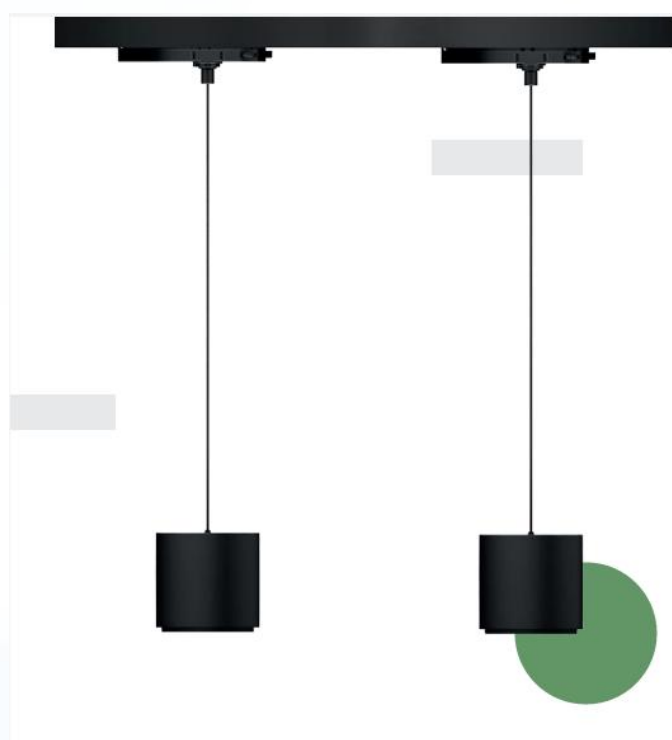


Product Environmental Profile of ELEMENT Indoor luminaires

Reference product: Core N110 (light source) + Fogo metal rod FSMB-16 (luminaire)

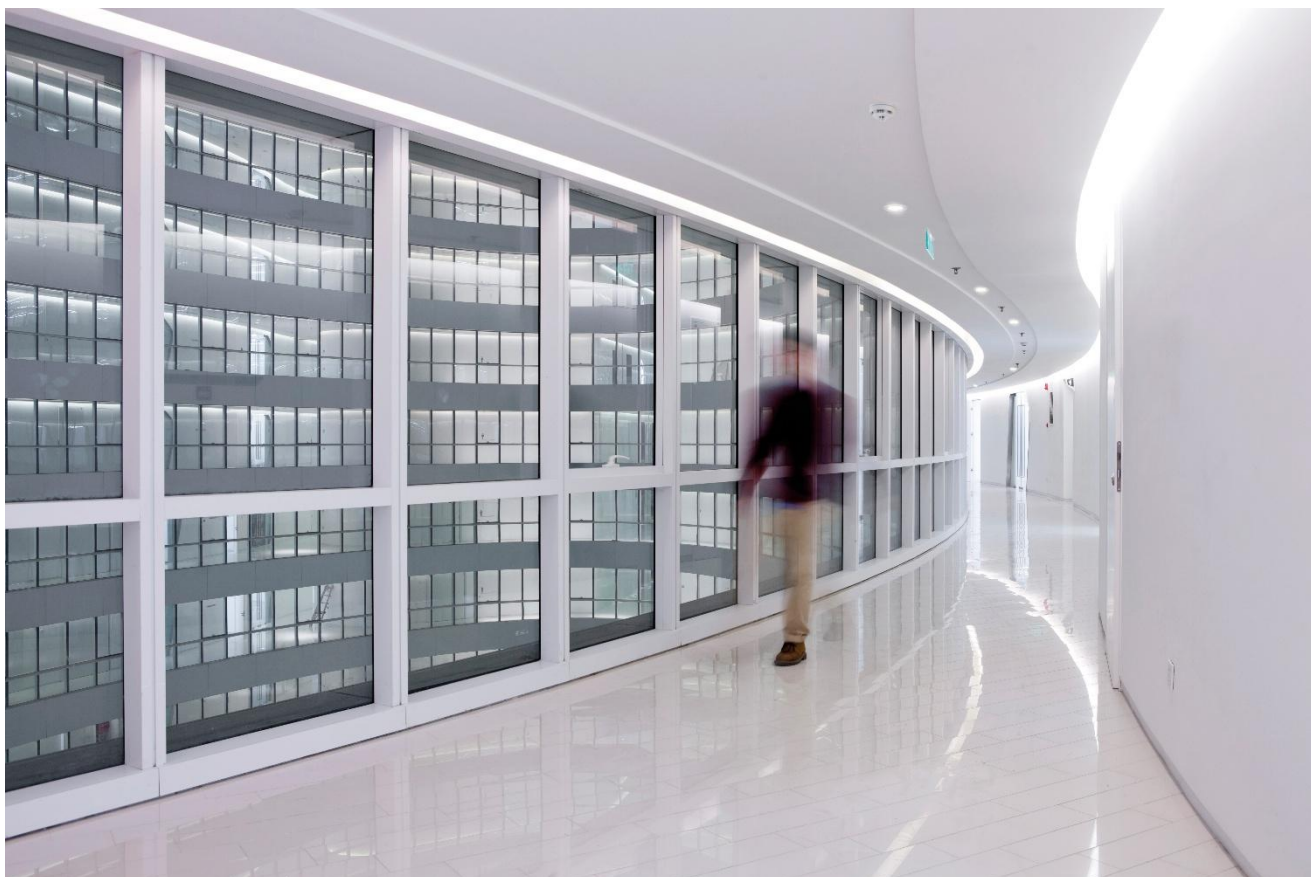


Registration number: NORM-00006-V01.01-EN	Rules "PCR-ed4-EN 2021 09 06" Supplemented by "PSR-0014-ed2-EN-2023 07 13"
Verifier accreditation number: V45	Information and reference documents: www.pep-ecopassport.org
Date of issue: 12-2025	Validity period: 5 years
Independent verification of the declaration and data, in compliance with ISO 14025:2010: Internal <input type="checkbox"/> External <input checked="" type="checkbox"/>	
The PCR review was conducted by a panel of experts chaired by [...]	
PEP are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022 The components of the present PEP may not be compared with components from another program.	
Document in compliance with ISO 14025:2010 "Environmental labels and declarations. Type III environmental declarations"	





Indoor lighting



NORMALIT

by Normagrup

Environmentally Light!





1. GENERAL INFORMATION

1.1 COMPANY INFORMATION

*"Lighting the future with efficient, safe and sustainable
efficient, safe and sustainable technological solutions"*

The strategic approach of our corporate culture is based on a commitment to innovation, industrial excellence, and sustainability as fundamental pillars for moving toward a responsible future.

At Normagrup Technology, we are firmly committed to domestic manufacturing, ongoing research and technological development, and respect for sustainability, through a comprehensive approach that encompasses environmental, social, and economic dimensions, driving ethical and responsible growth.

Since its founding in 1971, the company has undergone a continuous process of development and expansion, becoming a benchmark in the technical lighting and safety sector, with a presence in various international markets. Its production model is governed by a commitment to innovation, care for the planet, occupational safety, equal opportunities, and contribution to local development.

We strive to bring innovative solutions to the market, always guided by a sixth sense engraved in our DNA: **the sense of technology.**





Everything we do is driven by the core principles of the Normagrup DNA:



Innovation

Imagining, creating, and daring to take the road less traveled is the only way to build the future.



Safety

Our very first development was an emergency light fixture, and since then, safety has remained a constant priority at Normagrup.



Confort y control

Our developments aim to make life more comfortable for everyone, with simple and intuitive operation.



Design

We care about the aesthetics and appearance of our products to create pleasant environments



Quality

The customer is the absolute priority of our work, and the quality of our products and services is always aimed at achieving their maximum satisfaction.



Sustainability

We design efficient products based on eco-design principles and with a life cycle aligned with circular economy principles.



Owner of the PEP: Normagrup Technology, S.A.

★ Location of production and assembly site:
Parque Tecnológico de Asturias
C/Ablanal, 1 33428 Llanera. Asturias. España

Legal contact:
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ENVIRONMENTAL COMMITMENT OF THE COMPANY

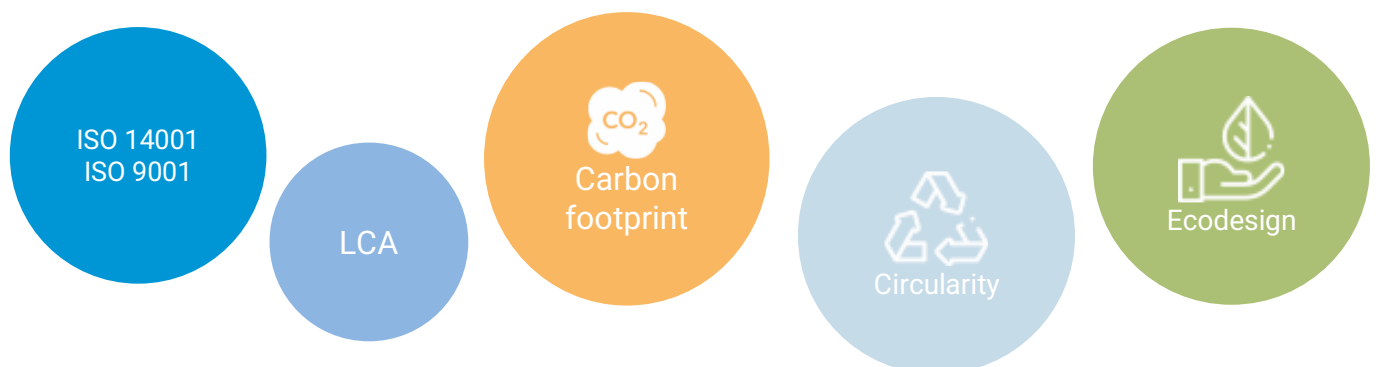
Normagrup Technology is a global company dedicated to the design, manufacture, and marketing of innovative technological solutions in lighting, signage, and emergency and detection systems, backlit fabrics, and hospital headwalls.

Since its origins, Normagrup has integrated environmental protection as a key pillar of its activity, implementing measures aimed at preventing, reducing, and controlling the environmental impacts associated with its production processes and products.

Driven by this strong commitment, an integrated quality and environmental management system was established according to ISO 9001:2015 and ISO 14001:2015, respectively, based on a holistic approach to the continuous improvement of our processes. This enables us to advance toward efficient and resource-optimized manufacturing, minimize waste and emissions, and incorporate sustainability and efficiency criteria at every stage of our products' life cycle.

This vision is embodied in a strong commitment to evaluating the environmental impact of our products through Life Cycle Assessment (LCA), a key tool for objectively quantifying impacts from the manufacturing phase to end-of-life disposal. This approach allows us to progress toward designing safer products that integrate sustainability criteria from the outset, guiding our decisions toward continuous improvement.

The results of this study are reflected in this Environmental Product Declaration (EPD), which serves as a key element for the improvement and transparency of our products.





1.2 PRODUCT DESCRIPTION AND METHODOLOGY

This Environmental Product Declaration (EPD), represents the Element indoor lighting family, which includes a combination of a luminaire and a light source (non-integrated), distinguished by the following technical characteristics:

Table 1. Technical characteristics

NORMALIT ELEMENT	Indoor Lighting Ref. N110 + FSMB-16	
	LED	CE
	UNE 60598-2-22 230V 50/60HZ	
	Lumen output (lm)	3420
	Colour temperatures (K)	2700/3000/4000
	CRI	80-98
	Light source lifetime	66.000h L80B10
	Lifetime (h)	100.000
	Macadam ellipses	3
	Beam angle	20/35/60
	Photobiological security	1
	Power (W)	20,4
	Voltage	220-240V 50/60Hz
	Power factor	0,95/0,97
	Class	II
	UGR	16
	IP	20
	Energy efficiency	B

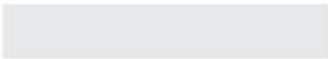
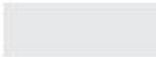
For more information please visit: <https://www.normalit.com/Element>

The EPD is structured according to the life cycle stages established by the standards Product Category Rules (PCR-ed4-EN-2021 09 06) and the Product Specific Rules (PSR-0014-ed2-EN-2023 07 13) and is based on the UNE-EN 15804:2012+A2:2020 standard. These stages cover the “cradle to grave” phases (A1-C4). The primary data used in the LCA are representative of the Element combination Core N110 light source with the Fogo metal rod FSMB-16 luminaire model, corresponding to 2024 production. Element light sources are not integrated in the luminaire, since luminaires and light sources are sold separately (see possible combinations in the [family catalogue](#)).

Sales data included both 2024 and 2025, since this product was launched at the end of 2024, in order to provide more representativeness to the sales data.



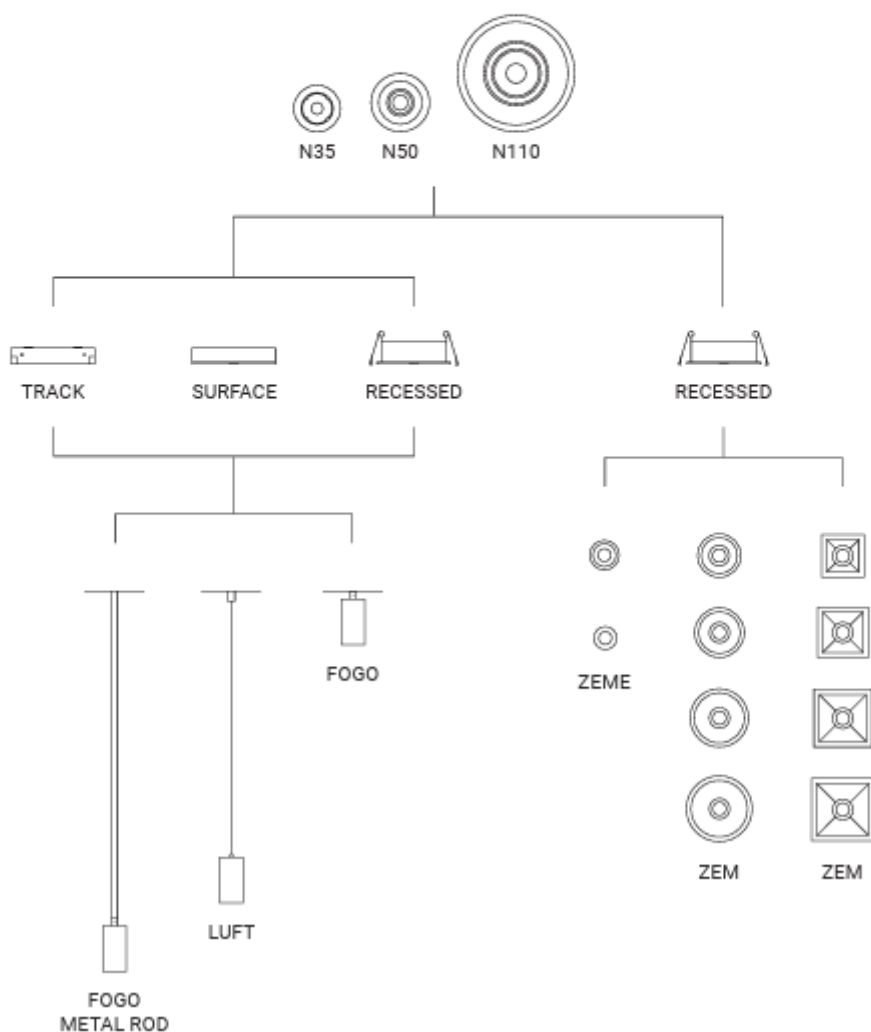
ELEMENT





THE ELEMENT SYSTEM

A customized composition of the space with multiple lighting configurations, designs and installation options.





ELEMENT

N 35

FOGO METAL ROD



FOGO



LUFT



ZEME



ZEM



22

N 50

FOGO METAL ROD



FOGO



LUFT



ZEM



N 110

FOGO METAL ROD



FOGO



LUFT





FUNCTIONAL UNIT | REFERENCE PRODUCT

The **reference product** is the ELEMENT luminaire Fogo metal rod ceiling-mounted (FSMB-16) and the light source Core N110. Within the combinations of luminaires and light source for the ELEMENT family, the most conservative combination was chosen: the light source with the highest luminous output and weight, and the luminaire with the highest weight and the mounting option that requires more materials.

The **functional unit (FU)** of the study is to provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours. This functional unit is chosen in accordance with the specifications of the Product Category Rules (PCR-ed4-EN-2021 09 06) and the Product Specific Rules (PSR-0014-ed2-EN-2023 07 13), which apply for luminaires.

The following information has been used to generate the Environmental Product Declaration.

Table 2. Methodological information

Methodological information	
Product name	Core N110 + Fogo metal rod FSMB-16
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1.000 lumens during a reference lifetime of 35.000 hours.
Reference Flow	0,102
Declared unit	One Element CoreN110 light source with the Fogo metal rod FSMB-16 luminaire providing a luminous output of 3.420 lumens over a designated lifetime of 100.000 hours.
Reference service life	35.000 h
Life cycle stages covered	Cradle to grave
Product category according to PSR	Luminaires (indoor lighting)

The **reference flow** for this study is defined as:

$$\frac{35.000 \text{ (h)}}{\text{assigned product lifetime of the reference product (h)}} \times \frac{1.000 \text{ (lm)}}{\text{outgoing luminous flux of the reference product (lm)}} =$$

Consequently, the reference flow of the reference product corresponds to:

$$(35.000\text{h}/100.000\text{h}) \times (1.000 \text{ lm}/ 3.420 \text{ lm}) = 0,1023$$



The **reference service life (RSL)** is 35.000 hours in accordance with the Product Specific Rules (PSR-0014-ed2-EN-2023 07 13) for luminaire. The **declared service life (DSL)** refers to the period during which the luminaire is expected to operate under normal conditions before being taken out of service and is 100.000 hours.

In addition to the functional unit, the **declared unit** is defined as a single Element Core N110 light source with the Fogo metal rod FSMB-16 luminaire that provides 3.429 lumens of lighting over a reference service life of 100.000 hours.

1.3 HOMOGENEOUS ENVIRONMENTAL FAMILY

The reference product represents the Element family, all the products in this family differ in terms of power, dimensions and weight. **Table 3** shows the range of variations.

Table 3. Range of variation within the family of products.

Element family	Unit	Reference product's value Element	Minimum value in product range	Maximum value in product range
Product's gross weight (light source + luminaire)	kg	1,50	0,12	1,68
Power	W	20,4	2,3	20,4
Lumens	Lumen	3.420	275	3.420

The rest of the products that belong to the same homogeneous family and are covered by this PEP are listed in **Table 4 and 5**. The family includes the combinations of the luminaire (table 4) with the respective light source (table 5) as mentioned in the first column of table 4.

Table 4. Product references included in the Element homogeneous family, for the luminaire references.

Product references of the ELEMENT luminaire family		
Luminaire	Installation type	Ref. product
FOGO suitable for N35	Recessed	FORB-3DC
		FORB-3
	Track	FOCB-3DC
	Surface	FOSB-3DC
		FOSB-3



FOGO suitable for N50	Recessed	FORB-52
		FORDB-52
	Track	FOCB-52
		FOCDB-52
	Surface	FOSB-52
		FOSDN-52
FOGO suitable for N110	Recessed	FORB-13
		FORB-16
		FORDB-13
		FORDB-16
	Track	FOCB-13
		FOCB-16
		FOCDB-13
		FOCDB-16
	Surface	FOSB-13
		FOSB-16
		FOSDB-13
		FOSDB-16
FOGO METAL ROD suitable for N35	Recessed	FMRB-3DC
		FMRB-3
	Track	FMCB-3DC
	Surface	FMSB-3DC
		FMSB-3
FOGO METAL ROD suitable for N50	Recessed	FMRB-52
		FMRDB-52
	Track	FMCB-52
		FMCD-52
	Surface	FMSB-52
		FMSDN-52
FOGO METAL ROD suitable for N110	Recessed	FMRB-13
		FMRB-16
		FMRDB-13
		FMRDB-16
	Track	FMCB-13
		FMCB-16



		FMCDDB-13
		FMCDDB-16
	Surface	FMSB-13
		FMSB-16
		FMSDB-13
		FMSDB-16
LUFT suitable for N35	Recessed	LURB-3DC*
		LURB-3
	Track	LUCB-3DC*
	Surface	LUSB-3DC*
		LUSB-3
LUFT suitable for N50	Recessed	LURB-52
		LURDB-52
	Track	LUCB-52
		LUCDB-52
	Surface	LUSB-52
		LUSDB-52
LUFT suitable for N110	Recessed	LURB-13
		LURB-16
		LURDB-13
		LURDB-16
	Track	LUCB-13
		LUCB-16
		LUCDB-13
		LUCDB-16
	Surface	LUSB-13
		LUSB-16
		LUSDB-13
		LUSDB-16
ZEME suitable for N35	Recessed	ZEB-3DC*
	Trimless	ZT-3DC*
ZEM suitable for N35	Recessed (round ZEM)	ZR72B-3DC*
		ZR83B-3DC
		ZR94B-3DC*
		ZR105B-3DC*



ZEM suitable for N50	Recessed (squared ZEM)	ZQ72B-3DC*
		ZQ83B-3DC
		ZQ94B-3DC
		ZQ105B-3DC*
	Recessed (round ZEM)	ZR72B-52
		ZR83B-52
		ZR94B-52
		ZR105B-52
		ZR72DB-52
		ZR83DB-52
		ZR94DB-52
		ZR105DB-52
	Recessed (squared ZEM)	ZQ72B-52
		ZQ83B-52
		ZQ94B-52
		ZQ105B-52
		ZQ72DB-52
		ZQ83DB-52
		ZQ94DB-52
		ZQ105DB-52



Table 5 Product references included in the Element homogeneous lighting family, for the light source references.

Product references of the ELEMENT lighting family		
Light source	Ref. product	Expected lifetime
N35	N35-82S	10800h L80B10
	N35-82M	
	N35-83S	
	N35-83M	
	N35-84S	
	N35-84M	
	N35-92S	
	N35-92M	
	N35-93S	
	N35-93M	
	N35-94S	
	N35-94M	
N50	N50-82S	66000h L80B10
	N50-82M	
	N50-82F	
	N50-83S	
	N50-83M	
	N50-83F	
	N50-84S	
	N50-84M	
	N50-84F	
	N50-92S	
	N50-92M	
	N50-92F	
	N50-93S	
	N50-93M	
	N50-93F	
	N50-94S	
	N50-94M	
	N50-94F	
	N110-82S	66000h L80B10



N110	N110-82M	
	N110-82F	
	N110-83S	
	N110-83M	
	N110-83F	
	N110-84S	
	N110-84M	
	N110-84F	
	N110-92S	
	N110-92M	
	N110-92F	
	N110-93S	
	N110-93M	
	N110-93F	
	N110-94S	
	N110-94M	
	N110-94F	

The present PEP declaration is valid for all the products in the described homogeneous environmental family. The extrapolation coefficients at product level (declared unit) and the information of the products included in the homogeneous environmental family can be found in the spreadsheets provided as annex. This information shall be used by the PEP user to extrapolate the impact of a product from the Element family, based on technical parameters of the considered product, as shown in **Annex II** (Annex II. Extrapolation coefficients).



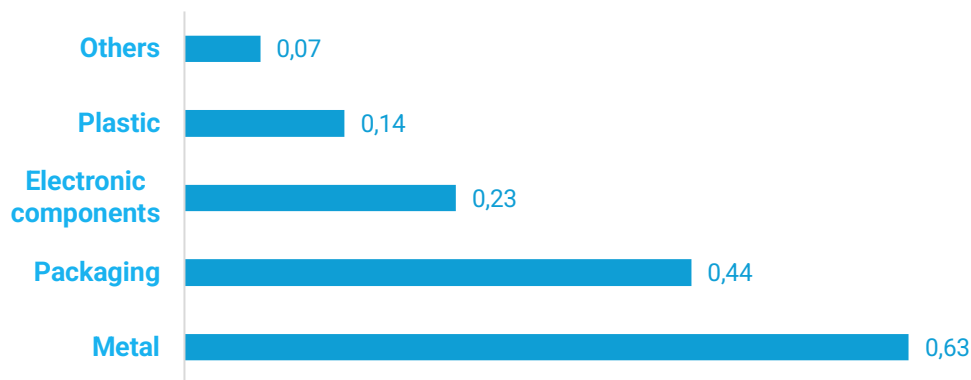
2. CONSTITUENT MATERIALS

Table 5. Weigh by material of the reference product.

	kg	%
Metal		
Steel	0,021	3,36
Zinc-plated steel	1,00E-05	0,00
Aluminium	0,604	96,48
Galvanized steel sheet	1,00E-03	0,16
TOTAL	0,626	100
Plastic		
ABS	0,114	82,00
Polycarbonate	0,023	16,56
Polyamide	1,00E-03	0,72
EPDM	1,00E-03	0,72
TOTAL	0,138	100
Electric components		
Electronic components	0,222	94,34
LED circuit	0,003	1,25
PCB circuits	0,010	3,90
Wires	1,00E-04	0,04
TOTAL	0,235	100
Packaging		
100% recycled cardboard	0,434	99,02
Pallet	0,001	0,15
Polyethylene film	0,004	0,83
Instructions	1,00E-05	0,00
TOTAL	0,438	100
Others		
PC colorant	0,045	68,74
Powder coating	0,020	31,26
TOTAL	0,065	100



Graph 1. Weight distribution by material type.



3. ADDITIONAL ENVIRONMENTAL INFORMATION

Normagrup has integrated environmental protection as a key pillar of its activity, implementing measures aimed at preventing, reducing, and controlling the environmental impacts associated with its production processes and products. Since 2019, we have been calculating our organizational carbon footprint and are working to reduce our greenhouse gas emissions. In line with this goal, we have created an emission absorption project: [Normagrup Forest](#).

The following sections outline the measures taken by Normagrup to minimise the product's environmental impact across all stages of the product's life cycle.



MANUFACTURING: A1-A3

A1 – Supply of raw materials.

A2 – Transport of raw materials.

A3 – Manufacturing.

Regarding the supply of raw materials, all suppliers with whom we maintain supply relationships have been previously assessed to be aligned with our corporate principles. They have accepted our [Code of Conduct](#) and are committed to meeting our [environmental requirements](#).

For Element packaging, Normagrup uses only 100% recycled cardboard as primary and secondary packaging.

As for the manufacturing, Normagrup has a photovoltaic electricity production centre at the main production plant, which allows to reduce the need for non-renewable electricity in our facilities.



DISTRIBUTION AND INSTALLATION: A4-A5

A4 – Distribution.

A5 – Installation.

Normagrup aims for a smart transportation by maximising the available space during the distribution stage.

The product is commercialized as two separate components: the Fogo metal rod FSMB-16 luminaire and the Core N110 light source. They are shipped separately in pallets (1200 x 800 mm), fitting 84 units of FSMB-16 luminaires, and 1.155 units of Core N110 light sources, respectively.

During installation, energy consumption is considered negligible because it is carried out manually, although electric tools such as drills may be used. The product comes ready to be installed by the end-user. In this stage, the product is unpacked and therefore the packaging waste is generated during the installation. The waste of packaging materials is treated using default values according to PCR-ed4-EN-2021 09 06 and PSR-0014-ED2.0-EN-2023 07 13 for distances and waste treatment statistics are based on Eurostat.



USE: B1-B7

B1 - Use.

B2 - Maintenance.

B3 - Repair.

B4 - Replacement.

B5 - Rehabilitation.

B6 – In service energy use.

B7 - In-service water use

The use stage concerns the maintenance (B2) during the product's life cycle and the electricity consumption (B6) associated with the operation of the product.

As a maintenance task, one LED will be replaced over the product's service life, since a service life of 66.000h is ensured for the LED and the luminaire's service life is 100.000h. The waste treatment of the initial LED is considered in this stage.

The electricity consumption during the use phase is calculated based on the Spanish and Portuguese electrical mix, since 54,4% of the sales are made in this



country, and the remaining sales happened in the Spanish market. Therefore, the electricity consumption scenario is based on the average Portugal and Spain electricity grid mix, respectively, and is estimated over a lifetime of 100.000 hours and for 20,4 W of power.

The product has no direct emissions (B1) and is designed so that no parts replacement is necessary (B4). Additionally, no standard repairs (B3) or refurbishments (B5) take place as of now. The use of the product does not involve water consumption (B7).



C1-C4 END OF LIFE

C1 - Deconstruction/Demolition

C2 – Waste transport

C3 – Waste processing

C4 - Provision

The product is required to be professionally collected and recycled in accordance with the EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE). The company fulfils its responsibility within the EU by participating in national WEEE schemes. We meet our extended producer responsibility obligations by adhering to a national SCRAP.

The waste treatment scenario of each material and component was determined based on public data provided by Eurostat in 2022 and available datasets.

Table 5. Waste treatment scenarios considered.

Scenario	Recycling and incineration with energy recovery	Incineration and landfill	Modelling assumptions
Wire	62%	38%	Transport (100 km) and treatments based on Eurostat for Europe 2022.
Metal	77%	23%	Transport (100 km) and treatments based on Eurostat for Europe 2022.
Plastic	40%	60%	Transport (100 km) and treatments based on Eurostat for Europe 2022.
Electronic	70%	30%	Transport (100 km) and treatments based on available datasets.



4. ENVIRONMENTAL IMPACTS

The environmental impact assessment examines the stages of the reference product's life cycle: manufacturing, distribution, installation, use, and end of life. It is representative of the products marketed and used in Europe.

The Life Cycle Assessment (LCA) model was developed using the online tool *edit®* in combination with the SimaPro 10.2.0.2 software to evaluate the environmental impact associated with the reference product. Data concerning material and energy flows entering the product system were primarily sourced from the Ecoinvent v3.11.1 database.

The impact indicators and models used are those specified by the reference standards PCR-ed3-EN-2015 04 02 and PSR-0014-ed2-EN-2023 07 13. The environmental indicators are calculated for the total life cycle and each life cycle stage (i.e., manufacturing, distribution, installation, use and end-of-life) of the reference product. This environmental declaration has been developed by considering an outgoing luminous flux of 1.000 lumens during a reference lifetime of 35.000 hours.

For the use stage, the electricity consumption scenario considers the geographic area of Europe, specifically Portugal and Spain, since 54,5% of the sales were made in Portugal and the remaining 45,5% in Spain.

Overall, datasets were selected based on their geographical representativeness, prioritizing those most closely aligned with the location of each life cycle stage.



RESULTS

Table 6. Results of mandatory inventory indicators per F.U (1.000 lumens during a reference lifetime of 35,000 hours) of Element N110 + FSMB-16.

Stage	Unit	1. Manufacturing			2. Distribution	3. Installation	4. Use		5. End of life			Total
Impact category		A1	A2	A3	A4	A5	B2	B6	C2	C3	C4	
Climate change - total	kg CO2 eq.	2,07E+00	1,19E-02	1,06E+00	2,46E-02	6,87E-03	8,20E-02	2,58E+01	2,07E-03	2,17E-02	3,21E-02	2,91E+01
Climate change - fossil fuels	kg CO2 eq.	2,12E+00	1,19E-02	1,06E+00	2,46E-02	1,05E-03	8,17E-02	2,53E+01	2,07E-03	2,17E-02	1,38E-02	2,86E+01
Climate change - land use and land use transformation	kg CO2 eq.	3,92E-03	4,88E-06	2,82E-04	8,15E-06	3,78E-07	1,46E-04	4,18E-01	6,86E-07	1,05E-05	1,38E-06	4,22E-01
Climate change - biogenic	kg CO2eq.	-5,66E-02	2,30E-06	5,53E-03	5,18E-06	5,82E-03	1,35E-04	8,65E-02	4,37E-07	1,52E-05	1,84E-02	5,98E-02
Ozone depletion	kg CFC-11 eq.	2,91E-06	2,23E-10	6,11E-08	5,37E-10	2,16E-11	8,63E-10	6,43E-07	4,52E-11	2,14E-10	3,34E-11	3,62E-06
Acidification	mol H+ eq.	3,23E-02	1,60E-04	3,23E-03	7,90E-05	4,80E-06	5,07E-04	1,23E-01	6,65E-06	2,92E-05	8,41E-06	1,59E-01
Freshwater eutrophication	kg P eq.	2,90E-03	6,56E-07	9,19E-05	1,68E-06	8,66E-08	4,43E-05	6,07E-03	1,42E-07	6,52E-06	9,18E-07	9,12E-03
Marine aquatic eutrophication	kg N eq.	3,48E-03	4,18E-05	9,45E-04	2,66E-05	4,31E-06	1,01E-04	2,08E-02	2,24E-06	7,19E-06	1,74E-05	2,54E-02
Terrestrial eutrophication	mol N eq.	3,86E-02	4,63E-04	9,94E-03	2,89E-04	1,74E-05	9,91E-04	2,25E-01	2,44E-05	6,96E-05	2,91E-05	2,75E-01
Photochemical ozone formation	kg NMVOC eq.	1,45E-02	1,38E-04	7,38E-03	1,20E-04	8,06E-06	2,84E-04	8,71E-02	1,01E-05	2,77E-05	9,10E-06	1,10E-01
Abiotic resource depletion - metals and minerals	kg Sb eq.	8,32E-04	2,89E-08	1,59E-06	8,30E-08	3,22E-09	1,35E-06	5,74E-04	6,99E-09	3,06E-08	6,93E-09	1,41E-03
Abiotic resource depletion - fossils	MJ	1,54E+01	1,05E-02	1,76E+00	2,74E-02	1,37E-03	6,76E-01	3,71E+02	2,31E-03	3,15E-02	5,61E-03	3,89E+02
Water requirement	m3 depriv.	6,93E-01	5,25E-04	7,86E-02	1,35E-03	-4,94E-04	2,22E-02	2,53E+01	1,14E-04	1,42E-03	-9,42E-04	2,61E+01



Table 7. Results of mandatory inventory indicators per F.U (1.000 lumens during a reference lifetime of 35,000 hours) of Element N110 + FSMB-16.

Stage	Unit	1. Manufacturing			2. Distribution	3. Installation	4. Use		5. End of life			Total
Impact category		A1	A2	A3	A4	A5	B2	B6	C2	C3	C4	
Use of renewable primary energy (excl. resources used as raw materials)	MJ	2,74E+00	2,10E-03	9,02E-01	5,69E-03	2,75E-04	1,34E-01	3,38E+02	4,80E-04	1,17E-02	1,22E-01	3,42E+02
Use of renewable primary energy resources (used as raw materials)	MJ	7,56E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,02E-04	-1,21E-01	6,35E-01
Total use of renewable primary energy resources	MJ	3,49E+00	2,10E-03	9,02E-01	5,69E-03	2,75E-04	1,34E-01	3,38E+02	4,80E-04	1,16E-02	1,27E-03	3,43E+02
Use of non-renewable primary energy (excl. resources used as raw materials)	MJ	1,54E+01	1,05E-02	1,76E+00	2,74E-02	1,37E-03	6,76E-01	3,71E+02	2,31E-03	3,14E-02	5,61E-03	3,89E+02
Use of non-renewable primary energy resources (used as raw materials)	MJ	2,09E-02	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	2,09E-02
Total use of non-renewable primary energy resources	MJ	1,54E+01	1,05E-02	1,76E+00	2,74E-02	1,37E-03	6,76E-01	3,71E+02	2,31E-03	3,14E-02	5,61E-03	3,89E+02
Use of secondary materials	kg	4,44E-02	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	4,44E-02
Use of renewable secondary fuels	MJ	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	MJ	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	m3	2,14E-02	1,67E-05	2,15E-03	4,33E-05	-8,48E-06	7,61E-04	4,10E-01	3,65E-06	4,25E-05	-1,64E-05	4,34E-01
Hazardous waste	kg	4,45E-03	3,18E-06	6,98E-04	8,81E-06	5,38E-05	1,65E-04	3,18E-02	7,42E-07	8,29E-03	5,72E-03	5,11E-02
Non-hazardous waste	kg	1,48E-01	4,94E-03	4,97E-02	1,67E-02	4,73E-03	2,23E-03	3,31E+00	1,41E-03	2,23E-03	1,52E-02	3,55E+00
Radioactive waste	kg	5,63E-05	3,60E-08	1,22E-05	1,03E-07	4,71E-09	2,36E-06	4,62E-03	8,65E-09	1,42E-07	2,56E-08	4,69E-03



Table 8. Results of mandatory inventory indicators per F.U (1.000 lumens during a reference lifetime of 35,000 hours) of Element N110 + FSMB-16.

Stage	Unit	1. Manufacturing			2. Distribution	3. Installation	4. Use		5. End of life			Total
Impact category		A1	A2	A3	A4	A5	B2	B6	C2	C3	C4	
Components for reuse	kg	6,76E-05	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	6,76E-05
Materials for recycling	kg	0,00E+00	0,00E+00	2,68E-02	0,00E+00	1,41E-02	2,52E-04	0,00E+00	0,00E+00	3,06E-02	3,13E-06	7,18E-02
Materials for energy recovery	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
Exported energy	MJ	0,00E+00	0,00E+00	5,39E-03	0,00E+00	2,69E-01	0,00E+00	0,00E+00	0,00E+00	2,22E-06	1,63E-02	2,91E-01
Total use of primary energy during the life cycle	MJ	1,89E+01	1,26E-02	2,66E+00	3,31E-02	1,64E-03	8,10E-01	7,09E+02	2,79E-03	4,31E-02	6,88E-03	7,31E+02
Emission of fine particles	incidence of diseases	1,67E-05	7,13E-10	2,85E-08	1,97E-09	8,66E-11	4,90E-09	7,06E-07	1,66E-10	4,08E-10	1,02E-10	1,74E-05
Ionizing radiation, human health	kBq U-235 eq.	2,27E-01	1,46E-04	5,12E-02	4,16E-04	1,90E-05	9,63E-03	2,01E+01	3,51E-05	5,34E-04	9,99E-05	2,04E+01
Ecotoxicity (fresh water)	CTUe	6,19E+01	1,76E-02	2,57E+00	4,62E-02	1,79E-01	2,76E-01	7,98E+01	3,90E-03	3,00E-01	3,82E-01	1,45E+02
Human toxicity, carcinogenic effects	CTUh	5,98E-06	2,20E-12	5,81E-10	4,17E-12	5,55E-13	1,60E-11	1,10E-08	3,52E-13	2,46E-11	3,65E-12	6,00E-06
Human toxicity, non-carcinogenic effects	CTUh	8,31E-08	7,73E-11	5,03E-09	2,17E-10	3,82E-11	9,87E-10	5,14E-07	1,83E-11	6,80E-11	7,71E-11	6,04E-07
Impacts related to land use/soil quality	-	1,65E+01	6,45E-02	9,97E-01	2,06E-01	9,78E-03	2,11E-01	2,03E+02	1,74E-02	4,97E-02	1,27E-02	2,21E+02
Biogenic carbon content of the associated packaging	kg of C	-1,79E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,41E-06	5,01E-03	-1,29E-02
Biogenic carbon content of the product	kg of C	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



Table 9. Results of mandatory inventory indicators per D.U (for 3.420 lumens for 100.000 hours) of Element N110 + FSMB-16.

Stage	Unit	1. Manufacturing			2. Distribution	3. Installation	4. Use		5. End of life			Total
Impact category		A1	A2	A3	A4	A5	B2	B6	C2	C3	C4	
Climate change - total	kg CO2 eq.	2,02E+01	1,16E-01	1,04E+01	2,41E-01	6,72E-02	8,01E-01	2,52E+02	2,03E-02	2,12E-01	3,14E-01	2,84E+02
Climate change - fossil fuels	kg CO2 eq.	2,07E+01	1,16E-01	1,03E+01	2,40E-01	1,03E-02	7,98E-01	2,47E+02	2,03E-02	2,12E-01	1,35E-01	2,79E+02
Climate change - land use and land use transformation	kg CO2 eq.	3,83E-02	4,77E-05	2,76E-03	7,96E-05	3,70E-06	1,43E-03	4,08E+00	6,71E-06	1,03E-04	1,34E-05	4,13E+00
Climate change - biogenic	kg CO2eq.	-5,54E-01	2,25E-05	5,41E-02	5,07E-05	5,69E-02	1,32E-03	8,46E-01	4,27E-06	1,53E-04	1,80E-01	5,84E-01
Ozone depletion	kg CFC-11 eq.	2,85E-05	2,18E-09	5,97E-07	5,25E-09	2,11E-10	8,44E-09	6,28E-06	4,42E-10	2,09E-09	3,26E-10	3,54E-05
Acidification	mol H+ eq.	3,15E-01	1,56E-03	3,15E-02	7,72E-04	4,69E-05	4,96E-03	1,20E+00	6,50E-05	2,86E-04	8,22E-05	1,55E+00
Freshwater eutrophication	kg P eq.	2,83E-02	6,41E-06	8,98E-04	1,64E-05	8,47E-07	4,33E-04	5,94E-02	1,38E-06	6,37E-05	8,98E-06	8,91E-02
Marine aquatic eutrophication	kg N eq.	3,40E-02	4,09E-04	9,23E-03	2,60E-04	4,21E-05	9,85E-04	2,03E-01	2,19E-05	7,03E-05	1,70E-04	2,49E-01
Terrestrial eutrophication	mol N eq.	3,78E-01	4,52E-03	9,71E-02	2,83E-03	1,70E-04	9,68E-03	2,20E+00	2,38E-04	6,80E-04	2,84E-04	2,69E+00
Photochemical ozone formation	kg NMVOC eq.	1,42E-01	1,35E-03	7,22E-02	1,17E-03	7,88E-05	2,78E-03	8,51E-01	9,87E-05	2,71E-04	8,89E-05	1,07E+00
Abiotic resource depletion - metals and minerals	kg Sb eq.	8,13E-03	2,83E-07	1,55E-05	8,11E-07	3,15E-08	1,32E-05	5,61E-03	6,83E-08	2,99E-07	6,77E-08	1,38E-02
Abiotic resource depletion - fossils	MJ	1,50E+02	1,03E-01	1,72E+01	2,68E-01	1,34E-02	6,60E+00	3,63E+03	2,26E-02	3,07E-01	5,48E-02	3,80E+03
Water requirement	m3 depriv.	6,77E+00	5,13E-03	7,69E-01	1,32E-02	-4,83E-03	2,17E-01	2,48E+02	1,11E-03	1,39E-02	-9,21E-03	2,55E+02



Table 10. Results of mandatory inventory indicators per D.U (for 3.420 lumens for 100.000 hours) of Element N110 + FSMB-16.

Stage	Unit	1. Manufacturing			2. Distribution	3. Installation	4. Use		5. End of life			Total
Impact category		A1	A2	A3	A4	A5	B2	B6	C2	C3	C4	
Use of renewable primary energy (excl. resources used as raw materials)	MJ	2,67E+01	2,06E-02	8,82E+00	5,57E-02	2,69E-03	1,31E+00	3,30E+03	4,69E-03	1,15E-01	1,19E+00	3,34E+03
Use of renewable primary energy resources (used as raw materials)	MJ	7,39E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,05E-03	-1,1E+00	6,21E+00
Total use of renewable primary energy resources	MJ	3,41E+01	2,06E-02	8,82E+00	5,57E-02	2,69E-03	1,31E+00	3,30E+03	4,69E-03	1,14E-01	1,24E-02	3,35E+03
Use of non-renewable primary energy (excl. resources used as raw materials)	MJ	1,50E+02	1,03E-01	1,72E+01	2,68E-01	1,34E-02	6,60E+00	3,63E+03	2,26E-02	3,07E-01	5,48E-02	3,80E+03
Use of non-renewable primary energy resources (used as raw materials)	MJ	2,04E-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	2,04E-01
Total use of non-renewable primary energy resources	MJ	1,50E+02	1,03E-01	1,72E+01	2,68E-01	1,34E-02	6,60E+00	3,63E+03	2,26E-02	3,07E-01	5,48E-02	3,80E+03
Use of secondary materials	kg	4,34E-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	4,34E-01
Use of renewable secondary fuels	MJ	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	MJ	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	m3	2,09E-01	1,64E-04	2,10E-02	4,23E-04	-8,29E-05	7,44E-03	4,00E+00	3,56E-05	4,15E-04	-1,60E-04	4,24E+00
Hazardous waste	kg	4,35E-02	3,11E-05	6,83E-03	8,61E-05	5,26E-04	1,61E-03	3,10E-01	7,25E-06	8,11E-02	5,59E-02	5,00E-01
Non-hazardous waste	kg	1,45E+00	4,82E-02	4,86E-01	1,63E-01	4,62E-02	2,18E-02	3,23E+01	1,38E-02	2,18E-02	1,48E-01	3,47E+01
Radioactive waste	kg	5,50E-04	3,52E-07	1,19E-04	1,00E-06	4,60E-08	2,31E-05	4,51E-02	8,45E-08	1,39E-06	2,51E-07	4,58E-02



Table 11. Results of mandatory inventory indicators per D.U (for 3.420 lumens for 100.000 hours) of Element N110 + FSMB-16.

Stage	Unit	1. Manufacturing			2. Distribution	3. Installation	4. Use		5. End of life			Total
Impact category		A1	A2	A3	A4	A5	B2	B6	C2	C3	C4	
Components for reuse	kg	6,61E-04	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	6,61E-04
Materials for recycling	kg	0,00E+00	0,00E+00	2,62E-01	0,00E+00	1,38E-01	2,46E-03	0,00E+00	0,00E+00	2,99E-01	2,98E-05	7,01E-01
Materials for energy recovery	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
Exported energy	MJ	0,00E+00	0,00E+00	5,27E-02	0,00E+00	2,63E+00	0,00E+00	0,00E+00	0,00E+00	2,30E-05	1,59E-01	2,84E+00
Total use of primary energy during the life cycle	MJ	1,84E+02	1,23E-01	2,60E+01	3,24E-01	1,61E-02	7,92E+00	6,93E+03	2,73E-02	4,21E-01	6,72E-02	7,15E+03
Emission of fine particles	incidence of diseases	1,63E-04	6,96E-09	2,78E-07	1,92E-08	8,46E-10	4,79E-08	6,90E-06	1,62E-09	3,99E-09	9,96E-10	1,71E-04
Ionizing radiation, human health	kBq U-235 eq.	2,22E+00	1,43E-03	5,00E-01	4,07E-03	1,86E-04	9,41E-02	1,97E+02	3,43E-04	5,22E-03	9,77E-04	1,99E+02
Ecotoxicity (fresh water)	CTUe	6,05E+02	1,72E-01	2,51E+01	4,52E-01	1,75E+00	2,70E+00	7,80E+02	3,81E-02	2,94E+00	3,73E+00	1,42E+03
Human toxicity, carcinogenic effects	CTUh	5,85E-05	2,15E-11	5,68E-09	4,08E-11	5,43E-12	1,57E-10	1,07E-07	3,44E-12	2,40E-10	3,57E-11	5,86E-05
Human toxicity, non-carcinogenic effects	CTUh	8,12E-07	7,56E-10	4,92E-08	2,13E-09	3,73E-10	9,64E-09	5,02E-06	1,79E-10	6,64E-10	7,54E-10	5,90E-06
Impacts related to land use/soil quality	-	1,61E+02	6,30E-01	9,74E+00	2,02E+00	9,56E-02	2,07E+00	1,99E+03	1,70E-01	4,86E-01	1,24E-01	2,16E+03
Biogenic carbon content of the associated packaging	kg of C	-1,75E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,49E-05	4,90E-02	-1,26E-01
Biogenic carbon content of the product	kg of C	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



5. EXTRAPOLATION RULES

The extrapolation rules followed are based on the specifications of the PCR-ed4-EN-2021 09 06 and the Product Specific Rules (PSR-0014-ed2-EN-2023 07 13).

Element N110 + FSMB-16 was selected as the representative product. Within the combinations of luminaires and light source for the ELEMENT family, the most conservative combination was chosen: the light source with the highest luminous output and weight, and the luminaire with the highest weight and the mounting option that requires more materials.

The different products within the Element family differ in terms of power, dimensions and lumens. Other product parameters that vary among the various products of the family are weight of parts, product mass and energy consumption. A sensitivity analysis was carried out to assess the potential variability of the most influential parameters: product mass and energy consumption. Additionally, extrapolation coefficients were calculated and evaluated. In cases where multiple coefficients were available for a given stage, the most representative one was selected. For example, in the use stage, the extrapolation rule applicable to the electricity consumption was chosen.

The rules defined shall be applied using the Extrapolation coefficients file provided as annex (ANNEX II. Extrapolation coefficients.xlsx). Please refer to the table below for the data on reference product 'Element N110 + FSMB-16', needed to calculate the coefficients.

Table 12. Parameters of the reference product.

Parameter	Unit	Value for reference product Element N110 + FSMB-16
Power	W	20,4
Lumen	lm	3.420
Luminaire structure weight	kg	0,61
Power supply equipment weight	kg	0,23
Light source weight	kg	0,49
Luminaire weight	kg	0,58
Packaging weight	kg	0,44
Product weight (no packaging)	kg	1,07
Product weight (including packaging)	kg	1,50

**The lumens and power are considered in the LCA to establish the total energy consumption and calculate the results at FU level.*



The calculation of extrapolation coefficients at the functional unit level shall be performed using the following formula:

$$\text{Extrapolation coefficient at the product level} \times \frac{\text{Lighting output of reference product (lm)}}{\text{Lighting output of concerned product (lm)}}$$