



Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

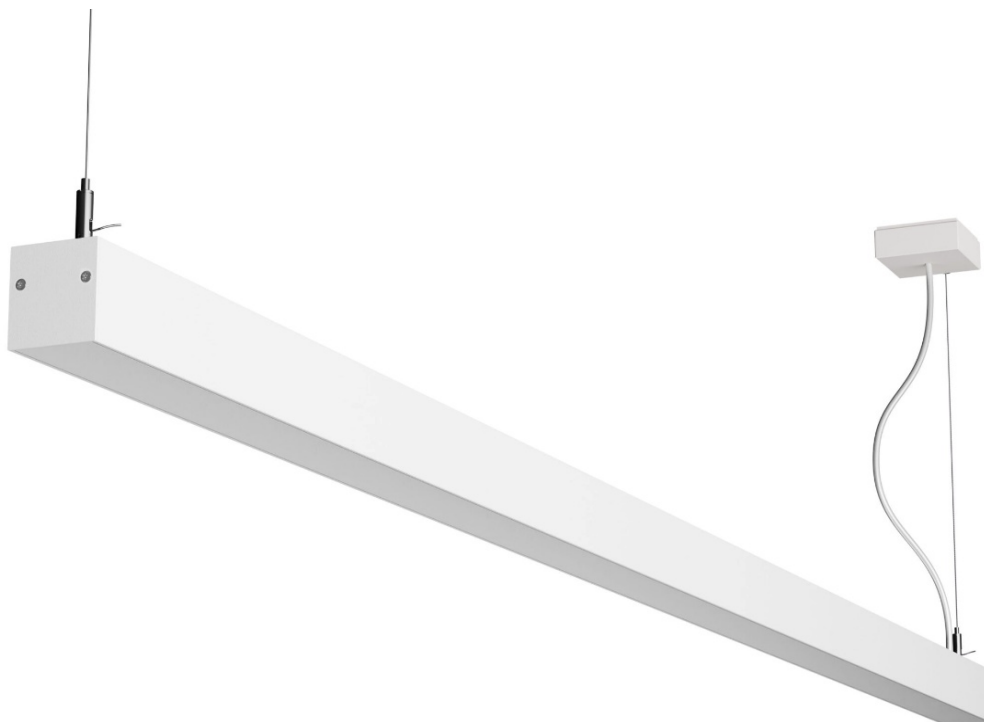
Spectrasol Sunline 45

From

Spectrasol, s.r.o.

Version date: 2025-10-20

Validity date: 2030-10-19



GENERAL INFORMATION

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Address and contact information of the LCA practitioner commissioned by the EPD owner, if applicable:

LCA Studio s.r.o.

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Third-party Verification:

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

Third-party verifier: prof. Ing. Silvia Vilčeková, PhD., Silcert, s.r.o.

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

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: **Spectrasol, s.r.o.**

Address: Hájkova 1682/1, Prague 3 – Žižkov, 130 00

Contact: Dr. Daniel Jesenský (daniel.jesensky@spectrasol.cz)

Description of the organisation: Spectrasol s.r.o., is a Czech company founded in 2018. We supply and apply unique procognitive photobiomodulation and biodynamic LED technology lighting protected by two patents, which has a proven positive effect on the body of users and the resulting practical benefits. Our luminaires are proving their capabilities in a number of organisations, educational and medical facilities, among other institutions.

PRODUCT INFORMATION

Product name: Spectrasol Sunline 45

Product identification: **Spectrasol Sunline 45**



UN CPC code: 4653 Lighting equipment

Product description: The Spectrasol Sunline 45 is a procognitive linear LED pendant luminaire for the highest lighting comfort *and unique biological quality*. Thanks to the indirect light distribution, it creates the impression of a clear sky in the interior and thus provides pleasant full-spectrum light for work or study.

Sunline 45 is a luminaire with an aluminium profile. This pendant or wall-mounted luminaire works with clear optical system and indirect light distribution. It is offered with ON/OFF, DALI version and PUSH DIM control options. It is available with fullspectrum procognitive photobiomodulating *spectral composition and colour temperature around* LED 5000K, with a high Colour Rendering Index (CRI) of 95 and with exceptional biological effectiveness. The DERMel values are: D65 = 0.87; D50 = 1.02. The luminaire comes in lengths of up to 3000 mm. Colour variants include white, black or silver. Spectrasol provides a 5-year warranty.

The certified version of this luminaire has dimensions of **1800x46x49 mm**, and features a clear optical system (indirect). This EPD applies to variants with luminous flux values of **8 700 lm**, **11 600 lm**, and **14 500 lm**.

Product is directly sent from the site of production to the customer.

Name and location of production site(s): **Halla, a.s.** Černčická 43, 549 01 Nové Město nad Metují

Name of manufacturer(s): **Halla, a.s.** Litvínovská 288/11, 190 00 Praha 9

References to any relevant websites for more information: www.spectrasol.eu

CONTENT DECLARATION

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Aluminium	1,1877	0	0	0
Polymethyl methacrylate	0,1009	0	0	0
Polycarbonate granulate	0,0498	0	0	0
Polystyrene	0,0068	0	0	0
Steel, cold rolled	0,1403	0	0	0
Stainless steel	0,0026	0	0	0
Bronze	0,0010	0	0	0
Polyvinyl chloride	0,0770	0	0	0
Wire	0,0659	0	0	0
Brass	0,0004	0	0	0
LED module	0,0619	0	0	0
LED driver	0,2050	0	0	0
TOTAL	1,8993	0	0	0

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Paper	1,7414	91,7	0,75
Low density polyethylene	0,0315	1,7	0
TOTAL	1,7729	93,3	0,75

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO₂.

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per 1000 lumens of the luminaire
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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% weight.

LCA INFORMATION

Declared unit: Declared unit is 1000 lumens of 1 m of the luminaire.

Conversion factor: The conversion factor to mass of 1 kg is 0,53. To convert the results per 1 kg, the values must be multiplied by this factor.

The results are calculated per 1000 lumens. To obtain results for a specific luminous flux, values must be multiply by the appropriate factor.

Product/luminous flux	Factor
8700 lm	8,7
11600 lm	11,6
14500 lm	14,5

For a product with 8700 lm, multiply results by 8,7; with 11600 lm, multiply results by 11,6 and with 14500 lm, multiply results by 14,5.

Reference service life: 70 000h

Time representativeness: Site specific data from producer are based on 1 year average for process data (reference year 2024). Time scope less than 10-years was applied for background data. Time scope less than 2-years was applied for specific data.

Geographical scope: Global, Czech Republic

Database(s) and LCA software used: Software LCA for Experts (version 10.9.1.17). Sphera databases (content version 2025.1), ecoinvent database (version 3.9.1).

Description of system boundaries:

The system boundary is cradle to grave and module D (A+B+C+D) according to EN 15804 + A2/AC:2021. It covers the production of raw materials, all relevant transport down to the factory gate, manufacturing, transport from manufacturing plant to the site (250 km), installation of the luminaire including product unpacking, operational energy of use of the luminaire (considered European residual electricity grid mix), deconstruction of the luminaire, transport of deconstructed materials, waste processing and recycling of used luminaire.

Process flow diagram:

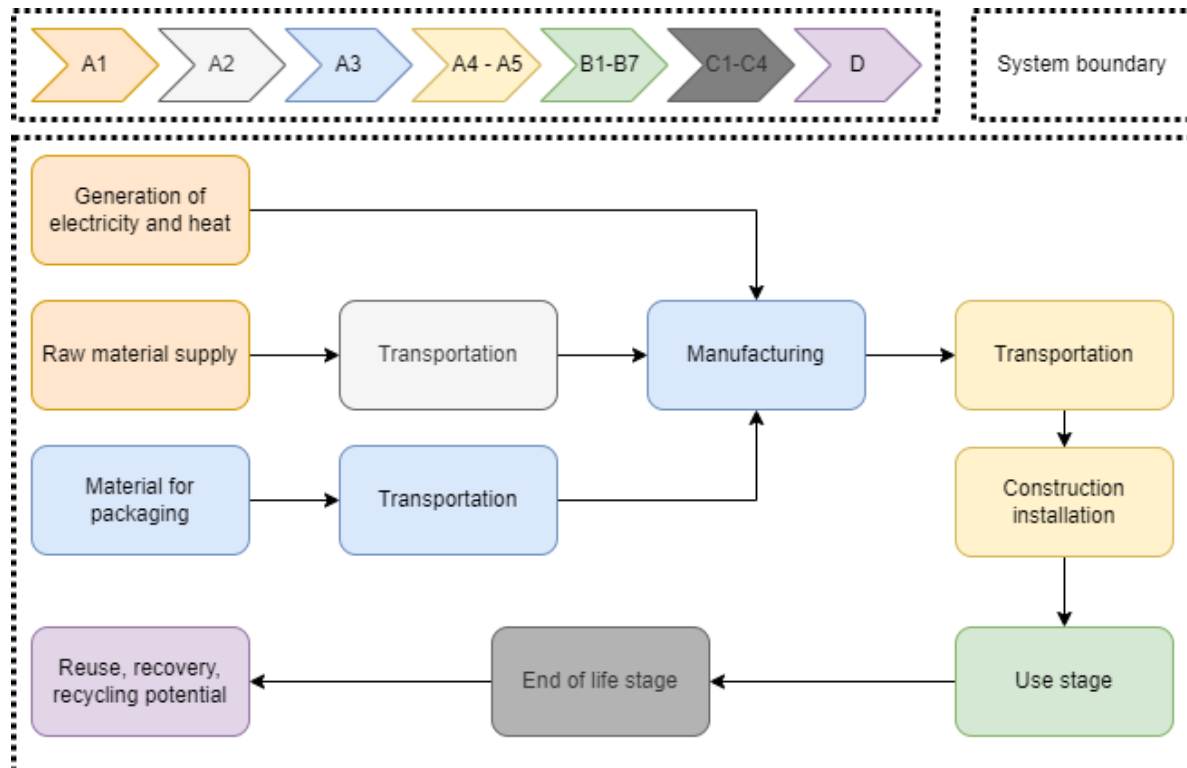


Figure 1 System boundary of the LCA study conducted on production of Spectrasol Sunline 45

More information:

Cut off rules: The cut-off criterion was chosen based on the used PCR. According to the used PCR, more than 99 % of flows were included.

Allocations: All material and energy flows were assigned to one product. Allocation was not necessary.

General content of steel and iron scrap in steel production and general content of stainless steel scrap in stainless steel production are used in production of a luminaire. General content of secondary paper fibres is used in a production of packaging secondary cardboard. No secondary fuels are used in production. Generic process data for the production of input materials and components were used.

Electricity consumption: Generation of electricity consumed within production was based on the Czech residual electricity grid mix. GWP-GHG indicator of the used residual electricity grid mix is 0,59 kg CO₂eq./kWh.

Characterisation factors: Characterisation factors are based on Environmental Footprint 3.1. (EF 3.1).

Information about declared modules:

Module A1 covers the production of materials and components and also it includes fuels and energy carriers (electricity, natural gas). This consists of the production of input materials.

Module A2 covers the transport of material into the site of production. Generic DB processes with site-specific parameters for distance were used.

Module A3 covers on-site operated processes dealing with the luminaire production and packaging. These processes are under the operational control of Halla, a.s., and these are specific processes modelled based on data collection.

Module A4 covers the transport of material from the site of production to the site of installation (considered weighted average 250 km). Generic DB processes with site-specific parameters for distance were used.

Module A5 covers the phase of installation of the luminaire and electricity used for installation of luminaire. In this module the unpacking luminaires before installation is done. Treatment and disposal of waste generated from the unpacking is also included in this module. Default processes according to the PCR were used for recycling of packaging materials. It is assumed material recycling of paper and energy recovery of plastics.

Module B6 covers operational energy use during the use phase of luminaire (considered European residual electricity grid mix).

It is assumed, that product is 100% sent to recycling.

Module C1 covers estimated energy for deconstruction related to the mass of deconstructed material.

Module C2 covers the transport of material into the recycling plant. Generic DB processes with estimated general distances were used according to PCR.

Module C3 covers the processing for loading and unloading at sorting facility, sorting, treatment of materials before recycling and recycling of aluminium, steel, stainless steel and brass scrap of used luminaire according to PCR.

Module C4 covers the process for disposal/landfilling for steel, stainless steel, brass and aluminium.

Module D covers declared benefits from energy recovery of materials from waste-to-energy plant. In this case it is energy recovery of used packaging of product.

Data quality of processes contributing with more than 10% to the GWP-GHG results of modules A1-A3:

Process	Source Type	Source	Reference year	Data category
Production of LED driver	EPD	Supplier EPD	<5 years old	Primary

Production of LED module	Database	Ecoinvent 3.9.1	2024	Secondary
Production of aluminium	Database	Sphera 2025.1	2024	Secondary

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

	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	GLO	GLO	CZ	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO

The share of primary data is 8,8% and it is calculated based on GWP-GHG results.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

Mandatory impact category indicators according to EN 15804

Results per 1000 lumens of 1 m of Spectrasol Sunline 45										
Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	3,81E+00	3,76E-02	1,35E-02	2,13E+02	2,86E-04	2,25E-03	4,81E-04	1,46E-04	-1,25E+00
GWP-biogenic	kg CO ₂ eq.	-2,97E-01	3,33E-06	3,13E-01	1,38E-01	1,86E-07	1,99E-07	2,10E-07	0,00E+00	0,00E+00
GWP-luluc	kg CO ₂ eq.	1,64E-02	3,87E-04	2,48E-05	1,11E-01	1,50E-07	2,31E-05	1,53E-07	6,00E-07	-3,03E-03
GWP-total	kg CO ₂ eq.	3,53E+00	3,80E-02	3,26E-01	2,13E+02	2,87E-04	2,27E-03	4,81E-04	1,47E-04	-1,25E+00
ODP	kg CFC 11 eq.	1,43E-08	6,23E-15	3,03E-12	2,65E-09	3,56E-15	3,72E-16	3,84E-12	4,08E-16	-3,17E-11
AP	mol H ⁺ eq.	2,43E-02	5,66E-05	3,45E-05	3,17E-01	4,26E-07	1,17E-05	2,59E-06	1,03E-06	-6,53E-03
EP-freshwater	kg P eq.	1,06E-03	1,01E-07	1,37E-08	5,84E-05	7,85E-11	6,05E-09	7,48E-09	2,18E-10	-9,75E-07
EP-marine	kg N eq.	3,26E-03	2,27E-05	1,40E-05	8,58E-02	1,15E-07	5,72E-06	1,13E-06	2,70E-07	-1,11E-03
EP-terrestrial	mol N eq.	3,45E-02	2,42E-04	1,65E-04	9,34E-01	1,26E-06	6,22E-05	1,23E-05	2,95E-06	-1,21E-02
POCP	kg NMVOC eq.	1,07E-02	5,04E-05	3,38E-05	2,41E-01	3,24E-07	1,11E-05	3,61E-06	8,09E-07	-3,26E-03
ADP-minerals&metals*	kg Sb eq.	3,18E-04	2,50E-09	3,79E-10	1,57E-05	2,11E-11	1,49E-10	1,02E-10	9,05E-12	-1,05E-04
ADP-fossil*	MJ	5,26E+01	4,81E-01	6,48E-02	3,88E+03	5,22E-03	2,88E-02	7,51E-03	1,92E-03	-1,55E+01
WDP*	m ³	7,63E-01	1,72E-04	9,69E-03	1,17E+01	1,58E-05	1,03E-05	2,39E-05	1,58E-05	-1,78E-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: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

Results per 1000 lumens of 1 m of Spectrasol Sunline 45										
Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	3,83E+00	3,80E-02	1,36E-02	2,13E+02	2,87E-04	2,27E-03	4,81E-04	1,47E-04	-1,25E+00

Resource use indicators

Results per 1000 lumens of 1 m of Spectrasol Sunline 45										
Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	MJ	2,14E+01	3,63E-02	1,03E-02	6,44E+02	8,66E-04	2,17E-03	7,42E-04	3,71E-04	-9,42E+00
PERM	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
PERT	MJ	2,14E+01	3,63E-02	1,03E-02	6,44E+02	8,66E-04	2,17E-03	7,42E-04	3,71E-04	-9,42E+00
PENRE	MJ	5,32E+01	4,81E-01	6,48E-02	3,88E+03	5,22E-03	2,88E-02	7,51E-03	1,92E-03	-1,55E+01
PENRM	MJ.	1,12E-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
PENRT	MJ	5,33E+01	4,81E-01	6,48E-02	3,88E+03	5,22E-03	2,88E-02	7,51E-03	1,92E-03	-1,55E+01
SM	kg	4,37E-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
RSF	MJ	4,14E-24	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	4,86E-23	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	4,04E-02	1,79E-05	2,30E-04	7,62E-01	1,03E-06	1,07E-06	1,11E-06	4,63E-07	-6,42E-03
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									

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste indicators

Results per 1000 lumens of 1 m of Spectrasol Sunline 45										
Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Hazardous waste disposed	kg	6,87E-07	1,93E-11	1,63E-11	7,72E-07	1,04E-12	1,15E-12	8,68E-13	4,20E-13	-1,30E-08
Non-hazardous waste disposed	kg	6,65E-01	6,72E-05	3,05E-03	9,78E-01	1,32E-06	4,02E-06	1,10E-06	9,58E-03	-2,74E-01
Radioactive waste disposed	kg	2,02E-03	9,08E-07	2,48E-06	4,90E-01	6,59E-07	5,43E-08	5,51E-07	2,04E-08	-7,64E-04

Output flow indicators

Results per 1000 lumens of 1 m of Spectrasol Sunline 45										
Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Components for re-use	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
Material for recycling	kg	2,48E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,18E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	3,89E-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
Exported energy, electricity	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	-1,37E-01
Exported energy, thermal	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	-2,11E-01

ADDITIONAL ENVIRONMENTAL INFORMATION

Our Commitment to Sustainability

Sustainability is a key part of our manufacturer's approach to design, manufacturing, and operation. continuously improves its processes to minimize environmental impact.

High Efficiency and Long Service Life

We offer a 5-year warranty on our luminaires, focusing on their durability and efficiency of full spectral technology. In addition, our luminaires are designed to support procognitive lighting, promoting well-being, concentration, *health*, *productivity* and visual comfort in working and learning environments.

Circular Packaging and Recyclable Materials

We aim to deliver our luminaires in returnable boxes whenever possible. Our manufacturer's also reuse packaging internally and have reduced production waste by 28% over the past four years, actively recycling materials such as iron, plastic, paper, and aluminium.

ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

Spectrasol – Ethical and Social Responsibility

Spectrasol unequivocally condemns child labor, human rights violations, and all forms of discrimination or inequality based on origin, gender, or race. The company is fully committed to respecting and promoting human rights and individual freedoms across all its activities.

Spectrasol operates with a transparent ownership structure, meets all statutory tax and fee obligations, and ensures full compliance with the laws and regulations of the Czech Republic and the European Union.

The company actively supports education, culture, sports, and charitable initiatives. It remains engaged in the well-being of its local community, collaborates with cultural events, and contributes to a variety of social and philanthropic projects.

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO ₂ eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO ₂ eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO ₂ eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO ₂ eq.)
GWP-total	Total Global Warming Potential (kg CO ₂ eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO ₂ eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H ⁺ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m ³)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m ³)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)

Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg);
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m ³	Cubic Meter
NM VOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO ₂ eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO ₂ eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared

REFERENCES

ISO 14025: EN ISO 14025:2006-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework, 2006-07

ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines, 2006-07

EN 15804+A2:2019 European Committee for Standardization: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, 2019

Ecoinvent: www.ecoinvent.org, ecoinvent database

Sphera: LCA for Experts software, 2025, Sphera solutions.