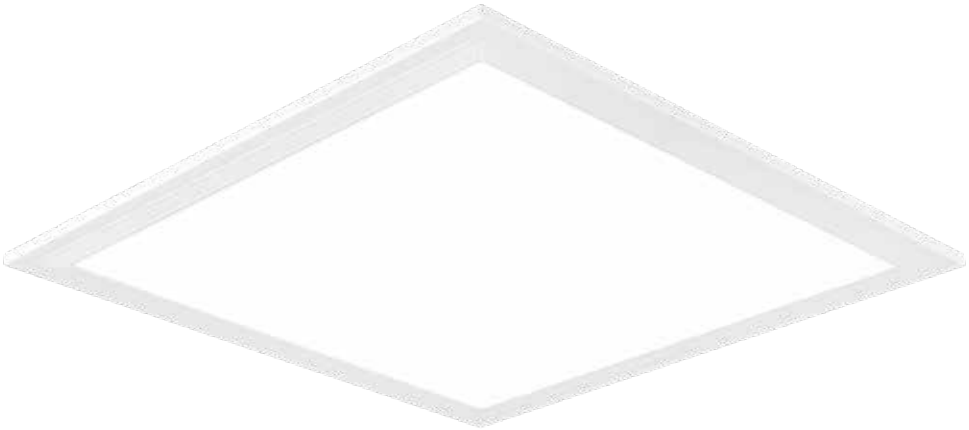
ENVIRONMENTAL PRODUCT DECLARATION



In accordance with ISO14025 and EN15804+A2:2019/AC:2021 for

Bloom Luminaire average EPD based on reference product

Manufactured by EAE Aydınlatma A.Ş.

Programme: The International EPD® System, www.environdec.com
Programme Operator: EPD International AB
Licensee: EPD Türkiye
EPD Registration Number: EPD-IES-0016140
Publication Date: 2024-10-11
Revision Date: 2025-03-18
Validity Date: 2029-10-10
Geographical Scope: Global

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

PROGRAMME INFORMATION

The International EPD® System: EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden, info@environdec.com

EPD Türkiye www.epdturkey.org info@epdturkey.org managed and run by SÜRATAM www.suratam.org NEF 09 B Blok No:7/15 34415 Kağıthane/Istanbul, Türkiye

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR) Product Category Rules (PCR): 2019:14 Version 1.3.2, Construction Products and, EN 15804:2012 + A2:2019/AC:2021 Sustainability of Construction Works

PCR review was conducted by: The Technical Committee of the International EPD® System. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third party verifier: Stephen Forson

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes ☐ **No** ☒

Life Cycle Assessment (LCA)

LCA accountability: Metsims Sustainability Consulting

Differences versus previous versions

The attachment has been updated.

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes 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 characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

About EAE Lighting

Owner of the EPD and Production Site:

EAE Aydınlatma A.Ş
Organize Sanayi Bölgesi Mah. 14. Sk. Fabrika Binası (A+B+C BLOK) NO:3/1 Dilovası/Kocaeli

As EAE Lighting, our adventure full of innovation and passion that started in 1983 continues unabated. Thanks to the knowledge and experience of the past 40 years, we have made a name for ourselves with our high ceiling lighting products that set the standards of the sector, while combining the same quality understanding with aesthetics and functionality in our decorative products. We work devotedly in our modern production facilities by focusing on innovation at every step we take throughout our ongoing experience. Designed and developed by our R&D department, our products are meticulously tested in our laboratories, helping us maintain the high quality and durability standards that are synonymous with EAE Lighting. Thanks to these standards, our long-lasting products bring us one step closer to our goal of a greener world with less waste, less energy consumption and less use of natural resources.

About the Product

Bloom is ideal for lighting offices, hospitals, schools and retail spaces with its minimal body design, clean finishes and homogeneous light emitted from its glare-controlled opal diffuser. Light surfaces defined in different sizes can adapt to modular ceiling types and guarantee a high level of visual comfort. With its traditional product body structure, it is preferred for projects that require a balanced combination of economy and energy efficiency

The product UN CPC code is 4653 according to Central Product Classification (CPC) Version 2.1.

The figures correspond to a reference product, being the most produced unit of the complete range of the Bloom.

Product Range/ Technical Specifications

Index	Product Range	Reference Product
Body Material	Sheet Metal	Sheet Metal
Body Color	RAL 9005, RAL 9010, RAL 9003	RAL 9003
Optic	-	-
Diffuser	Glass, Plastic	Plastic
IP Grade	IP20 / IP40 / IP 54/ IP65	IP20
Installation	Recessed Mounted / Surface Mounted / Pendant	Recessed Mounted
Correlated Color Temperature	2700 K / 3000K /4000K / 5000K / 5700K/ 6500K /RED	4000 K
Power	10-136 W	24 W
Input Voltage	220-240 V AC	220-240 AC
Frequency	50-60 Hz	50-60 Hz
CRI	≥80	≥80
Lumen	943 - 8700 lm	3400 lm
Impact Resistance	IK02 /IK03	IK03
Optional Features	EEK/ Sensor	-
Control	On Off/ DALI	On Off
Ambient Temperature	-20°C - +55 °C	-20°C - +40 °C
Luminaire Efficiency	100-142 lm/watt	133 lm/watt

System Boundaries & Description

A1 - RAW MATERIAL SUPPLY

This stage includes raw material/s extraction and pre-treatments before its use in manufacturing. The production of the energy necessary for the manufacturing of process is taken into account.

A2 - TRANSPORT

Transport information of the raw materials is provided by the manufacturer. The distances and routes are calculated accordingly. The raw materials are locally supplied transported via trucks and the waste is sourced within the production province.

Transport Mode	Type
Road	Vehicle: Lorry Size Class: >32 metric ton Emission Standard: EURO5 Fuel Type: Diesel
Sea	Vehicle: Container Ship DWT (Load Capacity): 43000 tonnes Fuel Type: Heavy Fuel Oil

A3 - MANUFACTURING

The manufacturing stage encompasses all the emissions that are risen during the assembly of each product. The assembly is not energy intensive, although all the energy used in the EAE facility was allocated to each product regardless of if it was used for the office or space heating applications. Additional to the electricity and natural gas use, the waste generated from the production process and packaging used to transport the product is considered in this stage.

Parameter	Value
Turkish Electricity Grid, Medium Voltage	0.523 kg CO2/kWh

A4 - TRANSPORT

Transport of final product to customers are considered and the routes and distances are calculated accordingly. Transport routes were provided by the manufacturer for 2022.

Transport Mode	Type
Road	Vehicle: Lorry Size Class: >32 metric ton Emission Standard: EURO5 Fuel Type: Diesel
Sea	Vehicle: Container Ship DWT (Load Capacity): 43000 tonnes Fuel Type: Heavy Fuel Oil

A5 – INSTALLATION

Installation is done in accordance with the installation instructions. The assembly hanger kit is the commonly applied installation method of choice. The hanger kit is made out of metal sheet and metal has a total weight of 84 grams. The installation does not require any auxiliary equipment or energy demand.

Parameter	Value
Hanger Kit (Metal Sheet and Metal)	0.084 kg

B - USE

Certain environmental considerations are relevant during the product's use stage. However, in this particular case, the product doesn't necessitate maintenance, repair actions, or water usage. Therefore, Modules B1 to B5, which pertain to such activities, have no impact. Additionally, Module B7, which addresses water usage during service, is also irrelevant in this context. The sole significant factor to consider in this stage is the consumption of electricity throughout the product's lifespan. We have assessed this by using the low voltage electricity mix data from Türkiye (sourced from the Ecoinvent database), as this region is the primary market for the product.

The use phase electricity consumption is calculated as follows:

- The power of the luminaires is 24 W for the Bloom,
- The lamps will be placed on indoor commercial places such as architectural interior lighting, hospitals, schools and offices;
- The service life has been considered to be 20 years of service,
- The total electricity consumption for the commercial indoor scenario will be:
  Bloom (24 W & 3400 lm) --> 1728 kWh
- To calculate the electricity consumption into the declared unit, the lumens emitted must be considered:

Bloom --> 1728 kwh / 3400 lumens ×1000 lumens= 508 kwh

Parameter	Value
Electricity Consumption of Bloom	508 kWh
Turkish Electricity Grid, Low Voltage	0.620 kg CO2/kWh

C1 - DECONSTRUCTION / DEMOLITION

Bloom luminaires that have completed their service life are dismantled without any energy use.

C2 - WASTE TRANSPORT

This step includes the transport to the recycling plant after they reach their end-of-life. The average distance was assumed 200 km by truck from demolition site to the closest recycling area.

Parameter	Value
Vehicle Type	Vehicle: Lorry Size Class: 16-32 metric ton Emission Standard: EURO5 Fuel Type: Diesel
Distance	200 km (assumption)

C3 - WASTE PROCESSING

This phase includes the energy and materials used for treatment of the waste transported to the recycling center for electronic waste. The reconditioning of the lamp pieces for recycling and treatment is considered in this phase.

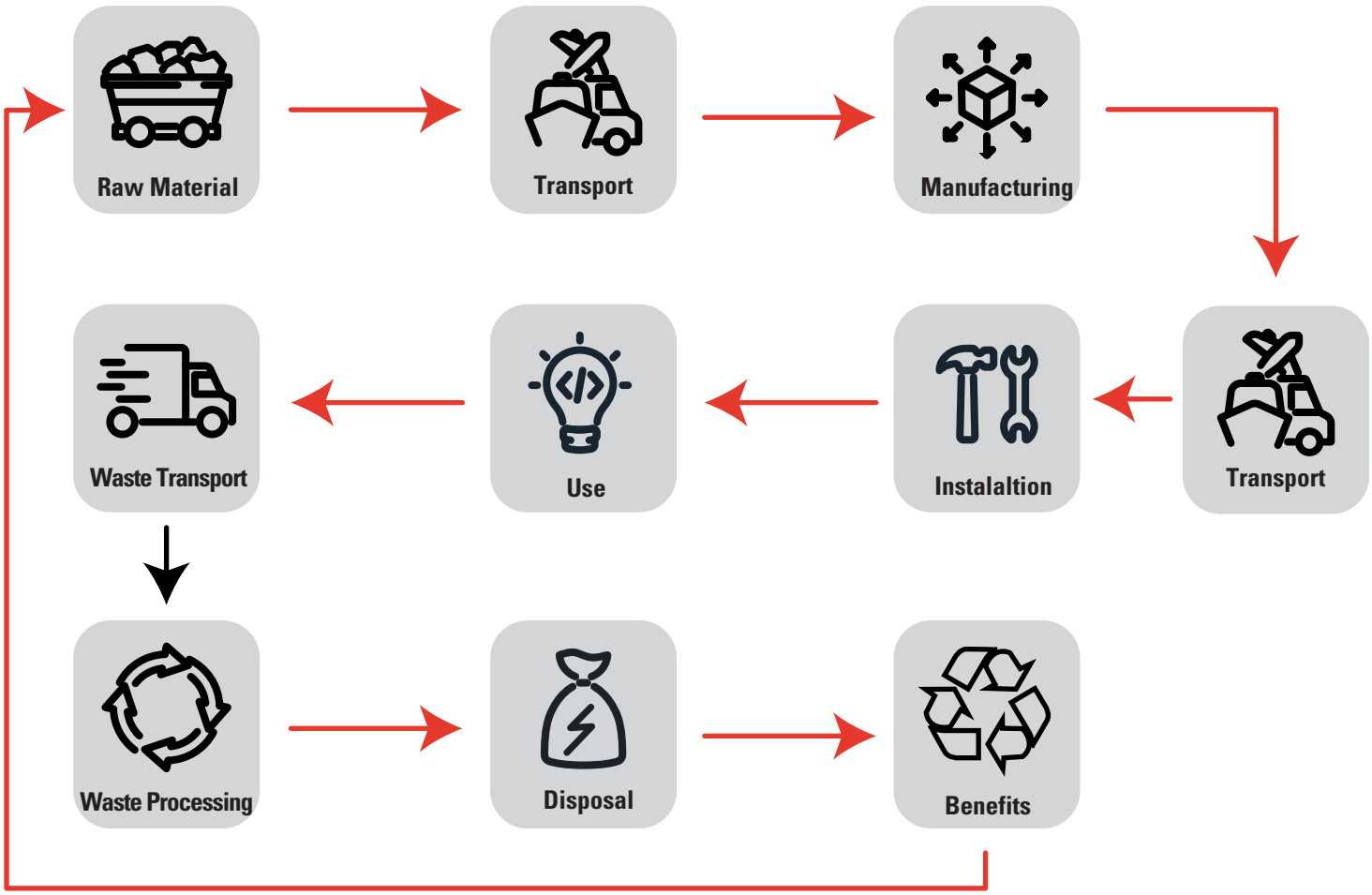
C4 – DISPOSAL

The waste disposal phase accounts for the emissions that are resulting due to disposal of the waste. The Bloom product at the end of its life will be subject to the WEEE Directive and would be handled accordingly. The Eurostat Lighting Equipment waste category 5 has been considered for the product, 89.2% of the lighting waste will be recycled or reused.

D - BENEFITS

This module assesses the advantages and environmental impacts associated with the recovery, reusing, or recycling processes of waste generated by the product at the end of its life cycle. These processes could potentially contribute to the life cycle of a new product. The calculations for these benefits and impacts have been determined primarily based on the materials that will be recycled, namely aluminum and steel, as these are the primary materials used in the product. It's important to note that when calculating the benefits of recycling these materials, only the post-consumer composition of the materials has been considered, and not the composition of the materials after they've been recycled.

Product Life Cycle Diagram



LCA Information

Functional Unit/ Declared Unit: The declared unit are thousand lumens (1,000 lm) of Bloom interior luminaire unit for a 20-year life.

This lifetime has been selected, because it is the product guarantee offered by the company, although this life is usually longer (72,000 hours of light).

Machinery/infrastructure and their maintenance cycle due to the fact that these impacts are assumed to have negligible impacts according to the relevant PCR.

To convert the declared unit to a comparable mass of product (Kg) it has been used the number of lumens of each luminaire and transformed to 1,000 lumens for the four references.

From the Bloom it has been chosen as a reference product for the study the model Bloom-S NG, 3400 lumens, 24 W LED Bloom Luminaire.

Reference Service Life: 20 year for the LCA study

Time Representativeness: Primary LCA data covers January to December of 2022.

Database(s) and LCA Software: Ecoinvent 3.9.1 and SimaPro 9.5

Calculation Methodology: Life cycle impacts were calculated using EN15804+A2 method implementation which has aligned methodology based on EF 3.1 method

System Boundaries: Cradle to gate with options, A1-A3-C-D and optional A4-A5 + B + D

Geographical Scope: The geographical scope of this LCA is Global.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
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	TR	TR	TR	GLO	GLO	GLO	GLO	GLO	GLO	GLO	TR	GLO	GLO	GLO	GLO	GLO	GLO
Specific data used	30%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0				-	-	-	-	-	-	-	-	-	-	-	-	-

The inventory for the LCA study is based on the 2022 production figures.

Allocations
Water consumption, energy consumption and raw material transportation were weighted according to 2022 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2022 total waste generation. There is no co-product allocation.

Cut-Off Criteria
1% cut-off is applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

REACH Regulation
No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

LCA Modelling, Calculation and Data Quality
The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. EN15804 method is followed. All energy calculations were obtained using Cumulative Energy Demand, Low Heating Values (LHV) methodology, while freshwater use is calculated within selected inventory flows in SimaPro according to the PCR. Corresponding regional energy datasets were used for all energy related activities. Data quality assessment scheme is given in the table below.

LCA Stages	Data Type
Raw Material Supply	Generic database, plant specific data
Raw Material Transport	Generic database, plant specific data
Manufacturing	Generic database, plant specific data
Product Transport	Generic database, generic data
Installation	Generic database, scenario and generic data
Maintenance	-
Deconstruction	-
Use	Generic database, scenario and generic data
Waste Transport	Generic database, scenario and generic data
Waste Processing	Generic database, scenario and generic data
Disposal	Generic database, scenario and generic data
Benefits and Loads	Generic database, scenario and generic data

Content Declarations

Product Composition

Product composition for range of included products is shown in the table below.

Product components	Weight, kg	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/kg
Metal Sheet	70-80%	0%	0%
Plastics	10-15%	0%	0%
Electronic Parts	10-15%	0%	0%
Others	<1%	0%	0%
Sum	100%	0%	0%

Packaging

The Bloom lamps are packaged using extruded polystyrene and corrugated cardboard.

Packaging materials	Weight, kg	Weight-%	Weight biogenic carbon, kg C/kg
Corrugated Board	0.442	95-99%	1.74E-02
Polystyrene	0.007	1-3%	0
Sum	0.450	100%	

LCA Results

For the assessment of the environmental performance, the latest update of the default list was made on 2022-03-29, referred to as Version 2.0 is used. The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

LCA results for 24 W, 3400 lumens Bloom reference product has been calculated and the environmental impacts are given in the table below for the declared unit of 1000 lumens with the service life of 20 years.

Indicator name and abbreviation (EN)

Core environmental impact indicators	Unit (EN)	Total A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential - fossil fuels (GWP-fossil)	kg CO_2 eq.	8.65E+00	7.38E-02	2.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E+02	0.00E+00	0.00E+00	1.83E-02	0.00E+00	5.99E-03	-1.65E+00
Global warming potential - biogenic (GWP-biogenic)	kg CO_2 eq.	-5.46E-02	5.89E-05	1.78E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.17E+00	0.00E+00	0.00E+00	1.46E-05	0.00E+00	6.44E-02	-6.22E-03
Global warming potential - land use and land use change (GWP-luluc)	kg CO_2 eq.	2.40E-02	3.60E-05	1.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.40E+00	0.00E+00	0.00E+00	8.93E-06	0.00E+00	2.00E-06	-2.68E-03
Global warming potential - total (GWP-total)	kg CO_2 eq.	8.61E+00	7.39E-02	2.53E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.72E+02	0.00E+00	0.00E+00	1.83E-02	0.00E+00	7.04E-02	-1.66E+00
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	2.48E-07	1.68E-09	3.43E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.37E-06	0.00E+00	0.00E+00	4.16E-10	0.00E+00	3.41E-11	-9.19E-09
Acidification potential, accumulated exceedance (AP)	mol H+ eq.	7.32E-02	1.83E-04	1.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.45E+00	0.00E+00	0.00E+00	4.53E-05	0.00E+00	1.59E-05	-8.30E-03
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	6.74E-03	5.45E-06	1.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E-01	0.00E+00	0.00E+00	1.35E-06	0.00E+00	1.38E-06	-5.13E-04
Eutrophication potential - marine (EP-marine)	kg N eq.	1.34E-02	4.99E-05	2.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-01	0.00E+00	0.00E+00	1.24E-05	0.00E+00	1.81E-04	-1.62E-03
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	1.41E-01	5.13E-04	2.67E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.06E+00	0.00E+00	0.00E+00	1.27E-04	0.00E+00	4.62E-05	-1.63E-02
Photochemical ozone creation potential (POCP)	kg NMVOC eq.	5.09E-02	2.99E-04	9.41E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E+00	0.00E+00	0.00E+00	7.40E-05	0.00E+00	3.34E-05	-5.65E-03
Abiotic depletion potential - non-fossil resources (ADPE)	kg Sb eq.	1.34E-03	2.06E-07	8.95E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-03	0.00E+00	0.00E+00	5.12E-08	0.00E+00	5.72E-09	-2.43E-05
Abiotic depletion potential - fossil resources (ADPF)	MJ, net calorific value	1.10E+02	1.12E+00	2.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.82E+03	0.00E+00	0.00E+00	2.78E-01	0.00E+00	3.28E-02	-1.96E+01
Water (user) deprivation potential (WDP)	m^3 world eq. deprived	2.97E+00	5.35E-03	1.74E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.59E+02	0.00E+00	0.00E+00	1.33E-03	0.00E+00	1.17E-03	-7.70E-01

Additional mandatory environmental impact indicators

Global warming potential (GWP-GHG)	kg CO_2 eq.	8.70E+00	7.40E-02	2,.2E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.67E+02	0.00E+00	0.00E+00	1.84E-02	0.00E+00	5.49E-02	-1.65E+00

Additional mandatory environmental impact indicators

Particulate matter emissions (PM)	Disease incidence	4.90E-07	7.31E-09	2.08E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-05	0.00E+00	0.00E+00	1.81E-09	0.00E+00	2.16E-10	-9.83E-08
Ionizing radiation, human health (IRP)	kBq U235 eq.	6.45E-01	1.41E-03	1.89E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.27E+00	0.00E+00	0.00E+00	3.51E-04	0.00E+00	1.14E-04	-4.95E-02
Eco-toxicity - freshwater (ETP-fw)	CTUe	1.24E+02	5.39E-01	1.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E+03	0.00E+00	0.00E+00	1.34E-01	0.00E+00	2.25E-01	-6.29E+00
Human toxicity, cancer effect (HTP-c)	CTUh	2.87E-08	3.28E-11	7.44E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-07	0.00E+00	0.00E+00	8.15E-12	0.00E+00	2.85E-12	-1.79E-08
Human toxicity, non-cancer effects (HTP-nc)	CTUh	2.84E-07	8.01E-10	4.34E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.67E-06	0.00E+00	0.00E+00	1.99E-10	0.00E+00	1.29E-10	-2.67E-08
Land use related impacts/Soil quality (SQP)	dimensionless	4.83E+01	1.14E+00	8.51E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.52E+02	0.00E+00	0.00E+00	2.82E-01	0.00E+00	5.88E-02	-2.46E+00

Indicators describing resource use

Use of renewable primary energy as energy carrier (PERE)	MJ, NCV	1.10E+01	1.64E-02	4.77E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E+02	0.00E+00	0.00E+00	4.07E-03	0.00E+00	1.45E-03	-1.27E+00
Use of renewable primary energy resources used as raw materials (PERM)	MJ, NCV	1,81E-03	0.00E+00	-1,81E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy (PERT)	MJ, NCV	1.10E+01	1.64E-02	4.77E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E+02	0.00E+00	0.00E+00	4.07E-03	0.00E+00	1.45E-03	-1.27E+00
Use of non renewable primary energy as energy carrier (PENRE)	MJ, NCV	9.59E+01	1.12E+00	2.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+03	0.00E+00	0.00E+00	2.78E-01	0.00E+00	3.28E-02	-1.96E+01
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ, NCV	2,22E-03	0.00E+00	-2,22E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non renewable primary energy resource (PENRT)	MJ, NCV	9.59E+01	1.12E+00	2.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+03	0.00E+00	0.00E+00	2.78E-01	0.00E+00	3.28E-02	-1.96E+01
Use of secondary material (SM)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water (FW)	m^3	6.73E-02	2.23E-04	1.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.92E-01	0.00E+00	0.00E+00	5.53E-05	0.00E+00	3.03E-05	-4.48E-03

Environmental information describing waste categories

Hazardous waste disposed (HWD)	kg	7.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-harzardous waste disposed (NHWD)	kg	3.74E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	; .: 6Q/24	0.00E+00
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Environmental information describing output flows

Components for re-use (CRU)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	1,32E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8,13E-01	0.00E+00
Materials for energy recovery (MER)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE)	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Disclaimer 1: The the uncertainties results on value of these this results environmental are high impact or as indicator there is shall limited be used experienced with with care the as indicator.

Disclaimer 2: GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology. The indicator includes all greenhouse gases included in the GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. The GWP-GHG indicator is identical to GWP-total except that the characterisation factor (CF) for biogenic CO2 is set to zero.

Disclaimer 3: This impact category deals mainly with the eventual impact of low dose ionising radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or due to radioactive waste disposal in underground facilities. This indicator also does not measure potential ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 4: Discouraging the use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C.

References

GPI/ General Programme Instructions of the International EPD® System. Version 4.0. EN ISO 9001/ Quality Management Systems - Requirements

EN ISO 14001/ Environmental Management Systems - Requirements

EN ISO 50001/ Energy Management Systems - Requirements ISO 14020:2000/ Environmental Labels and Declarations — General principles

EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006) PCR 2019:14 Construction products (EN 15804:A2) (1.3.2) prepared by IVL Swedish Environmental Research Institute, EPD International Secretariat, date 2022-11-01.

The International EPD® System/ The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com

Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

SimaPro/ SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com

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Additional Environmental Information

To identify the product-specific life cycle impacts of the Bloom, specific formulas and conversion processes are applied. The declared unit for presenting results is set at 1000 lumens (lm). However, since the product has unique specifications—3400 lm luminous flux, 24 W power consumption, and 3.03 kg weight—formulas for different modules are employed. Conversion from the declared unit to the product-specific results is crucial in accurately reflecting the environmental impacts associated with the product's distinct characteristics. In the example equation provided below, we demonstrate the calculation steps to illustrate how the product-specific life cycle results are derived, ensuring an accurate representation of the environmental footprint based on the products' specifications.

Below is an example for Global Warming Potential only and the similar approach can be applied to all indicators.

x_{acd} = 0.008484 + (0.00023 × Product Power,W) - (0.000002× Product Lumen,lm) + (0.327362 × Product Weight,kg)

x_b = 1.122285 + (0.0414 × Product Power,W) - (0.000381× Product Lumen,lm) + (0.058753 × Product Weight,kg)

Environmental Impact for modules A,C,D= (Environmental Indicator Value × x_{acd})/Amounts per declared unit

Environmental Impact for modules B= (Environmental Indicator Value × x_b)/Amounts per declared unit

x_{acd} = 0.008484 + (0.00023 × 24) - (0.000002 x 3400) + (0.327362 x 3.03) = 1.00

x_b = 1.122285 + (0.0414 × 24) - (0.000381 x 3400) + (0.058753 x 3.03) = 1.00

Bloom(3.03kg,24W,3400 lm)-->(A1-A3) module, GWP_{total}= (8.61 kg CO_2 eq.×1)/0.294=2.93×10^1 kg CO_2 eq.

Bloom(3.03kg,24W,3400 lm)-->B6 module, GWP_{total}= (4.72 ×10^2 kg CO_2 eq.×1)/0.294=1.61×10^3 kg CO_2 eq.

Conversion

Product Name	Product Weight, kg	Amounts per declared unit, units	Declared Unit Weight, kg
Bloom	2.94	0.294	0.911

The number of raw materials used in the production of the product and the amount of energy used in the production of the product depends on the components and weights of the product, and the weight coefficient between products is used in modules A, C and D. The amount of energy that the product will consume during its lifetime depends on the lumen and power value, and the coefficient obtained by using these two parameters is used with the formula below:

x_{acd} = 0.008484 + (0.00023 × Product Power,W) - (0.000002× Product Lumen,lm) + (0.327362 × Product Weight,kg)

x_b = 1.122285 + (0.0414 × Product Power,W) - (0.000381× Product Lumen,lm) + (0.058753 × Product Weight,kg)

Environmental Impact for modules A,C,D= (Environmental Indicator Value × x_{acd})/Amounts per declared unit

Environmental Impact for modules B= (Environmental Indicator Value × x_b)/Amounts per declared unit


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