetime of the product. The assigned lifetime of the luminaire is the same as for the integrated LED module (50,000 hours), calculated considering the average annual operating hours by building type, as specified in the PSR-0014-ed1.0-EN-2018 07 18 (Retail = 5,000 hours/year).

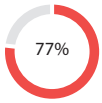
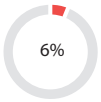
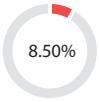
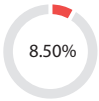
The product is used for indoor lighting, such as offices, commercial spaces or museums. According to the distribution scenario, the use phase is modeled using the average electricity mix of the Countries in which the product is distributed and installed (Italy, France, Germany and Great Britain).

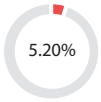
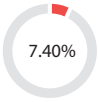
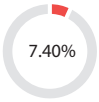
End of life

The company is affiliated to a WEEE (Waste Electrical and Electronic Equipment) Italian consortium (Ecolight, https://ecolight.it/). The product at its end of life is managed as prescribed by the current legislation about EEE waste (Directive 2012/19/EU) and the waste treatment scenarios of the Countries in which the product is distributed. According to the most recent data available, waste treatment scenarios are the following:

Proportion of luminaire	Italy WEEE waste scenario (for electronic components)	Modelling assumption
	Recycling	Transport (150km) and treatment of waste based on materials contained in the components
	Incineration with energy recovery	Transport (150km) and treatment of waste based on materials contained in the components
	Landfill	Transport (150km) and landfilling of materials contained in the components

Proportion of luminaire	Italy WEEE waste scenario (for LED)	Modelling assumption
	Recycling	Transport (150km) and treatment of waste based on materials contained in the components
	Incineration with energy recovery	Transport (150km) and treatment of waste based on materials contained in the components
	Landfill	Transport (150km) and landfilling of materials contained in the components

Proportion of luminaire	France WEEE waste scenario	Modelling assumption
	Recycling	Transport (1,000km) and treatment of waste based on materials contained in the components
	Incineration with energy recovery	Transport (1,000km) and treatment of waste based on materials contained in the components
	Incineration without energy recovery	Transport (1,000km) and incineration without energy recover of materials contained in the components
	Landfill	Transport (1,000km) and landfilling of materials contained in the components

Proportion of luminaire	Germany and Great Britain WEEE waste scenario	Modelling assumption
	Recycling	Transport (1,000km) and treatment of waste based on materials contained in the components
	Incineration with energy recovery	Transport (1,000km) and treatment of waste based on materials contained in the components
	Incineration without energy recovery	Transport (1,000km) and incineration without energy recover of materials contained in the components
	Landfill	Transport (1,000km) and landfilling of materials contained in the components

In addition, it is worth to mention that the product can be easily disassembled, as the low number of components are assembled using mainly screws and clips. No use of glues or welding is required.

Environmental impacts

The evaluation of environmental impacts examines the stages of the Reference Product life cycle: manufacturing, distribution, installation, use and end-of-life. It is representative from products marketed and used in Europe, in compliance with the local current standards.

Environmental impact assessment of the reference product has been performed using Simapro 9.1.1.1 software. Background datasets have been retrieved from Ecoinvent 3.7 and ELCD 3.2 libraries. The impact indicators and impact models used are the ones indicated by the PCR-ed3-EN-2015 04 02. This environmental declaration has been developed considering an outgoing artificial luminous flux of 1,000 lumens over a reference lifetime of 35,000 hours (Functional Unit).

Results of mandatory indicators per F.U. (for 1,000 lumens during 35,000 hours) of Light Shed R918 luminaire

Indicator	Unit	Total/FU		Manufacturing		Distribution		Installation		Use		End of Life	
Depletion of abiotic resources - elements	kg Sb_{eq}	1.12E-03	100%	1.43E-04	12.8%	1.28E-04	11.5%	2.61E-05	2.3%	7.97E-04	71.5%	2.10E-05	1.9%
Global Warming	kg CO_2 eq	9.76E+01	100%	5.58E+00	5.7%	2.56E+00	2.6%	6.70E-01	0.7%	8.82E+01	90.4%	5.22E-01	0.5%
Ozone deplention	kg CFC-11 eq	1.44E-05	100%	2.92E-07	2.0%	4.47E-07	3.1%	9.19E-08	0.6%	1.35E-05	93.7%	7.16E-08	0.5%
Photochemical ozone creation	kg C_2H_4 eq	1.50E-02	100%	1.62E-03	10.9%	3.76E-04	2.5%	1.09E-04	0.7%	1.28E-02	85.4%	7.21E-05	0.5%
Acidification of soil and water	kg SO_2eq	3.30E-01	100%	2.86E-02	8.7%	9.59E-03	2.9%	2.01E-03	0.6%	2.88E-01	87.3%	1.63E-03	0.5%
Eutrophication	kg $(PO_4)^{3-}$ eq	2.43E-01	100%	8.24E-03	3.4%	2.41E-03	1.0%	7.86E-04	0.3%	2.30E-01	94.7%	1.49E-03	0.6%
Total use of primary energy	MJ (Ihv)	2.68E+03	100%	1.11E+02	4.2%	3.93E+01	1.5%	8.11E+00	0.3%	2.52E+03	93.8%	6.47E+00	0.2%
Net fresh water use	m^3	2.15E+01	100%	2.17E+00	10.1%	1.38E-01	0.6%	2.93E-02	0.1%	1.91E+01	89.0%	3.21E-02	0.1%

Results of mandatory indicators at the product level (for 1 luminaire of 6,930 lumens during 50,000 hours) of Light Shed R918 luminaire

Indicator	Unit	Total/Product		Manufacturing		Distribution		Installation		Use		End of Life	
Depletion of abiotic resources - elements	kg Sb_{eq}	1.10E-02	100%	1.42E-03	12.8%	1.27E-03	11.5%	2.58E-04	2.3%	7.89E-03	71.5%	2.08E-04	1.9%
Global Warming	kg CO_2 eq	9.66E+02	100%	5.53E+01	5.7%	2.53E+01	2.6%	6.63E+00	0.7%	8.74E+02	90.4%	5.17E+00	0.5%
Ozone deplention	kg CFC-11 eq	1.43E-04	100%	2.89E-06	2.0%	4.42E-06	3.1%	9.10E-07	0.6%	1.34E-04	93.7%	7.09E-07	0.5%
Photochemical ozone creation	kg C_2H_4 eq	1.48E-01	100%	1.61E-02	10.9%	3.72E-03	2.5%	1.07E-03	0.7%	1.26E-01	85.4%	7.14E-04	0.5%
Acidification of soil and water	kg SO_2eq	3.27E+00	100%	2.83E-01	8.7%	9.49E-02	2.9%	1.99E-02	0.6%	2.86E+00	87.3%	1.62E-02	0.5%
Eutrophication	kg $(PO_4)^{3-}$ eq	2.40E+00	100%	8.16E-02	3.4%	2.39E-02	1.0%	7.79E-03	0.3%	2.27E+00	94.7%	1.47E-02	0.6%
Total use of primary energy	MJ (Ihv)	2.65E+04	100%	1.10E+03	4.2%	3.89E+02	1.5%	8.03E+01	0.3%	2.49E+04	93.8%	6.40E+01	0.2%
Net fresh water use	m^3	2.13E+02	100%	2.15E+01	10.1%	1.37E+00	0.6%	2.90E-01	0.1%	1.89E+02	89.0%	3.18E-01	0.1%

Results of mandatory indicators per unit of product (of Light Shed R918 luminaire) – Detail of the use phase with the decomposition of module B (B1-B7) according to EN 15978 and EN 15804.

Indicator	Unit	Total/product	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use
Depletion of abiotic resources - elements	kg Sb_{eq}	7.89E-03	-	-	-	-	-	7.89E-03	-
Global Warming	kg CO_2 eq	8.74E+02	-	-	-	-	-	8.74E+02	-
Ozone deplention	kg CFC-11 eq	1.34E-04	-	-	-	-	-	1.34E-04	-
Photochemical ozone creation	kg C_2H_4 eq	1.26E-01	-	-	-	-	-	1.26E-01	-
Acidification of soil and water	kg SO_2eq	2.86E+00	-	-	-	-	-	2.86E+00	-
Eutrophication	kg $(PO_4)^{3-}$ eq	2.27E+00	-	-	-	-	-	2.27E+00	-
Total use of primary energy	MJ (Ihv)	2.49E+04	-	-	-	-	-	2.49E+04	-
Net fresh water use	m^3	1.89E+02	-	-	-	-	-	1.89E+02	-

Extrapolation rules

Extrapolations rules have been calculated following PCR-ed3-EN-2015 04 02 and PSR-0014-ed1.0-EN-2018 07 18. The rules defined shall be applied using the extrapolation coefficients provided in the following tables. The outgoing artificial luminous flux of each product is covered by the PEP intended for the product range.

Parameter for reference product (Light Shed R918)	Values (Light Shed R918)
Lighting output [lumens]	6,930
Weight of light source [kg]	0.52
Weight of luminaire structure [kg]	7.15
Weight of power equipment [kg]	0.18
Weight of product including its light source [kg]	7.86
Weight of product including its packaging [kg]	17.41
Power [W]	47.8

Extrapolation coefficients

The reported extrapolation coefficients are intended at product level (declared unit) and not at functional unit.

Products	Manufacturing	Distribution	Installation	Use	End of Life
R868 - R869 - R870 - R871 R872 - R873 - R874 - R875	0.45	0.27	0.30	0.49	0.23
R896 - R897 - R898 - R899 R900 - R901 - R902 - R903	0.45	0.27	0.30	0.61	0.23
R879 - R880 - R881 - R882	0.43	0.33	0.42	0.53	0.23
R883 - R884 - R885 - R886	0.43	0.33	0.42	0.54	0,23
R907 - R908 - R909 - R910 R911 - R912 - R913 - R914	0.43	0.33	0.42	0.69	0.23
R890 - R891 - R892 - R893	1	1	1	0.85	1
R918 - R919 - R920 - R921	1	1	1	1	1

The following table reports the informations of the products included in the homogeneous enviromental family.

Product code	Dimensions (mm x mm)	Wattage (W)	Lumen (lm)	Product weight (kg)	Packaging weight (kg)	Structure weight (kg)	Weight of power equipment (kg)	Weight of light source (kg)
R868	600x600	23.2	3,290	1.83	2.86	1.50	0.15	0.18
R869	600x600	23.2	2,670	1.83	2.86	1.50	0.15	0.18
R870	600x600	23.2	2,960	1.83	2.86	1.50	0.15	0.18
R871	600x600	23.2	2,550	1.83	2.86	1.50	0.15	0.18
R872	600x600	23.4	3,290	1.83	2.86	1.50	0.15	0.18
R873	600x600	23.4	2,670	1.83	2.86	1.50	0.15	0.18
R874	600x600	23.4	2,960	1.83	2.86	1.50	0.15	0.18
R875	600x600	23.4	2,550	1.83	2.86	1.50	0.15	0.18
R896	600x600	29.3	3,990	1.83	2.86	1.50	0.15	0.18
R897	600x600	29.3	3,240	1.83	2.86	1.50	0.15	0.18
R898	600x600	29.3	3,590	1.83	2.86	1.50	0.15	0.18
R899	600x600	29.3	3,090	1.83	2.86	1.50	0.15	0.18
R900	600x600	29.2	3,990	1.83	2.86	1.50	0.15	0.18
R901	600x600	29.2	3,240	1.83	2.86	1.50	0.15	0.18
R902	600x600	29.2	3,590	1.83	2.86	1.50	0.15	0.18
R903	600x600	29.2	3,090	1.83	2.86	1.50	0.15	0.18
R879	1200x300	25.4	3,420	1.84	3.98	1.56	0.15	0.13
R880	1200x300	25.4	2,780	1.84	3.98	1.56	0.15	0.13
R881	1200x300	25.4	3,080	1.84	3.98	1.56	0.15	0.13
R882	1200x300	25.4	2,650	1.84	3.98	1.56	0.15	0.13
R883	1200x300	25.7	3,420	1.84	3.98	1.56	0.15	0.13
R884	1200x300	25.7	2,780	1.84	3.98	1.56	0.15	0.13
R885	1200x300	25.7	3,080	1.84	3.98	1.56	0.15	0.13
R886	1200x300	25.7	2,650	1.84	3.98	1.56	0.15	0.13
R907	1200x300	33.0	4,335	1.84	3.98	1.56	0.15	0.13
R908	1200x300	33.0	3,530	1.84	3.98	1.56	0.15	0.13
R909	1200x300	33.0	3,910	1.84	3.98	1.56	0.15	0.13
R910	1200x300	33.0	3,370	1.84	3.98	1.56	0.15	0.13
R911	1200x300	33.2	4,335	1.84	3.98	1.56	0.15	0.13
R912	1200x300	33.2	3,530	1.84	3.98	1.56	0.15	0.13
R913	1200x300	33.2	3,910	1.84	3.98	1.56	0.15	0.13
R914	1200x300	33.2	3,370	1.84	3.98	1.56	0.15	0.13
R890	1200X1200	40.4	6,000	7.89	9.55	7.15	0.18	0.52
R891	1200X1200	40.4	4,880	7.89	9.55	7.15	0.18	0.52
R892	1200X1200	40.4	5,400	7.89	9.55	7.15	0.18	0.52
R893	1200X1200	40.4	4,650	7.89	9.55	7.15	0.18	0.52

Product code	Dimensions (mm x mm)	Wattage (W)	Lumen (lm)	Product weight (kg)	Packaging weight (kg)	Structure weight (kg)	Weight of power equipment (kg)	Weight of light source (kg)
R918	1200X1200	47.8	6,930	7.89	9.55	7.15	0.18	0.52
R919	1200X1200	47.8	5,630	7.89	9.55	7.15	0.18	0.52
R920	1200X1200	47.8	6,230	7.89	9.55	7.15	0.18	0.52
R921	1200X1200	47.8	5,370	7.89	9.55	7.15	0.18	0.52

The extrapolation coefficients calculation at the functional unit level shall be taken into account with the following formula:

$$\textit{Extrapolation coefficient at the product level} \times \left(\frac{\textit{Lighting output of reference product (lumens)}}{\textit{Lighting output of concerned product (lumens)}} \right)$$