Riff

Environmental Product Declaration

Product dimensions: Width 196mm, Heigh 256mm,

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021
Ateljé Lyktan AB, Fyrvaktaregatan 7, SE-296 35, Sweden

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	IES-0016485
Publication date:	2024-11-26
Valid until:	2029-11-26

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
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR2019-14 Construction products v1.3.4 and UN CPC code(s) 4653 Together with EN 15804:2012+A2:2019, valid until 2025-06-20
PCR review was conducted by: *The Technical Committee of the International EPD® System.* *Review chair: Claudia A. Peña, University of Concepción, Chile. 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: Viktor Hakkarainen, CHM Analytics AB, Viktor.hakkarainen@chm-analytics.com *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 registered in different EPD programs, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

The LCA approach harmonizes with the Product Category Rules for building products, PCR 2019:14 v1.3.4. The Life Cycle Assessment report (Böckin & Roos, 2024) 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
Ateljé Lyktan AB

Contact
Rasmus Nilsson, rasmus.nilsson@ateljelyktan.se

Description
Ateljé Lyktan develops, produces and markets lighting products – with a focus on energy efficiency, sustainability and circularity. We design our products to be used, upgraded and reused in a well-thought-out and flexible way. We make it possible to extend the life of the product by upgrading both hardware and software. The company was founded in 1934. The head office and factory are located in Åhus, located on the shores of the Baltic Sea in the southern Sweden.

Name and location of production site(s)
Ateljé Lyktan AB, Fyrvaktaregatan 7, SE-296 35, Sweden

Product-related or management system-related certifications
Ateljé Lyktan AB is certified according to ISO 9001 and ISO 14001. All products are produced in accordance with the requirements for CE-marking.

CE

ISO 9001:2015 CERTIFICATION Intertek

ISO 14001:2015 CERTIFICATION Intertek

Product information

Product name
Riff

Product identification
Riff, width 196mm, height 256mm,

Product description
Riff is a lighting luminaire for offices, showrooms and other open spaces. Suspended from ceiling, with ideal placement being high level open exposed ceilings.

Including LED light source with colour temperature: 3000K or 4000K. Colour rendering CRI min. 80, CRI 90 on request. Rated lifetime: L70 50 000h.

Electronic DALI-driver is mounted in the supplied ceiling cup. Equipped with Touch and DALI to regulate the light with amplitude modulation creating a flicker-free light. Dimming 1-100%.

Light engine in die cast metal. Shade in handblown opal glass.

For this report, the system studied was the life cycle of Riff, cradle to grave, and its function is to act as a light source in an office environment. The assessed product for this report is the Riff version with a width of 196mm, a height of 256mm, a weight of 1,99kg that is used for 20 years (and 2500 hours per year) with a power-rating of 11W and a luminous flux of 830lm.

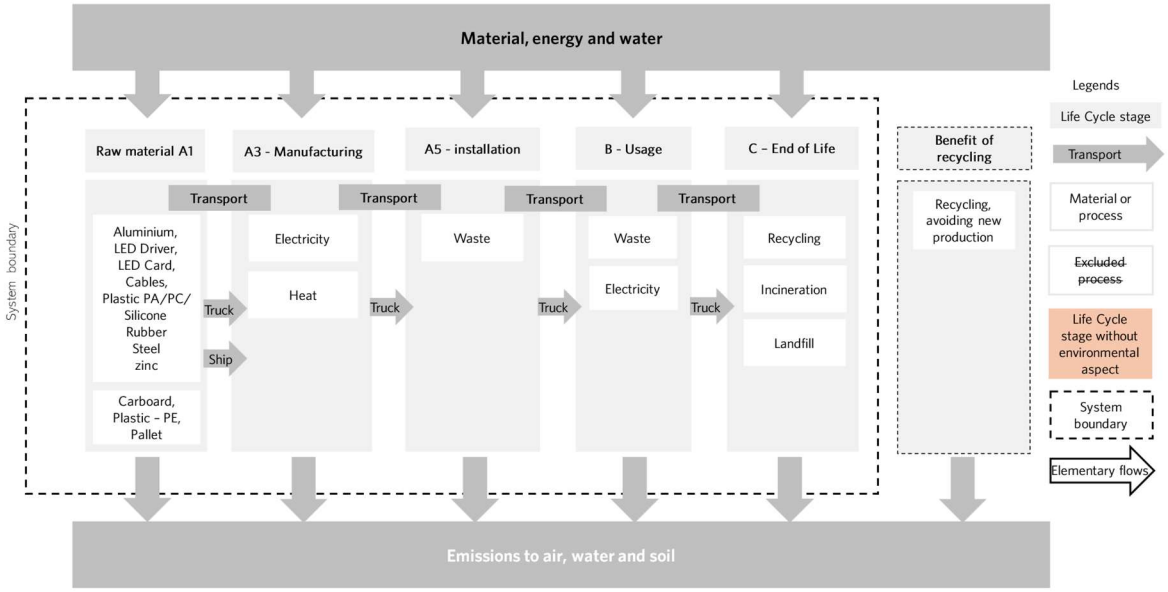
LCA information

Declared Unit	**One (1) Riff luminaire with the width 196mm, a height of 256mm and a weight of 1,99 kg used for 20 years (and 2500 hours per year) with a power-rating of 11W and a luminous flux of 830lm.**
Function	Office light during the lifetime of one luminaire.
Technical Lifetime	Minimum of 50 000 of operating hours. Implies that no parts needs to be replaced during the assumed lifetime, which therefore gives a Estimated Service Life (ESL) of 20 years.
Product group classification	UN CPC 4653
Goal and Scope	Understanding the product's environmental impact during the life cycle, for internal 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.
Manufacturing Site	Ateljé Lyktan, Åhus, Sweden.
Geographical Area	Results represent Sweden, which is the product's main market.
Compliant with	This EPD follows the "Book-keeping" LCA approach which is defined as attributional LCA. In accordance with ISO 14025, ISO 14040 – ISO 140 44 and EN 15804:2012+A2:2019 This EPD follows the Product Category Rules PCR2019-14 Construction products v1.3.4 valid until 2025-06-20 This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment.
Cut-Off Rules	The following procedure is followed for the exclusion of inputs and output: - Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included - Infrastructure/capital goods have been excluded in this assessment except for direct electricity-datasets that's been used. The chosen electricity-datasets has therefore been modelled with system-processes to still capture the impact caused by infrastructure/capital goods as infrastructure are deemed to be of importance in electricity-datasets. A screening and expert judgement showed that the following aspects contribute less than 1% and could be cut-off: - Various supplier packaging - Manufacturing waste - Energy and material use in installation - Energy for deconstruction
Background data	The data quality is considered fair. All site-specific data for raw materials, auxiliary materials as well as energy and emissions in the manufacturing process is from 2023 and have been represented with Ecoinvent datasets. All other relevant environmental aspects have been represented by generic Ecoinvent data. Ecoinvent is the world's biggest LCI (Life cycle inventory) data library and the latest and most updated version was used. Ecoinvent contains data for the specific geographical regions relevant for this study. The background data from Ecoinvent 3.10 are from 2017-2023. EN 15804 reference package 3.1 has been used.
Foreground data - primary	Weight of articles and composition of raw materials. Suppliers' location for transport and some specific data on energy and material use Packaging, rest materials, electricity, heat and waste.
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 3.10 regionalized for Sweden.
Allocations	Polluter Pays / Allocation by Classification The energy and fuel necessary for the manufacturing is calculated by economic allocation to kWh needed in production for the declared unit

Impact Assessment methods	Potential environmental impacts are calculated with Environmental Footprint 3.1 method as implemented in SimaPro 9.6 Resource use values are calculated from Cumulative Energy Demand V1.12.
Based on LCA Report	Miljögiraff LCA Report 1256C Riff - (Böckin & Roos, Miljögiraff AB, 2024)
Software	SimaPro 9.6

System diagram

This study has system boundaries of type b, cradle-to-gate with options, modules C1-C4 + D and with optional module (A1-A3 + C + D and additional modules A4-A5 and B1-B7). That means that all processes needed for raw material extraction, manufacturing, transport, usage and end-of-life are included in the study. All modules (A1-D) are declared, although some modules (B1-B5, B7 and C1) do not have any environmental aspects. Infrastructure is excluded except for the energy modelled with primary data in the EPD.



Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	Europe	Europe	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
Share of specific data, %	6,0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation products, %	0,0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation site, %	0,0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Modules declared: (X = included; ND = not declared), geographical scope, share of specific data (in GWP-GHG indicator) EPD modules included.

Share of specific data has been calculated according to the rules defined in the PCR. More specifically it has been calculated for the GWP-GHG indicator using the Sankey Diagram-function in SimaPro and checking the input and output-flows of every process taking place in modules A1-A3. The energy used in manufacturing (A3) and the transport of raw materials (A2) has been considered as specific data while all other data is considered non-specific. If an EPD has been used as input, its stated share of specific data has been used. The variation of products shows how the GWP-GHG climate impact indicator varies for the included products for the modules A1-A3. As no other products are include the variation is zero.

Content and life cycle information

The following table shows the material content of the Riff luminaire and the percentage of recycled and biogenic material in the product, for the representative product with a width of 196mm and height of 256mm.

Product components	**Weight (kg)**	**Post-consumer material, weight-%**	**Biogenic material**	
			Weight -%	**Kg C/product**
Aluminium	0,160	0,0%	0,0%	0,0
Galvanized steel	0,0290	0,0%	0,0%	0,0
Glass	1,24	0,0%	0,0%	0,0
LED Card	0,00200	0,0%	0,0%	0,0
LED Driver	0,120	0,0%	0,0%	0,0
Plastic - PA	0,0276	0,0%	0,0%	0,0
Plastic - PC	0,0165	0,0%	0,0%	0,0
Plastic - Silicone	0,0106	0,0%	0,0%	0,0
Rubber	0,0575	0,0%	0,0%	0,0
Textile Cable	0,320	0,0%	0,0%	0,0
Zinc	0,00200	0,0%	0,0%	0,0
Total	1,99	0,0%	0,0%	0,0
Packaging materials	**Weight (kg)**	**Weight-% (versus the product)**	**Biogenic material**	
			Weight -%	**Kg C/product**
Cardboard	1,31	65,9%	100,0%	0,589
Pallet	0,568	28,6%	99,0%	0,00989[1]
Plastic - PE	0,0015	0,0756%	0,0%	0,0
Total	1,88	94,6%	99,9%	0,599[1]
Dangerous substances from the candidate list of SVHC for Authorisation	**EC No.**	**CAS No.**	**Weight-% per functional or declared unit**	
(No dangerous substances exceeding 0,1 wt%)				

The majority of the product weight comes from virgin aluminium, glass and electronic components, including a LED Driver, LED Card and various cables.

[1] As a pallet are reused 25 times this value reflects the biogenic content in a 25th of an EU pallet, which reflects a weight of 0,0227 kg.

Manufacturing takes place in Åhus, Sweden and includes sawing the product into the desired size, drilling of holes and manual assembly of the armature and the electronic components. Manufacturing waste is cut off. The energy consumption for manufacturing was estimated by dividing the company's entire monthly energy consumption by the average number of products produced monthly. The source of this energy is hydropower (4,2 g CO2-eq/kWh), certified with a Guarantee of Origin. The finished products are packaged into cardboard boxes and placed on pallets to be transported to customers by trucks, which was represented with the Ecoinvent process of "Transport, freight, lorry 16-32 metric ton, EURO6 {RER}| market for transport, freight, lorry 16-32 metric ton, EURO6 | Cut-off, U". Weights of the packaging and other materials used as packaging can be found in the content declaration above. Ateljé Lyktans main customers are located in southern and middle parts of Sweden, and therefore Stockholm was used as approximation to represent the location of the company's main customers. The finished products are therefore transported a distance of 560 km to customers from ateljé Lyktans facility located in Åhus to Stockholm. Other mandatory information from table 10 from section 7.3.2.1 in EN15804+A2 is declared here:

- Fuel type and amount: diesel, 0,0375 per tkm,
- Capacity utilization: ca 50%
- Bulk density of transported goods: ca 400 kg/m3
- Volume capacity utilization factor: <1

It is assumed that there are no environmental aspects during **installation** of the product, except the waste management of packaging after installation. The transportation of said waste was modelled as a 20 km distance by truck and was modelled with the process "Municipal waste collection service by 21 metric ton lorry {GLO}| market for | Cut-off, U". Consequently, the mandatory information to declare from table 11 from section 7.3.2.2 in EN15804+A2 is all zero for ancillary materials, water use, other resource use, energy use, waste materials, output materials and direct emissions. The amount of materials (in kg) collected for re-use corresponds to the weight of the pallet (see content declaration).

For the **use phase**, the luminaire is assumed to be installed in Sweden (ateljé Lyktan's main market) in an office environment. The lifetime energy consumption of 0,55 MWh was calculated by multiplying the estimated service life (ESL=20 years) with the number of use hours per year (2500 hours in an office environment, according to EN15193) and the power draw of Riff (11W). The energy source was average electricity on the Swedish grid (44,4 g CO2-eq/kWh).

End of life is based on a generic scenario of European waste management (see table below for recycling rates according to R2 numbers in PEF's circular footprint formula. Non-recycled materials are 99% incinerated and 1% landfilled), as an approximation for Swedish waste management, where ateljé Lyktan's main market is located. The exception is the electronics, which are assumed to be separated and the copper and steel recycled while the rest is incinerated. The transportation of end-of-life waste was transported by truck and was modelled with the Ecoinvent process "Municipal waste collection service by 21 metric ton lorry {GLO}| market for municipal waste collection service by 21 metric ton lorry | Cut-off, U" and the distance was assumed to be 20 km.

Waste type	Recycling rate	Waste type	Recycling rate
Cardboard	75%	PE	0%
Packaging paper	62%	PET	0%
Glass	0%	PP	0%
Ferro metals	85%	PS	0%
Aluminium	85%	PVC	0%
Steel	85%	Compost	40,2%
Plastics	0%	Textile	11%

Instead of declaring table 15 from section 7.3.4 in EN15804+A2, the relevant information is included here: The amount of waste collected separately is the entire weight of the product (see content declaration).

The amount of materials (in kg) collected for recycling can be found in the indicator "Materials for recycling" in module C3 under the Output flow indicators under the section for Environmental performance. The amount of materials (in kg) collected for energy recovery is 0,456 kg. The amount of materials (in kg) collected for disposal (sanitary landfill) is 0,0 kg.

Environmental information

All results are for the representative product Riff with a width of 196mm, a height of 256mm, a weight of 1,99 kg that is used for 20 years (and 2500 hours per year) with a power-rating of 11W and a luminous flux of 830lm. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. See disclaimers below.

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	8,09E+00	2,80E-01	4,72E-02	0	0	0	0	0	1,82E+01	0	0	5,32E-02	1,38E+00	8,41E-04	-1,08E+00
GWP-biogenic	kg CO_2 eq.	-6,84E-01	9,18E-05	1,09E-02	0	0	0	0	0	9,39E-02	0	0	7,51E-06	1,14E+00	1,12E-02	-8,43E-01
GWP-luluc	kg CO_2 eq.	4,38E-02	6,88E-06	2,78E-06	0	0	0	0	0	2,04E+00	0	0	1,59E-06	1,02E-04	1,89E-07	-1,89E-02
GWP-total	kg CO_2 eq.	7,45E+00	2,80E-01	5,81E-02	0	0	0	0	0	2,04E+01	0	0	5,32E-02	2,53E+00	1,20E-02	-1,94E+00
ODP	kg CFC 11 eq.	4,60E-07	5,72E-09	6,80E-10	0	0	0	0	0	5,45E-07	0	0	8,24E-10	8,63E-10	5,39E-12	-5,92E-09
AP	mol H^+ eq.	1,74E-01	3,27E-04	2,71E-04	0	0	0	0	0	2,23E-01	0	0	2,80E-04	5,66E-04	2,63E-06	-4,44E-02
EP-freshwater	kg P eq	7,52E-04	2,35E-07	1,01E-07	0	0	0	0	0	1,19E-03	0	0	3,97E-08	2,96E-06	2,07E-07	-2,07E-04
EP-marine	kg N eq.	1,35E-02	7,24E-05	1,25E-04	0	0	0	0	0	2,61E-02	0	0	1,24E-04	3,73E-04	1,48E-05	-1,45E-03
EP-terrestrial	mol N eq.	1,61E-01	7,93E-04	1,30E-03	0	0	0	0	0	3,36E-01	0	0	1,36E-03	2,75E-03	8,36E-06	-3,12E-02
POCP	kg NMVOC eq.	5,17E-02	7,08E-04	4,59E-04	0	0	0	0	0	8,94E-02	0	0	5,39E-04	7,46E-04	5,38E-06	-1,03E-02
ADP-minerals&metals	kg Sb eq.	1,74E-03	9,26E-09	5,82E-09	0	0	0	0	0	2,18E-03	0	0	1,78E-09	3,23E-08	7,17E-11	-5,23E-04
ADP-fossil	MJ	1,21E+02	3,70E+00	5,15E-01	0	0	0	0	0	2,43E+03	0	0	6,87E-01	4,78E-01	4,99E-03	-2,20E+01
WDP	m^3	4,10E+00	1,57E-03	1,01E-02	0	0	0	0	0	3,54E+01	0	0	4,47E-04	3,38E-02	0,00E+00	-4,45E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption.															

Disclaimer 1: The results of the environmental impact indicators Abiotic depletion for fossil and non-fossil resources, Water depletion potential, Ecotoxicity-freshwater, Human toxicity-cancer, Human toxicity-non-cancer and Land use shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Disclaimer 2: The indicator GWP-GHG 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.

Disclaimer 3: The use of the results of modules A1-A3 without considering the results of module C is discouraged.

Disclaimer 4: The indicator Ionising radiation 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.

Potential environmental impact – additional mandatory and voluntary indicators

Results per declared unit																
Indicator	**Unit**	**Tot. A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	8,23E+00	2,80E-01	5,19E-02	0	0	0	0	0	2,06E+01	0	0	5,32E-02	1,49E+00	9,67E-03	-1,03E+00
Particulate matter	disease inc.	6,63E-07	1,66E-08	5,22E-09	0	0	0	0	0	1,29E-06	0	0	6,94E-09	8,49E-09	3,49E-11	-1,39E-07
Ionising radiation	kBq U-235 eq	3,40E-01	5,04E-04	7,86E-05	0	0	0	0	0	8,52E+01	0	0	5,51E-05	3,16E-04	4,74E-06	-3,29E-01
Ecotoxicity, freshwater	CTUe	1,75E+02	1,27E-01	7,15E-01	0	0	0	0	0	3,65E+02	0	0	2,35E-02	7,85E+00	1,72E-01	-5,04E+01
Human toxicity, cancer	CTUh	4,67E-08	1,95E-11	3,83E-11	0	0	0	0	0	2,39E-07	0	0	2,74E-12	6,07E-10	6,64E-13	-2,15E-08
Human toxicity, non-cancer	CTUh	9,26E-07	1,86E-09	1,14E-09	0	0	0	0	0	1,86E-06	0	0	6,90E-11	1,49E-08	7,50E-11	-4,17E-07
Land use	Pt	9,25E+01	8,28E-03	1,07E-02	0	0	0	0	0	5,73E+02	0	0	1,10E-03	2,20E-01	9,36E-03	-6,54E+01

Use of resources

Calculated according to option B in Annex 3 of the PCR.

Results per declared unit																
Indicator	**Unit**	**Tot. A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	4,56E+01	1,31E-02	2,98E-03	0	0	0	0	0	1,67E+03	0	0	1,32E-03	1,44E-02	1,49E-04	-2,38E+01
PERM	MJ	2,09E+01	0,00E+00	-2,09E+01	0	0	0	0	0	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,66E+01	1,31E-02	-2,09E+01	0	0	0	0	0	1,67E+03	0	0	1,32E-03	1,44E-02	1,49E-04	-2,38E+01
PENRE	MJ	1,17E+02	3,93E+00	5,49E-01	0	0	0	0	0	2,44E+03	0	0	7,30E-01	5,18E-01	5,31E-03	-2,26E+01
PENRM	MJ.	1,31E+01	0,00E+00	-4,65E-02	0	0	0	0	0	0,00E+00	0	0	0,00E+00	-1,31E+01	0,00E+00	0,00E+00
PENRT	MJ	1,30E+02	3,93E+00	5,02E-01	0	0	0	0	0	2,44E+03	0	0	7,30E-01	-1,26E+01	5,31E-03	-2,26E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,92E-01	2,26E-04	5,70E-04	0	0	0	0	0	9,70E-01	0	0	5,84E-05	2,81E-03	4,35E-06	-1,68E-02
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

Waste production and output flows

Waste production[2]

Results per declared unit																
Indicator	**Unit**	**Tot. A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Non-hazardous waste disposed	kg	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Radioactive waste disposed	kg	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Output flows

Results per declared unit																
Indicator	**Unit**	**Tot. A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00	0,00	0,545	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Material for recycling	kg	0,00	0,00	0,982	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,281	0,00	0,00
Materials for energy recovery	kg	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Exported energy, electricity	MJ	0,00	0,00	1,34	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	3,09	0,00	0,00
Exported energy, thermal	MJ	0,00	0,00	3,14	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	7,20	0,00	0,00

[2] The reported waste production are flows leaving the system boundary. Since waste treatment processes are part of the system boundary, the indicators are here reported as zero, according to Environdec's "guidance on the resource use and waste indicators" (https://environdec.com/resources/indicators)

Summary

From a life cycle perspective, the environmental impact of the Riff luminaire can mainly be attributed to electricity consumption in the use phase. The environmental impact of this electricity is dominated by fossil resource use. Despite using average electricity from the Swedish grid (which has a low climate impact compared to e.g. European average electricity), the **use phase stood for 74%** of total environmental impacts (single score).

The production of raw materials represents approximately 25% of total environmental impacts (single score). Most of these come from the production of the Textile Cable (12%~), LED Driver (10%~) and Glass (1,1%~)

The model of the product system is sensitive to the source of energy in production of the electricity used in the use phase. If wind power is used instead, the total IPCC climate impact would be 35,0% lower. At the opposite end of the spectrum is when a customer would be located in another country in Europe and instead use a European electricity mix compared to a Swedish electricity mix, the total IPPC climate impact would then instead be 543% higher.

Additional results

The main results for the use phase for the representative product Riff luminaire captures the impact caused over a time horizon of 20 years according to the luminaires ESL. In the table below the results are also shown for the impact for one year of use.

Results for one year of use (Module B6)					
Indicator[3]	**Unit**	**B6 (1 year of use)**	**Indicator[2]**	**Unit**	**B6 (1 year of use)**
GWP Fossil	kg CO2 eq	9,11E-01	ADPE	kg Sb eq	1,09E-04
GWP Biogenic	kg CO2 eq	4,69E-03	ADPF	MJ	1,22E+02
GWP LULUC	kg CO2 eq	1,02E-01	WDP	m3 depriv.	1,77E+00
GWP Total	kg CO2 eq	1,02E+00	PM	disease inc.	6,45E-08
ODP	kg CFC11 eq	2,72E-08	IR	kBq U-235 eq	4,26E+00
AP	mol H+ eq	1,11E-02	ETP – FW	CTUe	1,83E+01
EP - Freshwater	kg P eq	5,96E-05	HTP - C	CTUh	1,19E-08
EP - Marine	kg N eq	1,31E-03	HTP - NC	CTUh	9,28E-08
EP – Terrestrial	mol N eq	1,68E-02	Land use, SQP	Pt	2,87E+01
POCP	kg NMVOC eq	4,47E-03	GWP-GHG	kg CO2 eq	1,03E+00

[3] GWP: Global Warming Potential, LULUC: Land Use and Land Use Change, ODP: Ozone Depletion Potential, AP: Acidification Potential. EP: Eutrophication Potential, POCP: Photochemical Ozone Creation Potential, ADPE: Abiotic Depletion Potential – Elements, ADPF: Abiotic Depletion Potential – Fossil Fuels, WDP: Water Scarcity Footprint, PM: Particulate Matter, IRP: Ionizing Radiation - Human Health, ETP-FW: Ecotoxicity Potential – Freshwater, HTP-C: Human Toxicity Potential – Cancer, HTP-NC: Human Toxicity Potential – Non-Cancer, SQP: Soil Quality Potential Index, GWP GHG: Global Warming Potential, Greenhouse Gases.

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