Multilume Re:Think

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:
Fagerhults Belysning AB, Åvägen 1, 566 80 Habo, Sweden

Programme:	*The International EPD® System, www.environdec.com*
Programme operator:	EPD International AB
EPD registration number:	S-P-03128
Publication date:	2022-01-04
Valid until:	2027-01-04
	An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

FAGERHULT

ECO PLATFORM EPD VERIFIED

EPD®

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *pcr2019-14 Construction products v1.11 and UN CPC code(s)>* Together with EN 15804:2012+A2:2019
PCR review was conducted by: *The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Martyna Mikusinska, Sweco Environment AB, Martyna.Mikusinska@sweco.se, +46 (0)19-168178 Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 (*Svensk Standard Ss-En 15804:2012+a2:2019*, 2020) and ISO 14025 (ISO, 2006a). And the General Product Instructions (EPD International, 2021b).

The LCA approach harmonizes with the Product Environmental Footprint Category Rules for building products, cradle to grave (EPD International, 2021a). The Life Cycle Assessment report (Wendin, 2021) is available to EPD-auditor on request and include all the detailed information required according to ISO 14044 (ISO, 2006b).

Company information

Owner of the EPD:
Fagerhults Belysning AB

Contact:
Niclas Thulin, Sustainability Manager

Description:
Fagerhult develops, produces and markets professional lighting solutions for public environments such as offices, schools, retail areas, industries and hospitals, indoor and outdoor. Our lighting knowledge, in combination with a wide range of innovative, energy efficient, less environmental impact lighting solutions, makes us a natural partner for the entire project. Fagerhult is a part of the Fagerhult Group, one of Europe's leading lighting companies with 4,400 employees in 28 countries around the world.

Product-related or management system-related certifications:
Fagerhults Belysning AB are ISO 9001 and ISO 14001 certified. All products are produced in accordance with the requirements for CE-marking (Ström, 2020).

Name and location of production site(s):
Fagerhults Belysning AB, Habo, Åvägen 1, 566 80 Habo

Product information

Product family:
Multilume Re:Think

Product description:
Multilume Re:Think is a lighting luminaire for offices, classrooms, and other open spaces. The body of the luminaire is made of renewable material and it is developed from an environmental perspective. Multilume Re:Think is available in opal or delta (micro prism covers) for different lighting distributions. It is delivered with a separate stand-alone driver with nine different connections options on the primary side.

Product identification:
Multilume Re:Think Opal and Multilume Re:Think Delta (size: 600*600 mm).

Articles included in the EPD:
Article number 24100, including suffixes.

LCA information

Declared Unit	One Multilume Re:Think (which represent a family of articles with small variations, represented by version Delta).
The functional unit	2500 hours office light per year, during the lifetime.
The functional	Office light during the lifetime of one luminaire.
Lifetime - Reference Service Life	The lifetime is normally 20 years based on the experience from customer relations.
Technical lifetime	100 000 operation hours (40 years). Imply that parts are not exchanged.
Product group classification	UN CPC 412 Products of iron or steel (no more relevant found).
Goal	Understanding the environmental impact of the product during the life cycle, for internal use during product development to reduce the impact but also to our stakeholders when selecting luminaires.
Audience	Primarily purchasers of luminaires but also lighting installers, lighting designers, architects and constructors.
Scope	Cradle-to-grave and module D (A, B, C and D).
Time	Data regarding manufacturing is based on the environmental report for year 2019 and the allocation to Re:Think is based on the sales 2020.
Manufacturing Site	Fagerhults Belysning, Habo, Sweden.
Geographical Area	Europe. Use and disposal is represented by Sweden.
Compliant with	This EPD follows the "Book-keeping "LCA approach which is defined as an attributional LCA in the ISO 14040 standard. ISO 14025 EN 15804:2012+A2:2019 Product category rules (PCR): pcr2019-14 Construction products v1.11
Cut-Off Rules	Cut-offs have been made for chemical consumption in manufacturing, hand tools and work clothes.
Background Data	Ecoinvent 3.7 - allocation, Cut off.
Foreground Data -primary	Weight of articles and composition of raw materials. Suppliers' location for transport. Packaging, rest materials, electricity, heat and waste. Customers distance for distribution to client. Disposal scenario.
Forground Data -specific	Manufacturing at Fagerhult, Waste at Fagerhult, Component models with raw material, processing and transport. Driver from EPD (Gmbh, 2017)
Electricity data	Electricity consumption in the A3 module is Goo-certified hydro power and B6 Electricity is represented by data for national production mix in Ecoinvent 3.7 regionalized for Sweden.
LCA software	SimaPro 9.2

Description of the manufacturing process (A3)

The production site at Habo is a modern industrial facility including research and development, production, and assembly of the products. The environmental aspects are the consumption of raw materials (mostly steel and aluminium), electricity (from renewable sources), heat (from next door plant burning wood residues), waste to treatment, water and construction of the facilities (1940).

Re:Think in contracts to most products at Fagerhult, is not based on painted aluminium profiles. LED, PCB and driver are instead mounted on a structure of solid board. Therefor the manufacturing process is also minimal.

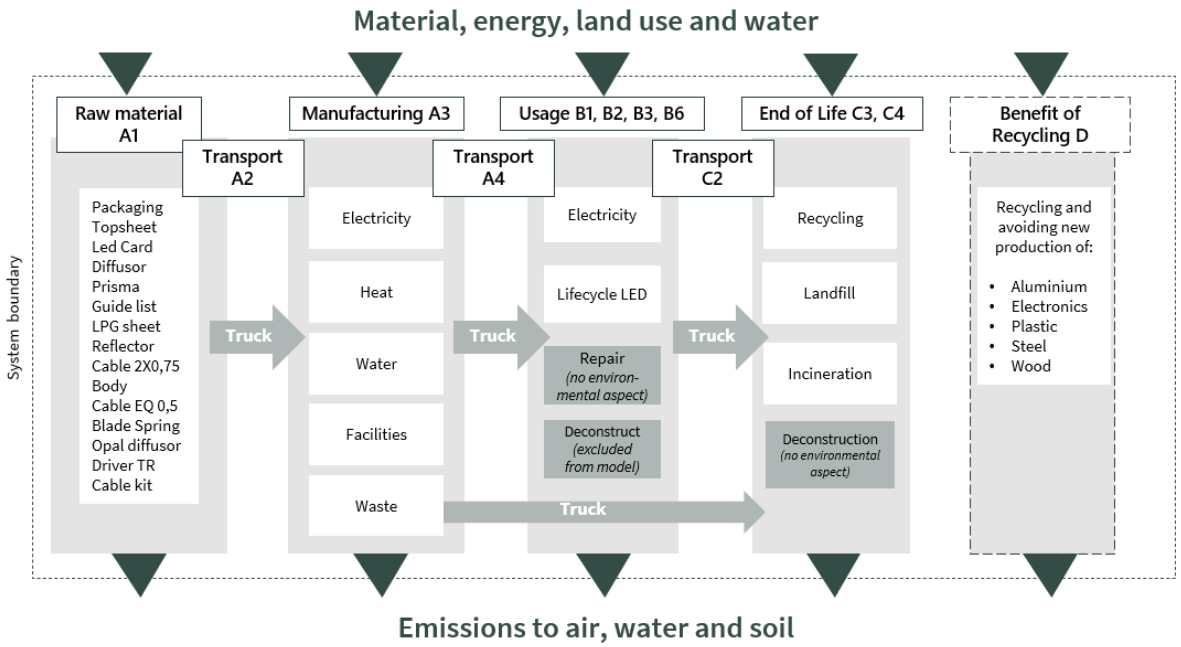
Assumptions: transportation, usage and end of life treatment (A4-D)

The distribution to clients is represented by an estimated average sized truck (32-ton payload) with average level of filling (45%), and an estimated average distance to client of 400 km.

The product is most often used in the application “offices” with an annual operating of 2500 hours. It is normally used for 20 years. Electricity is represented by data for national production mix in Sweden and the usage of the product is represented by an on-and off solution as worst case.

Deconstruction is not required at end of life, only sorted and recycled as electronic waste. At end of life the product is transported to municipal treatment of electronic waste. If necessary, the waste is sorted manually, but primarily the product are shredded and the materials final disposal is different waste treatment to material recycling.

System diagram:



This study includes a cradle-to-grave perspective. That means that all processes needed for raw material extraction, manufacturing, transport, usage and end-of-life are included in the study.

Included

- Production of the components and packaging (A1)
- Transport to manufacturing (A2)
- Electricity, water, heat and waste for manufacturing (A3)
- Production of materials for facilities and land use (A4)
- Distribution to clients and transport to disposal (A4 & C2)
- Electricity consumption (user) (B6)
- Disposal, dismantling and treatment of waste (C3 & C4)
- Avoided production of raw materials if recycled according to average municipal recycling in Sweden (D)

Excluded

- Production of machines.
- Transport of returned products.
- Labour and related aspects.
- Retail not relevant.
- Business travel.
- Research and development activities.

Reprocessing of recycled materials (estimated lower than cut-off 1%)

	Material		Manufacturing & Transportation			Use							End of life				Reuse
	Raw material	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Renovation	Energy during use	Water use	Demolition	Transport	Waste process	Final disposal	Potential benefit in recycling
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	X	X[1]	X[1]	X[1]	X[1]	X[1]	X[1]	X	X[1]	X[1]	X	X[1]	X	X
Geography	GLO	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Variation – products (% of GWP[2])	-2	0	0	-0,05	0	-	-	-	-	-	-	-	-	-	-	-	
Type of data	G/S	G	S	G	-	-	-	-	-	-	G	-	-	G	-	G	G

Modules declared: (X = included ND = not declared), geographical scope, share of specific data (in GWP-GHG indicator) and data variation: EPD modules included (G = generic data, S = Specific data).

The product's variations of constituent components (Opal and Delta) give a variation on environmental impact. The maximum environmental impact is reported as the result.

[1] Included but does not have any environmental aspects.

[2] Variation of the products is represented by the GWP.

Material content

The product weight is 3,396 kg as Opal, and 3,442 kg as Delta. The variation of functionality means that some components are not used. Several other variations are possible.

Material (in product)	Specification	Weight (kg)	Share weight (%)
Steel	EN 10 130	0,000	0%
Plastic	PMMA	1,210	30%
Plastic	PS	0,987	24%
Driver	Electronics	0,230	6%
Plastic	PET	0,142	3%
Wire	Steel	0,080	2%
LED-Module	Electronics	0,072	2%
Plastic	EPS		0%
Plastic	LDPE		0%
Plastic	PBT	0,044	1%
Sensor	Electronics	0,044	1%
Plastic	PA	0,037	1%
Plastic	PE	0,035	1%
Powder coating	Epoxy/polyester	0,020	0%
Plastic	PC	0,028	1%
Plastic	ABS	0,034	1%
Stainless steel	Steel	0,010	0%
Paper	Paper	1,115	27%
Plastic	TPE	0,000	0%
Rubber	Silicon	0,002	0%
Galvanized steel		0,002	0%

Packaging Materials	Opal	Delta	Share of Opal	Share of Delta	Biogenic Opal (g)	Biogenic Delta (g)
Plastic (g)	0	0	0,00%	0,00%	0	
Paper (g)	325	325	9,57%	9,44%	325	325
wood pallet (g)	96	96	2,83%	2,79%	96	96
Sum packaging (g)	421	421			421	421
Product weight (g)	3396	3442			1115	1115

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Impact category	Unit	A1	A2	A3	A4	B6	C2	D
Climate change	kg CO2 eq	32,54	0,36	2,39	0,02	84,71	0,22	-1,34E+01
Climate change – Fossil	kg CO2 eq	31,19	0,36	0,93	0,20	52,03	0,22	-1,28E+01
Climate change – Biogenic	kg CO2 eq	1,33	5,66E-04	0,95	-0,18	28,18	1,90E-04	-6,59E-01
Climate change - Land use and LU change	kg CO2 eq	0,02	0,00	0,52	1,92E-04	4,50	2,06E-05	-1,42E-03
Ozone depletion	kg CFC11 eq	6,42E-07	5,27E-08	6,74E-08	4,61E-08	2,54E-06	4,85E-08	-6,94E-08
Acidification	mol H+ eq	0,201	0,003	0,007	7,35E-04	0,269	0,001	-6,48E-02
Acidification	kg PO4 eq	0,037	1,70E-04	0,001	6,19E-05	0,091	1,27E-05	-0,001
Eutrophication, freshwater	kg P eq	0,012	5,54E-05	2,15E-04	2,02E-05	0,029	4,13E-06	-4,51E-04
Eutrophication, marine	kg N eq	0,026	0,001	0,002	1,79E-04	0,088	5,66E-04	-1,03E-02
Eutrophication, terrestrial	mol N eq	0,257	0,010	0,029	0,002	0,843	0,006	-9,71E-02
Photochemical ozone formation	kg NMVOC eq	0,094	0,003	0,005	0,001	0,188	0,002	-4,44E-02
Resource use, minerals and metals	kg Sb eq	3,13E-03	1,39E-06	1,07E-05	6,32E-07	4,39E-03	1,98E-07	-3,55E-05
Resource use, fossils	MJ	337,29	4,56	7,30	3,24	7891,06	3,03	-2,06E+02
Water use	m3 depriv.	7,02	0,03	1,91	0,02	101,62	2,40E-03	-4,64E+00
Particulate matter	disease inc.	1,21E-06	5,71E-08	1,86E-07	1,71E-08	4,10E-06	3,01E-08	-5,94E-07
Ionising radiation	kBq U-235 eq	1,22	0,02	0,05	0,02	570,53	0,01	-8,55E-02
Ecotoxicity, freshwater	CTUe	1086,32	5,92	38,87	2,69	3776,38	1,69	-8,70E+01
Human toxicity, cancer	CTUh	1,47E-08	3,79E-10	2,19E-09	2,47E-10	1,29E-07	3,27E-11	-5,97E-09
Human toxicity, non-cancer	CTUh	4,71E-07	4,43E-09	2,42E-08	2,72E-09	1,78E-06	1,11E-09	-5,65E-08
Land use	Pt	1,09E+02	4,29E+00	3,42E+01	1,50E+01	1,90E+03	5,34E-01	-3,93E+01

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Raw material (A1), Transport (A2), Manufacturing (A3), Distribution (A4), Usage (B6), Transport (C2), Waste treatment (C3), Final disposal (C4), secondary effects of reuse and recycling (D).

Climate impact (IPCC)

Impact category	Unit	A1	A2	A3	A4	C2	C4	D
IPCC GWP 100a	kg CO2 eq	30,57	0,35	1,51	0,20	56,03	0,22	-12,26

Due to differences in the method EF and IPCC, both results may be important to display.
The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources

The consumption of resources in terms of energy is measured as primary energy demand with the method CED 1.11.

Category	Unit	A1	A2	A3	A4	C2	C4	D
PERE	MJ	0,03	0,00	50,35	0,00	3598,12	0,00	-8,72
PERM	MJ	21,54	0,00	15,03	2,16	0,00	0,00	-5,54
PERT	MJ	21,6	0,0	3,9	2,2	3598,1	0,0	-14,26
PENRE	MJ	2,9	0,0	3,9	0,0	7915,4	0,0	-0,56
PENRM	MJ	360,8	0,0	13,1	0,5	0,0	0,0	-221,40
PENRT	MJ	363,8	0,0	17,0	0,5	7915,4	0,0	-221,97
SM	Kg	1,2	0,0	0,0	0,0	0,0	0,0	-1,2
RSF	MJ	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
FW	M3	6,78	0,01	0,00	0,35	1,18	0,85	-4,59

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 fuel
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water

Information on biogenic carbon content

Results per functional or declared unit		
Biogenic carbon content	**Unit**	**Quantity**
Biogenic carbon content in product	kg C	0,995
Biogenic carbon content in packaging	kg C	0,376

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Waste production and output flows

The production of waste in terms of final waste and the output of materials for recycling, is measured from the calculation of selected inventory results with our own method[3]. Final waste and output flows, refers to flows that are leaving the system of the LCA. In this LCA only elementary flows (substances) are leaving the system. For the manufacturing at Fagerhult, there are no such flows. For the manufacturing at Fagerhult, there are only technical flows followed to, and including, waste treatment.

Additional information

The environmental impact of Multilume Re:Think in a lifecycle perspective, comes mostly from the electricity consumption in the use phase and from the production of raw materials.

The environmental impact of the electricity is dominated by the environmental effect category “Resource use, fossils”. The source is electricity from the grid in Sweden, which has relatively low impact in comparison to electricity in other countries. The environmental impact of the raw materials is dominated by the environmental effect category “Resource use, minerals and metals”.

The model of the product system and value chain is sensitive to the source of energy in production of the electricity. If the product is used instead with European electricity[4], the Environmental Footprint Single score (EF) is 144% higher.

The components that contribute the most are the sensor, LPG sheet, driver and LED card. Thus, any changes in these component or data, should be considered in an update. The sensor is used in Delta version and allow for day and presence control. If required, it may reduce the electricity consumption up to 35%.

The LCA is on Multilume Re:Think which has variations. It is represented by Delta and reference flow Opal. In that way the result is easier to communicate because it is avoided having different results for all the variations. The variation contributes with -2% of the GWP of Multilume Re:Think.

References

EPD International. (2021a). *CONSTRUCTION PRODUCTS PCR 2019:14 VERSION 1.11*.
EPD International. (2021b). *General Programme Instructions for the International EPD® System. Version 4.0*.
Gmbh, T. (2017). *EPD driver; ECO-ZGR-28000672*.
ISO. (2006a). *ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures*.
ISO. (2006b). ISO 14044:2006. *Environmental Management - Life Cycle Assessement - Requirements and Guidelines, ISO 14044, International Organization for Standardization*. https://doi.org/10.1007/s11367-011-0297-3
Ström, N. (Fagerhult B. A. (2020). Declaration of Conformity. *Quality*, 1.
Svensk standard ss-en 15804:2012+a2:2019. (2020).
Wendin, M. (Miljögiraff ab). (2021). *1053 Life Cycle Assessment Of the luminaire Multilume Re : Think*.

[3] EPD (2018) EN15804 v3

[4] Parameter name ElfromEU.