Environmental Product Declaration

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

smartLED

from

Caleidoscope Systems AB

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products, based on representative product
EPD registration number:	EPD-IES-0028478:002
Version date:	2026-02-20
Validity date:	2031-02-19
	An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

EPD of multiple products: 222 3930 2201 222 3930 2203
222 3930 3801 222 3930 3803
222 3935 2201 222 3935 2203
222 3935 3801 222 3935 3803

GENERAL INFORMATION

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

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *2019:14 Construction products (EN 15804+A2) 2.0.1; 2030-04-07* **Product category classification:** *UN CPC 46531*
PCR review was conducted by: *The Technical Committee of the International EPD® System.* **Chair of the PCR review:** *Rob Rouwette (Chair), Noa meron (co-chair). The review panel may be contacted via support@environdec.com*

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: < *Sunil Kumar, SIPL Pvt Ltd.*> Approved by: 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 published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD:
Caleidoscope Systems AB
Address:
Östra Sandgatan 14 3tr, 252 27 Helsingborg, Sweden
Contact:
Marcus Isaksson, CEO,
+46 702 80 40 88
marcus@caleidoscope.se

Address and contact information of the LCA practitioner commissioned by the EPD owner:
Fiona Wang, Solomon J. Zhou. TÜV SÜD Certification and Testing (China) Co., Ltd., TÜV SÜD PSB PTE LTD

Description of the organisation:
Caleidoscope Systems AB is a manufacturer of high-quality products in the field of lighting, suspended ceilings, electrical systems and energy saving solutions with nearly 40 years of experience as a supplier and installer to both national and international customers.

Product-related or management system-related certifications:
CE, RoHS

PRODUCT INFORMATION

Product name:
smartLED

Product identification:
Construction product

Visual representation of the product:

UN CPC code:

UN CPC code: 46531 - Portable electric lamps designed to function by their own source of energy (except those for cycles or motor vehicles); electric ceiling or wall lighting fittings (except those for lighting public open spaces or thorough-fares); electric table, desk, bedside or floor-standing lamps; non-electrical lamps and lighting fittings; illuminated signs, illuminated name-plates and the like.

Product description:

The products assessed in the report is smartLED with 8 types: 222 3930 2201, 222 3930 2203, 222 3930 3801, 222 3930 3803, 222 3935 2201, 222 3935 2203, 222 3935 3801, 222 3935 3803. These 8 products do not include drivers and sockets.

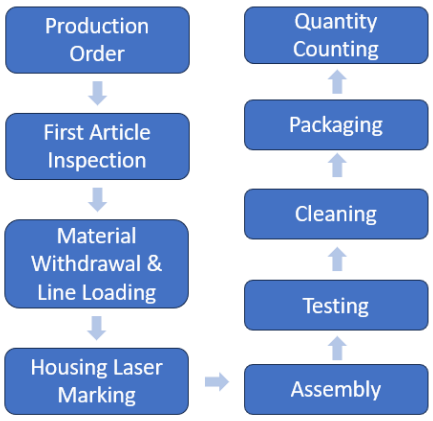
Among them, aside from differences in housing color, beam angle, and color temperature, the eight spotlight types are identical in all other respects.

The 8 types of smartLED are the spotlight for ceiling systems. They feature a unique magnetic attachment for easy and quick fixing to the grid ceiling system. These products are widely used for commercial lighting in large shopping malls and similar venues.

The characteristics of the products are show in the table below:

Types	Rated Power (W)	Operating Power (W)	Housing Color	Beam Angle	Color Temperature	Yield (Pcs)	Service life
222 3930 2201	23	20.39	White	22°	3000K	2000	50000
222 3930 2203	23	20.39	Black	22°	3000K	792	
222 3930 3801	23	20.39	White	38°	3000K	1300	
222 3930 3803	23	20.39	Black	38°	3000K	1000	
222 3935 2201	23	20.39	White	22°	3500K	1000	
222 3935 2203	23	20.39	Black	22°	3500K	220	
222 3935 3801	23	20.39	White	38°	3500K	1994	
222 3935 3803	23	20.39	Black	38°	3500K	1000	

The manufacturing process of the products:



Name and location of production site(s):
ZHONGSHAN MINKWONG ELECTRICAL COMPANY LIMITED
NO.2 North Lane 6, Middle FuLe Road, LianFeng Industrial Zone Xiaolan Taown, Zhongshan City, Guangdong, China.

Name of manufacturer(s), if different from the EPD owner:
ZHONGSHAN MINKWONG ELECTRICAL COMPANY LIMITED

For more information, please contact website: https://www.caleidoscope.se

CONTENT DECLARATION

The mass (weight) of the product:

Models	Product weight (kg)	Packaging weight (kg)
222 3930 2201	0.49	0.16
222 3930 2203	0.49	0.16
222 3930 3801	0.49	0.16
222 3930 3803	0.49	0.16
222 3935 2201	0.49	0.16
222 3935 2203	0.49	0.16
222 3935 3801	0.49	0.16
222 3935 3803	0.49	0.16

Content of the product:

Product component	222 3930 2201	222 3930 2203	222 3930 3801	222 3930 3803	222 3935 2201	222 3935 2203	222 3935 3801	222 3935 3803
Plastics	3.1600E-02	3.1600E-02	3.1600E-02	3.1600E-02	3.1600E-02	3.1600E-02	3.1600E-02	3.1600E-02
Iron / steel	6.9440E-02	6.9440E-02	6.9440E-02	6.9440E-02	6.9440E-02	6.9440E-02	6.9440E-02	6.9440E-02
Brass	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03
Aluminium	1.1000E-02	1.1000E-02	1.1000E-02	1.1000E-02	1.1000E-02	1.1000E-02	1.1000E-02	1.1000E-02
Recycled aluminium alloy	2.5900E-01	2.5900E-01	2.5900E-01	2.5900E-01	2.5900E-01	2.5900E-01	2.5900E-01	2.5900E-01
COB LED	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03	1.0000E-03
Cable	9.6000E-02	9.6000E-02	9.6000E-02	9.6000E-02	9.6000E-02	9.6000E-02	9.6000E-02	9.6000E-02
Electronic component	5.0000E-03	5.0000E-03	5.0000E-03	5.0000E-03	5.0000E-03	5.0000E-03	5.0000E-03	5.0000E-03
Magnet	1.2000E-02	1.2000E-02	1.2000E-02	1.2000E-02	1.2000E-02	1.2000E-02	1.2000E-02	1.2000E-02
GF	3.0000E-03	3.0000E-03	3.0000E-03	3.0000E-03	3.0000E-03	3.0000E-03	3.0000E-03	3.0000E-03
Total	4.8904E-01	4.8904E-01	4.8904E-01	4.8904E-01	4.8904E-01	4.8904E-01	4.8904E-01	4.8904E-01
Packaging materials	**222 3930 2201**	**222 3930 2203**	**222 3930 3801**	**222 3930 3803**	**222 3935 2201**	**222 3935 2203**	**222 3935 3801**	**222 3935 3803**
PP	1.1111E-03	1.1111E-03	1.1111E-03	1.1111E-03	1.1111E-03	1.1111E-03	1.1111E-03	1.1111E-03
Paper	1.6667E-03	1.6667E-03	1.6667E-03	1.6667E-03	1.6667E-03	1.6667E-03	1.6667E-03	1.6667E-03
Corrugated board	1.5833E-01	1.5833E-01	1.5833E-01	1.5833E-01	1.5833E-01	1.5833E-01	1.5833E-01	1.5833E-01
Total	1.6111E-01	1.6111E-01	1.6111E-01	1.6111E-01	1.6111E-01	1.6111E-01	1.6111E-01	1.6111E-01

The declared share of biogenic/recycled materials:
In accordance with the PCR, claims for biogenic carbon content are omitted as the biogenic carbon contained in the product is significantly less than 5 % of the total mass. And since the share of biobased materials of packages are unknown, this part of the content declaration is declared as 0% as a conservative estimation.
Certain components of the products incorporate recycled aluminum alloy. Given that all 8 types share an identical composition, the relevant information is shown in the table below.

Product component	Post-consumer recycled material, mass-% of product (%)
Plastics	0.00
Iron / steel	0.00
Brass	0.00
Aluminium	0.00
Recycled aluminium alloy	37.07
COB LED	0.00
Cable	0.00
Electronic component	0.00
Magnet	0.00
GF	0.00
Total	37.07

Information on the environmental and hazardous/toxic properties of a substances contained in the product:

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per product
N/A	N/A	N/A	N/A

LCA INFORMATION

Declared unit:
A piece of smartLED for 50000h of commercial service lighting in large shopping malls and similar venues. The conversion factor to mass from declared unit is 0.4890 kg/p.

Reference service life: 50000 h

Time representativeness: 2024.10.01~2025.09.30

Geographical scope:
The study reflects production (module A1-A3) of the studied product in Zhongshan City, Guangdong Province, China. Distribution (module A4) to, installation (module A5), usage (module B6) and disposal (module C1-C4) in Sweden according to the sales situation.

Database(s) and LCA software used:
Ecoinvent 3.11 (EN15804) Database, Simapro 10.2.0.0 software.
EN 15804 reference package based on EF 3.1 has been used.

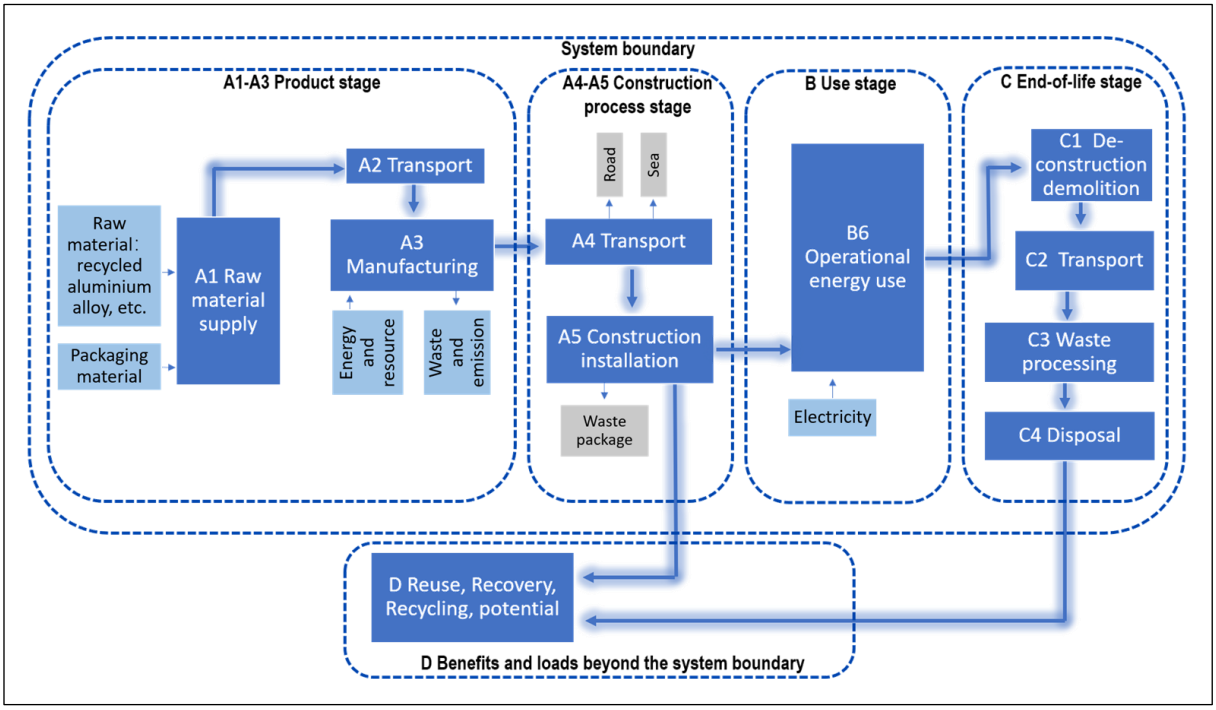
Description of system boundaries:

This study serves for type b), cradle-to-gate with options, modules C1-C4, module D and optional modules, namely A1-A3 + C+ D and additional modules A4-A5 and B6.

No life-cycle stage is omitted. B Use stage only includes module B6 operational energy use, when modules B1 use or application of the installed product, B2 maintenance, B3 repair, B4 replacement, B5 refurbishment and B7 operational water use are omitted, as the product operates in a stable indoor environment and does not require routine maintenance, repair, or cleaning activities after installation. In such cases the irrelevant module shall be declared as "not relevant".

Process flow diagram:

Process flow diagram of the product system, divided into the life-cycle stages and modules (or other division of the product life cycle, if defined in the PCR), showing the main processes included and the system boundary of the LCA. The diagram shall make it clear when the end-of-waste state is reached for main input flows of reused/recycled materials and recovered energy, and for output flows of reused/recycled materials and recovered energy exiting the end-of-life stage.



More information:

Product representativeness:

This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment.

In accordance with the PCR, similar products from a single or several manufacturing sites covered by the same PCR and manufactured by the same company with the same major steps in the core processes may be grouped and thereby included in the same EPD. For the EPDs referring to the LCA report, the option "EPD of multiple products, based on a representative product" is chosen, for the included modules from A to C, per declared environmental performance indicator. For EPD does not claim compliance with ISO 21930, variations above 10% are allowed, if justified in the LCA report and

the EPD declares the variation of each impact indicator results for which the variation is above 10%The LCA report lists all results of different types of products.
For the EPDs referring to the LCA report, the products include 8 different types, all of them are manufactured from same factory with same steps, and the LCA results variation between these thicknesses are below 10%. The product type with the highest production volume, i.e. the LCA result of 222 3930 2201 is chosen to represent all 8 types of products.

Cut-off rules:
In this life cycle assessment, less than 1% of total mass input of A1-A5, B6, C1-C4 and D modules are cut-off, and B1-B5, B7 modules are not relevant, which conforms to EN15804:2012. In addition, the consumption and emissions of roads and plants infrastructure, equipment of each process, personnel and living facilities in the plants were ignored.

Allocation rules:
Manufacturing resource and energy consumption from the manufacturing process are allocated according to theoretical yield of product of production line. The manufacturing emissions and wastes from the manufacturing process are allocated according to the quantity of raw material for the product.
The raw material and packaging material consumption, the transportation of them and manufacturing energy consumption do not involve allocations.

Data quality:
Declaration of sources and share of primary data are as blow (taking 222 3930 2201 as the example as it is the representative product):

Process	Source type	Source	Reference year	Data Category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing-Grid electricity use	Database	Ecoinvent 3.11	2024	Primary Data	0.33%
Transport-Raw material	Database	Ecoinvent 3.11	2024	Primary Data	0.08%
Transport-Manufacturing waste	Database	Ecoinvent 3.11	2024	Primary Data	0.0026%
Manufacturing-Raw material- Recycled aluminium alloy	Database	Ecoinvent 3.11	2024	Secondary Data	0%
Manufacturing-Raw material- Magnet	Database	Ecoinvent 3.11	2024	Secondary Data	0%
Other processes	Database	Ecoinvent 3.11	2024	Secondary Data	0%
Total share of primary data, of GWP-GHG results for A1-A3					0.41%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

The data quality assessment was conducted in compliance with EN 15941. In accordance with EN 15804:2012+A2:2019/AC:2021, the datasets contributing to at least 80% of the absolute impact for each core environmental indicator were analyzed. This EPD covers the reclaimed product smartLED and is based on data collected for the period from October 2024 to September 2025. The system boundaries include transport to and end-of-life treatment in Sweden. Background data was sourced from the Ecovient 3.11 (EN15804) database. The assessment of relevant data performed using the criteria in EN 15804:2012+A2:2019, Annex E, E.1, did not identify any fair, poor or very poor quality data, see results in following table:

Modules	Unit process	Data Category	Geographical Representative-ness	Technical Representative-ness	Time Representative-ness
A1	Recycled aluminium alloy	Secondary data	Good	Good	Good
	Cable	Secondary data	Good	Good	Good
	Magnet	Secondary data	Good	Good	Good
B6	Operational electricity use	Primary data	Very good	Good	Very good

Energy resource:
The data for generation of electricity applied in A1-A3 stage is the China Southern Power Grid Mix, namely Electricity, low voltage {CN-CSG}| market for electricity, low voltage | EN15804, U in the Ecoinvent 3.11 (EN15804) database. The purchased electricity in manufacturing process is from the State Grid, thus, the selection a) and b), namely the specific electricity mix with the Guarantee of Origin and residual mix of the specific electricity supplier is not applicable. Based on PCR, it belongs to c) residual electricity mixes on the market. Its GWP-total impact is 0.602 $kgCO_2eq/kWh$. The reference year of electricity dataset is 2021~2024.
The data for the production of electricity applied in B6 module is Electricity, low voltage {SE}| market for electricity, low voltage | EN15804, U in the Ecoinvent 3.11 (EN15804) database, which is chosen according to Residual electricity mix on the market in the electricity modelling hierarchy of PCR 2019:14 as no specific electricity mix or electricity mix of supplier is applicable. Its GWP-total impact is 0.0434 $kgCO_2eq/kWh$. The reference year of electricity dataset is 2020~2024.

Scenarios:
The products assessed in the present report relate to scenario assumptions.

For the waste packaging in the A5 module, 100 km by truck transport from final client to final disposal site is assumed referring to *Product Environmental Footprint Category Rules Guidance Version 6.3.*

In the C2 module, the end-of-life transport distance of the product is assumed to be 100 km, referring to *Product Environmental Footprint Category Rules Guidance Version 6.3.*

In the C3 module, waste processing including shredding is assumed.

In C4 module, the end-of-life disposal of the product after shredding is assumed to be landfill which follow the default R2 rates and R3 rates from the PEF method specified in PCR 2019:14 Construction

products (version 2.0.1). Among them, incineration is considered with energy recovery according to the PEF method.

Material	R2	R3	Final disposal rate
Aluminium	90.00%	9.87%	0.13%
Steel	93.00%	6.91%	0.09%
Copper	93.00%	6.91%	0.09%
PC	70.00%	29.62%	0.38%
PP	0.00%	98.74%	1.26%
Other waste	0.00%	98.74%	1.26%
Paper	62.00%	37.52%	0.48%
Corrugated board	74.61%	25.07%	0.32%
PCB and electrical component	0.00%	98.74%	1.26%

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

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	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	ND	ND	ND	ND	ND	X	ND	X	X	X	X	X
Geography	CN	CN	CN	SE	SE	-	-	-	-	-	SE	-	SE	SE	SE	SE	SE
Share of primary data	0.41%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

System boundaries (X=included, ND=module not declared)

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

ENVIRONMENTAL PERFORMANCE

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

Mandatory impact category indicators according to EN 15804

Results per declared unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	3.0978E+00	1.7175E-01	2.3263E-02	4.3641E+01	0.0000E+00	6.8361E-02	2.3767E-02	2.1871E-03	-8.8831E-01
GWP-fossil	kg CO_2 eq.	3.0288E+00	1.7164E-01	2.2526E-02	3.9148E+01	0.0000E+00	6.8348E-02	2.3659E-02	3.6258E-04	-8.8736E-01
GWP-biogenic	kg CO_2 eq.	5.7689E-02	3.1419E-05	7.3413E-04	6.8638E-01	0.0000E+00	6.1676E-06	5.8275E-05	1.8243E-03	-3.7413E-06
GWP-luluc	kg CO_2 eq.	1.1314E-02	8.5362E-05	2.4820E-06	3.8070E+00	0.0000E+00	7.5113E-06	4.8999E-05	1.9932E-07	-9.4130E-04
ODP	kg CFC 11 eq.	3.6073E-08	2.6250E-09	3.3772E-10	1.3367E-06	0.0000E+00	1.0246E-09	1.5877E-10	1.9800E-12	-2.5338E-08
AP	mol H^+ eq.	5.1949E-02	3.9293E-03	1.1768E-04	4.5800E-01	0.0000E+00	3.5687E-04	1.3354E-04	1.0141E-06	-3.8773E-03
EP-freshwater	kg P eq.	3.9625E-03	8.2363E-06	4.3247E-07	3.3552E-02	0.0000E+00	1.3086E-06	1.2063E-05	3.7282E-07	-2.5067E-04
EP-marine	kg N eq.	1.4202E-02	1.0001E-03	5.1668E-05	7.1788E-02	0.0000E+00	1.5576E-04	2.4935E-05	1.5202E-05	-6.4702E-04
EP-terrestrial	mol N eq.	5.4244E-02	1.1093E-02	5.6266E-04	7.6337E-01	0.0000E+00	1.7072E-03	2.6746E-04	3.0801E-06	-6.7257E-03
POCP	kg NMVOC eq.	1.6691E-02	3.0729E-03	2.2534E-04	1.9430E-01	0.0000E+00	6.8304E-04	7.5050E-05	1.4445E-06	-2.5586E-03
ADP-minerals&metals*	kg Sb eq.	5.3009E-04	2.7667E-07	1.5053E-08	4.1185E-03	0.0000E+00	4.5648E-08	2.2978E-07	1.5678E-10	-9.0812E-06
ADP-fossil*	MJ	3.8023E+01	2.1852E+00	2.9199E-01	4.8203E+03	0.0000E+00	8.8584E-01	3.1282E-01	1.5670E-03	-1.2818 E+01
WDP*	m^3	1.4355E+00	7.9437E-03	5.5048E-04	1.3097E+02	0.0000E+00	1.9294E-03	5.3376E-03	-3.1435 E-04	-9.6938E-02
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 on these results are high or as there is limited experienced with the indicator.*

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.

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

Additional mandatory and voluntary impact category indicators

Results per declared unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	3.0401E +00	1.7172E -01	2.2529E -02	4.2955E +01	0.0000E +00	6.8355E -02	2.3708E -02	3.6278E -04	-8.8830E-01

Resource use indicators

Results per declared unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	6.6408E +00	2.1525E -02	1.2702E -03	3.0553E +03	0.0000E +00	3.8427E -03	4.5220E -02	1.4741E -04	-9.5843E-01
PERM	MJ	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E+00
PERT	MJ	6.6408E +00	2.1525E -02	1.2702E -03	3.0553E +03	0.0000E +00	3.8427E -03	4.5220E -02	1.4741E -04	-9.5843E-01
PENRE	MJ	3.8079E +01	2.1853E +00	2.9199E -01	4.8203E +03	0.0000E +00	8.8585E -01	3.1283E -01	1.5671E -03	-1.2824 E+01
PENRM	MJ	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E+00
PENRT	MJ	3.8079E +01	2.1853E +00	2.9199E -01	4.8203E +03	0.0000E +00	8.8585E -01	3.1283E -01	1.5671E -03	-1.2824 E+01
SM	kg	3.6633E -01	1.0193E -03	4.2572E -05	8.9095E -01	0.0000E +00	1.2907E -04	8.6196E -05	4.4516E -07	4.0916E-03
RSF	MJ	1.8699E -02	5.2454E -06	3.9567E -07	4.6814E -03	0.0000E +00	1.1982E -06	1.4095E -05	7.5309E -09	1.5653E-03
NRSF	MJ	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E +00	0.0000E+00
FW	m^3	3.5500E -02	1.9473E -04	1.3377E -05	5.1804E +00	0.0000E +00	4.6616E -05	1.4575E -04	-7.2183 E-06	-2.3463E-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 CO_2 is set to zero.

Waste indicators

Results per declared unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5.3367E-01	3.1720E-03	1.5691E-04	4.8837E+00	0.0000E+00	4.7517E-04	2.3584E-03	2.9809E-06	-7.9137E-02
Non-hazardous waste disposed	kg	1.9946E+01	5.2501E-02	4.1606E-03	1.7883E+02	0.0000E+00	8.2582E-03	5.8717E-02	1.2691E-02	-1.3516E+00
Radioactive waste disposed	kg	3.4653E-04	3.2520E-07	2.0498E-08	7.3113E-02	0.0000E+00	6.2000E-08	7.6721E-07	3.4683E-09	-7.1425E-06

Output flow indicators

Results per declared unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Material for recycling	kg	4.6712E-02	1.4581E-03	1.0317E-06	1.1824E+00	0.0000E+00	3.1212E-06	4.9204E-05	5.4874E-08	-8.6541E-04
Materials for energy recovery	kg	1.9179E-05	7.0129E-08	5.4962E-09	6.7023E-05	0.0000E+00	1.6650E-08	3.4928E-08	4.1688E-11	-3.4056E-07
Exported energy, electricity	MJ	1.4592E-02	1.6844E-04	8.3925E-06	1.0446E+02	0.0000E+00	2.5376E-05	3.4767E-04	4.8133E-06	-3.3104E-03
Exported energy, thermal	MJ	1.4877E-02	1.7386E-04	8.4676E-06	1.4694E-01	0.0000E+00	2.5653E-05	1.9415E-05	1.0439E-06	-9.2543E-04

Additional LCA results

According to the PCR 2019:14 Construction products (version 2.0.1), If the recycled material inputs contribute more than 10% to the GWP-GHG results of modules A1-A3, the GWP-GHG intensity of that recycled material shall be declared in the EPD.

Product component	GWP-GHG intensity	Unit
Recycled aluminium alloy	3.9144E+03	$kgCO_2eq/tonne$

In C End-of-life stage, according to the PCR 2019:14 Construction products (version 2.0.1), If any of the declared scenarios is a mix of end-of-life alternatives (reuse, recycling, incineration with energy recovery, landfill, etc.), also the corresponding 100% scenarios (100% reuse, 100% recycling, 100% incineration with energy recovery, 100% landfill, etc.) shall be declared. In other words, the 100% scenario of relevance for the intended market shall be declared. Taking 222 3930 2201 as an example as it is the representative product, the LCA results of 100% scenarios are shown in the following table. Since the LCA results for modules C1 - C3 are identical for this product, the results presented in this table correspond only to module C4 for reference. The results for modules C1 - C3 can be found in Mandatory impact category indicators according to EN 15804 table.

LCA results of C End-of-life stage (module C4)					
LCA result	**Unit**	**Scenario assumptions**	**100% recycling**	**100% incineration with energy recovery**	**100% landfill**
GWP-total	kg CO_2 eq.	2.1871E-03	0.0000E+00	2.3284E-01	1.7525E-01
GWP-fossil	kg CO_2 eq.	3.6258E-04	0.0000E+00	2.3283E-01	3.0588E-02
GWP-biogenic	kg CO_2 eq.	1.8243E-03	0.0000E+00	1.0271E-05	1.4464E-01
GWP-luluc	kg CO_2 eq.	1.9932E-07	0.0000E+00	5.1514E-06	1.6312E-05
ODP	kg CFC 11 eq.	1.9800E-12	0.0000E+00	4.2204E-10	1.7559E-10
AP	mol H^+ eq.	1.0141E-06	0.0000E+00	1.9900E-04	8.5390E-05
EP-freshwater	kg P eq.	3.7282E-07	0.0000E+00	2.3152E-05	2.9634E-05
EP-marine	kg N eq.	1.5202E-05	0.0000E+00	3.9460E-04	1.2350E-03
EP-terrestrial	mol N eq.	3.0801E-06	0.0000E+00	9.6259E-04	2.6478E-04
POCP	kg NMVOC eq.	1.4445E-06	0.0000E+00	2.4855E-04	1.2206E-04
ADP-minerals &metals	kg Sb eq.	1.5678E-10	0.0000E+00	3.6353E-08	1.3669E-08
ADP-fossil	MJ	1.5670E-03	0.0000E+00	2.2276E-01	1.4077E-01
WDP	m^3 world eq. deprived	-3.1435E-04	0.0000E+00	1.5317E-02	-2.8258E-02
GWP-GHG	kg CO_2 eq.	3.6278E-04	0.0000E+00	2.3283E-01	3.0604E-02

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
Environmental Impact Indicators	
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 - LULU	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 (kg 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	
PERRE	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)
PENT	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)
PERRE	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)
PENT	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)
MHW	Non - Hazardous Waste (disposed) (kg)

RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MFR	Materials for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy: Electricity (MJ)
EET	Exported Energy: Thermal (MJ)
Lifecycle Stages / Module	
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
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	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
SE	Sweden
CN	China

REFERENCES

1) ISO 14040:2006 Environmental management — Life cycle assessment —Principles and Framework.
2) ISO 14044:2006 Environmental management — Life cycle assessment — Principles and guidelines.
3) ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
4) EPD International (2024) General Programme Instructions for the International EPD® System. Version 5.0.
5) Zampori, L. and Pant, R., Suggestions for updating the Product Environmental Footprint (PEF) method, EUR 29682 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76- 00654-1, doi:10.2760/424613, JRC115959.
6) Product Environmental Footprint Category Rules Guidance, Version 6.3, May 2018.
7) EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
8) Product category rules (PCR): CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 2.0.1.
9) R2 values available within the PEF Guidance document and supporting documentation (Annex_C_V2.1_May2020): https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

VERSION HISTORY

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