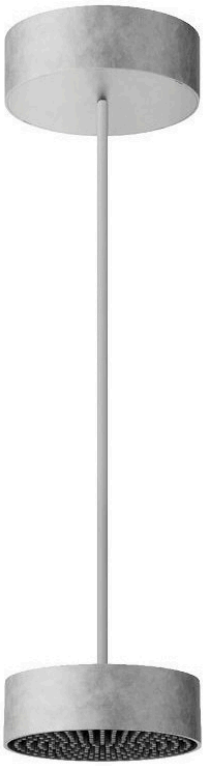
EUKLIDES

MILJØDOKUMENTASJON

ALTO W164 SUSPENDED

W+



Sammendrag fra Euklides og originaldokumentene fra produsent og sertifiseringsorgan, samlet i én fil.

SAMLET 29. OKTOBER 2026
EUKLIDES.NO/PRODUKTER/ALTO-W164-SUSPENDED

Kort fortalt

KLIMAAVTRYKK

48,5 kg CO_2e

Suspended S1
DALI (referanseprodukt)

OM TALLENE

Klimaavtrykket er GWP-total for fasene A1-A3 per stk (GWP-total, EN 15804+A2): råvarer, transport til fabrikken og produksjon, oppgitt i kilo CO_2-ekvivalenter. Tallene gjelder den representative stolen i miljødeklarasjonen. Andre utførelser ligger ifølge deklarasjonen innenfor 10 %.

HVA SOM GJELDER

Sammendraget er laget av Euklides for oversikt. Ved prosjektdokumentasjon og anbud er det originaldokumentene i denne filen som gjelder.

Dokumentene

DOKUMENT	UTSTEDT AV	GYLDIG TIL	SIDE
Miljødeklarasjon (EPD) EPD-IES-0031376	EPD International AB (The International EPD System)	28.04.2031	4

FINN DOKUMENTENE SELV

Miljødeklarasjon (EPD)
wastberg.com/pim/WASTBERG-/05_Ceiling_Suspended_CEILING_SUSPENDED/ALTO_SUSPENDED_W164S2/273c861923d13d20bd840b5cbe75581db7bebedd2329881913a82a9fcc4bb660_WASTBERG-__26_03_ALTO_SUSPENDED_W164S2_164S2120302_EPD-Certificate.pdf

OM PRODUSENTEN

Spørsmål om dokumentasjonen: post@euklides.no



EPD of multiple products, based on a representative product in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

ALTO
W164

from W+

Including multiple products of ALTO collection. Included products are specified on page 4.

Products recently on the market – Results of this EPD shall be used with care as the LCI data is not yet based on 1 year of production which may result in increased uncertainty.

Programme	The International EPD® System www.environdec.com
Programme operator	EPD International AB
EPD Registration number	EPD-IES-0031376:002
Version date	2026-06-02
Validity date	2031-04-28

Wastberg+
T +46 10 16 15 010
info@wastberg.com
wastberg.com

This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment. 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® THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

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

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

Product Category Rules (PCR)
PCR 2019:14 Construction products version 2.0.1, 2025-06-05.
UN CPC code(s): 4653 (Ver. 2.1) Lighting Equipment

PCR eview was conducted by
The Technical Committee of the International EPD® System.
See www.environdec.com for a list of members.

Review Chair: Rob Rouwette (chair), Noa Meron (co-chair).

The review panel may be contacted via support@environdec.com

Life Cycle Assessment (LCA) Accountability
XAL GmbH, Auer-Welsbach-Gasse 36, 8055 Graz, Austria

Individual EPD verification without a pre-verified LCA/EPD tool.
Third-party verifier:

Elisabet Amat Guasch
GREENIZE Projects
eamat@greenize.es

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

☒ Yes ☐ No

Approved by
The International EPD® System
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.



Owner of the EPD
Wastberg+
Box 5085
200 71 Malmö
Sweden

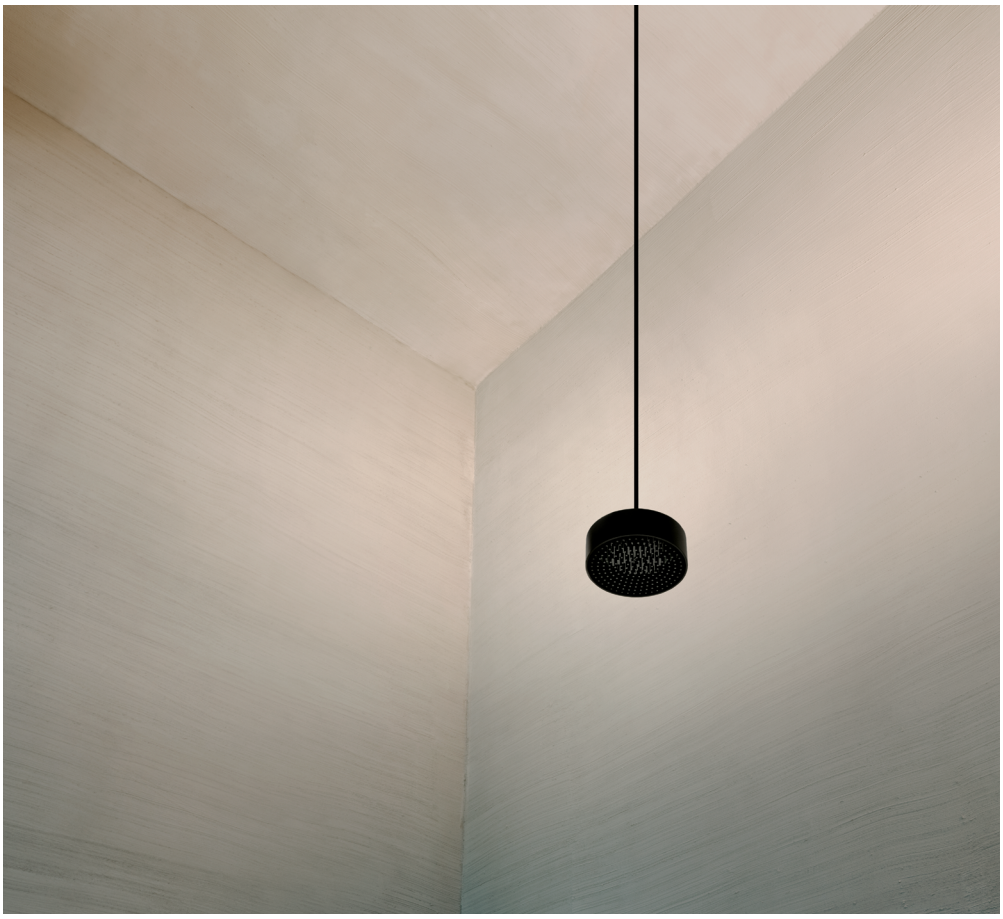
Contact
epd@wastberg.com

Description of the organisation
We create well-being through good light.

Working closely with leading architects and designers, we develop holistic lighting for humans and spaces.

Name and location of production site: The production site is located in Dongguan, Guangdong, China.

More information:
wastberg.com



Product Name
Alto W164

Product Identification
This EPD covers multiple products of the Alto collection:

– Alto Suspended W164S1 (reference product)
– Alto Suspended W164S1R
– Alto Suspended W164S2
– Alto Wall W164W1
– Alto Wall W164W2

All variants are available in the different colors jet black, raw aluminum, and traffic white including the LED-DALI Driver. Scaling factors for all variants can be found in Additional Environmental information section.

This EPD covers multiple variants of the Alto collection:



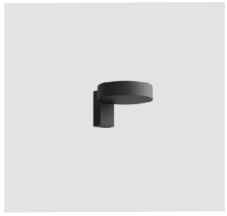
ALTO
SUSPENDED
W164S1



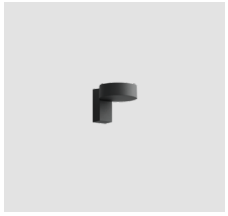
ALTO
SUSPENDED
W164S1R



ALTO
SUSPENDED
W164S2



ALTO
WALL
W164W1



ALTO
WALL
W164W2

DIRECT LIGHT

Drawing on brutalist aesthetics and advanced engineering, Alto pairs strict, bold form with an amazing spread of soft, indirect illumination. The result: calm, atmospheric light that feels both powerful and composed. This family of luminaires offers versatile mounting options and sizes to suit a variety of spaces.

Alto Suspended
Alto S1 and S1R are powerful pendants providing a full 180° spread of indirect light, with advanced heat protection for reliable performance and comfort. Available with two suspension lengths, 1200 mm or 2500 mm, both easy to shorten if needed. Alto S2 is a more compact pendant that brings Alto's characteristic light to smaller spaces, featuring a slightly softer light expression and a smooth, sleek underside. Its standard suspension length is 1200 mm, with 2500 mm available as a special option. Alto S2 is compatible with various drivers; both dimmable and DALI drivers are included in the EPD.

Alto Wall
The wall-mounted versions are designed to provide a more powerful, slightly outward-angled uplight, ideal for larger spaces.

Design: Dirk Winkel

TECHNICAL SPECIFICATIONS	**ALTO** SUSPENDED W164S1	**ALTO** SUSPENDED W164S1R	**ALTO** SUSPENDED W164S2	**ALTO** WALL W164W1	**ALTO** WALL W164W2
Inset power	86 W	86 W	32 W	34 W	17 W
Luminous efficiency	Up to 124 lm/W	Up to 124 lm/W	Up to 112 lm/W	Up to 113 lm/W	Up to 109 lm/W
Colour temperature	2700 K, 3000 K	2700 K, 3000 K	2700 K, 3000 K	2700 K, 3000 K	2700 K, 3000 K
Light control	DALI Push dim	DALI Push dim	DALI Push dim Phase-cut dim	DALI Push dim	DALI Push dim
Physical	Diameter 185 mm Height 1320 mm	Diameter 200 mm Height 1262 mm	Diameter 120 mm Height 1288 mm	Length 230 mm Width 184 mm Height 120 mm	Length 160 mm Width 120 mm Height 105 mm

Technical data was tested in house according to following standards:
EN 13032-1: 2004 +A1: 2012
EN 13032-4: 2015 +A1: 2019
CIE S 025/E: 2015
IES LM-79-19: 2019

UN CPC code(s):
4653 (Ver. 2.1) Lighting Equipment

CONTENT DECLARATION PER DECLARED UNIT

PRODUCT COMPONENTS	WEIGHT, KG	WEIGHT-% (VERSUS TOTAL WEIGHT)	POST-CONSUMER MATERIAL, WEIGHT-%	BIOGENIC MATERIAL, WEIGHT-% / DECLARED UNIT	BIOGENIC MATERIAL, KG C / DECLARED UNIT
Aluminum	1.939	68.19	47.00	0.00	0.00
Steel	0.332	11.66	0.00	0.00	0.00
Glass	0.119	4.17	0.00	0.00	0.00
Polyphenylene ether	0.099	3.47	0.00	0.00	0.00
Polycarbonate	0.093	3.26	0.00	0.00	0.00
Epoxy-Resin	0.069	2.43	0.00	0.00	0.00
Copper	0.038	1.34	0.00	0.00	0.00
Others (<1%)	0.154	5.48	0.00	0.00	0.00
TOTAL	**2.843**	**100.00**	**32.05**	**0.00**	**0.00**

PACKAGING MATERIALS*	WEIGHT, KG	WEIGHT-% (VERSUS THE PRODUCT)	WEIGHT BIOGENIC CARBON, KG C / DECLARED UNIT
Paper	0.247	8.68	0.128
Cardboard	0.707	24.87	0.358
Total	**0.954**	**33.55**	**0.485**

*Disclaimer: The packaging material table includes only product packaging. Transport packaging also included in the LCA.

The products do not contain any REACH and RoHS SVHC substances in amounts greater than 0.1 % (1 000 ppm).

Declared unit
The declared unit is one piece of Alto Suspended W164S1 DALI Push dim, 3000 K. This product has been chosen as the reference due to the highest share of sales. The weight of the product per declared unit is 2.843 kg.

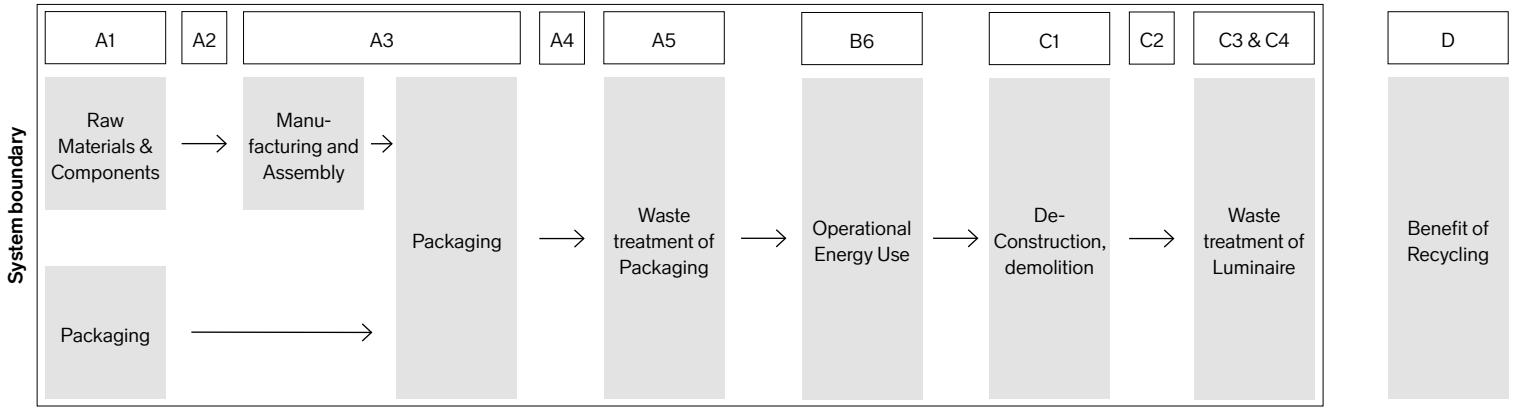
For better comparison with other types of luminaires, conversion factors are also available to convert the results to 1000 lumens during a reference lifetime of 35000 hours. This reference value is proposed by the PEP Category rules (PSR-0014-ed2.0-EN-2023 07 13). The conversion factors are available under "Additional environmental information".

The principles of "Modularity" and "polluter pay" have been followed.

Reference service live
13.1 years
Time representativeness
2025 - 2026*
Database and LCA software used
LCA for Experts 10.9.5.2
System boundaries
Cradle to gate with options, modules C1-C4, module D and with optional modules

*Some primary data (BoM and supplier data) is from a period < 12 months. It will be reviewed once one year of production is effective to confirm that the data is still representative.

System diagram



Allocation
Allocation by sales shares was done to identify the associated quantity of flows that are common for the factory: electricity and Natural gas for general factory needs and packaging, use of packaging materials and packaging waste from delivered components.

Product stage (A1 – A3)
Raw materials are found in the components used for the luminaire production. The raw materials and the necessary process steps have been modelled using LCA for Experts 10.9.5.2. The final assembly of the luminaire is done in Dongguan, China. The waste generated during the manufacturing process was handled in A3 according to the waste allocation method. Finished assembly and transportation to Belgium and from Belgium sales to the world. The corresponding electricity mix and natural gas have been used for manufacturing. Production losses are close to zero and therefore not included in the LCA. Transportation of all the components is incorporated. For the components which are delivered from China, aggregated data has been used, since transportation involved various routes and transport vehicles. It is calculated that 24% are delivered by plane route and 76% are delivered by ship route from Dongguan to Belgium. Packaging for the components has been accounted for using a worst-case approach.
Location based approach has been used for manufacturing stage electricity mix modelling due to a lack of information about the residual supplier or national mix.

Transport to building (A4)
The transport is calculated from Brussel to the capitals of the countries with expected sales shares >4% (Berlin, Vienna, Bern, Stockholm). The product market includes countries all over the world.

Weighted distance	1002 km
Truck used	Class EURO 6, 26-28 t
Fuel type	Diesel (0.00287 l/100 kkm)

Installation into building (A5)
No emissions occur during the installation. This module includes the waste treatment of the packaging.
Packaging waste incl. transport packaging:

Material	Weight (kg)
Cardboard	0.844
Paper	0.256

Operational energy use (B6)
Electricity consumption during the use stage is modelled based on the technical parameters of the luminaires and is representative for a weighted average of the following applications – office (40%), residential (36%), hotel (20%), restaurant (2%), hospital (1%), retail (1%) with an average lifetime of 13.1 years. Geography of the electricity mix is modelled by expected sales shares and is representative for European countries (88% - EU-28) and rest of world countries (12%). For the rest of world countries, an electricity mix for China is used following a worst-case approach.

The energy consumption is calculated using the formula from EN 15193:2007:
Energy consumption [kWh] = {Pa x FCP x FO x (FD x tD + FN x tN) + Pp x ty} x 1/1.000 x a

The results and additional Use Phase Information is presented in the table below:

SCENARIO	**ALTO** SUSPENDED W164S1	**UNIT**
Electricity use (13.1 years)	4311.37	kWh
Active power	39.00	W
Passive power	0.3	W
Total active time	44671.00	hours
Total passive time	70085.00	hours
Light control	DALI Push dim	-

End-of-life stage (C1-C4)
The product is presumed to be decomposed manually; therefore, no emissions should occur in C1. In accordance with PCR 2.0.1, the following transport distances are used for end-of-life waste treatment:

– Waste not destined for incineration: 80 km
– Waste destined for incineration: 130 km

Based on official statistics and literature, waste treatment options are taken into account for Europe and rest of the world countries.

SCENARIO	ALTO SUSPENDED W164S1	UNIT
Collected separately	2.843	kg
Collected with mixed (construction) waste	-	kg
For reuse	-	kg
For recycling	1.245	kg
For energy recovery	0.131	kg
For final disposal	0.562	kg

Module D
According to the guidelines of EN 15804+A2 and the PCR from EPD International, calculations are made for Module D. The loads and benefits result from the export of secondary materials and the energy which comes from incineration and landfilling. In Module D also the benefits from the product packaging waste are included.

SCENARIO	ALTO SUSPENDED W164S1	UNIT
Materials for recycling	2.133	kg
Materials for export of secondary fuels	-	kg
Materials for incineration	0.234	kg

Cut-off rules
Consistent with the PCR, a minimum of 95% of total inflows (mass and energy) are included. In addition, materials and processes with insignificant contributions of less than 1% are also included. For the use and end-of-life stage, scenarios are used, factoring in geographical conditions (such as electricity mix) and applications (waste treatment practices).

The following processes have been excluded:

– Manufacture of equipment used in production, buildings or any other capital goods;
– The transportation of personnel to the plant;
– Transportation of personnel within the plant;
– Research and development activities;
– Long-term emissions.

The following modules have been excluded:

– B1: For the use stage (B1), no energy and material inputs, or emissions are involved.
– B2-B5: During the reference service life no maintenance (B2), repair (B3), replacement (B4) or refurbishment (B5) is expected.
– B7: The use of the product does not require water consumption (B7).

Data quality
This LCA study reflects the production for 2025-2026, while overhead electricity consumption is based on 2025 data. Components are sourced from external suppliers, and their manufacturing processes are modeled using LCA for Experts, applying the most suitable representative geographical conditions and applications. Geographical representativeness is global, mainly China. Since some of the included products are only recently on the market (Alto Suspended W164S2, Alto Wall W164W1, and Alto Wall W164W2), LCI data is not based on a full year of production. Results of this EPD shall be used with care. Besides production data, data quality is very good / good.

Electricity grid
For the manufacturing in Dongguan, China, the corresponding electricity grid mix as stated on the invoice is used: Hard coal (32.2 %), Hydro (22.4 %), Photovoltaic (28.8 %), Wind (9.2%), Nuclear (3.8 %), other RE (3.6%).

ENVIRONMENTAL IMPACT OF THE ELECTRICITY USED IN CN	
CO_2 eq. [kg/kWh]	0.382

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	ND	ND	ND	ND	ND	x	ND	x	x	x	x	x
Geography	GLO	GLO	CN, BEL	GLO	GLO	-	-	-	-	-	GLO	-	GLO	GLO	GLO	GLO	GLO
Share of primary data	25.25%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-71%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acronyms	GLO = Global, CN = China, BEL = Belgium																

Primary data used

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.

Calculation of primary data used for module A1-A3:

PROCESS	SOURCE TYPE	SOURCE	REFERENCE YEAR	DATA CATEGORY	SHARE OF PRIMARY DATA OF GWP-GHG RESULTS FOR A1-A3
Transport of raw materials to manufacturing site	Collected Data	EPD Owner, Suppliers	2025-2026	Primary data	10.71%
Electricity used in manufacturing	Collected Data	EPD Owner	2025-2026	Primary data	14.15%
Others (<10% each)	Collected Data	EPD Owner	2025-2026	Primary data	0.39%
Total share of primary data of GWP-GHG results for A1-A3					25.25%

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. Usage of results from A1-A3 without considering the results of module C is not encouraged.

MANDATORY IMPACT CATEGORY INDICATORS ACCORDING TO EN 15804+A2 (BASED ON EF 3.1)

		Results per declared unit								
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – fossil	kg CO_2 eq.	5.05E+01	4.20E-01	2.08E-02	1.64E+03	0.00E+00	1.66E-02	4.35E-01	9.48E-03	-1.09E+01
GWP – biogenic	kg CO_2 eq.	-2.05E+00	0.00E+00	2.05E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-03
GWP – luluc	kg CO_2 eq.	2.56E-02	4.67E-03	5.01E-05	3.87E+00	0.00E+00	7.27E-05	6.25E-05	1.61E-05	-1.74E-02
GWP – total	**kg CO_2 eq.**	**4.85E+01**	**4.25E-01**	**2.07E+00**	**1.64E+03**	**0.00E+00**	**1.67E-02**	**4.35E-01**	**9.49E-03**	**-1.09E+01**
ODP	kg CFC 11 eq.	1.27E-08	2.09E-13	7.07E-14	1.24E-07	0.00E+00	3.49E-15	8.75E-13	3.81E-14	-1.75E-10
AP	mol H+ eq.	2.78E-01	6.12E-04	9.52E-05	4.36E+00	0.00E+00	2.64E-05	1.63E-04	6.48E-05	-4.06E-02
EP – freshwater	kg P eq.	3.28E-04	8.43E-07	8.95E-07	1.78E-03	0.00E+00	4.33E-08	5.36E-08	1.39E-08	-1.53E-06
EP – marine	kg N eq.	5.63E-02	2.49E-04	4.45E-05	1.04E+00	0.00E+00	1.07E-05	5.32E-05	1.62E-05	-8.33E-03
EP – terrestrial	mol N eq.	6.14E-01	2.75E-03	3.96E-04	1.20E+01	0.00E+00	1.15E-04	7.42E-04	1.78E-04	-9.13E-02
POCP	kg NMVOC eq.	1.63E-01	5.82E-04	1.36E-04	2.57E+00	0.00E+00	2.33E-05	1.36E-04	4.97E-05	-2.38E-02
ADP – minerals & metals*	kg Sb eq.	1.27E-03	3.61E-08	1.47E-09	3.43E-04	0.00E+00	1.24E-09	6.99E-09	8.83E-10	-8.03E-05
ADP – fossil*	MJ	6.03E+02	5.39E+00	2.82E-01	2.77E+04	0.00E+00	2.21E-01	5.19E-01	1.39E-01	-1.38E+02
WDP*	m^3	1.28E+01	1.47E-03	1.86E-02	3.58E+02	0.00E+00	5.89E-05	5.32E-02	1.08E-03	-1.07E+00

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.

MANDATORY AND VOLUNTARY IMPACT CATEGORY INDICATORS

		Results per declared unit								
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – GHG1	kg CO_2 eq.	5.06E+01	4.25E-01	2.09E-02	1.64E+03	0.00E+00	1.67E-02	4.35E-01	9.49E-03	-1.09E+01
PM	disease inc.	4.44E-06	6.10E-09	7.55E-10	4.29E-05	0.00E+00	2.60E-10	1.76E-09	7.78E-10	-5.84E-07
IRP – HE**	kg U235-eq	1.34E+00	5.40E-04	4.43E-04	5.06E+02	0.00E+00	2.94E-05	6.91E-03	1.79E-04	-3.91E-01
ETP – fw*	CTUe	2.63E+02	4.67E+00	2.12E-01	6.26E+03	0.00E+00	1.89E-01	1.66E-01	8.56E-02	-4.89E+01
HTP – c*	CTUh	1.07E-07	8.34E-11	4.99E-12	4.54E-07	0.00E+00	3.76E-12	1.49E-11	6.81E-12	-6.78E-09
HTP – nc*	CTUh	4.24E-07	3.20E-09	3.32E-10	1.37E-05	0.00E+00	1.97E-10	8.68E-10	6.57E-10	-7.89E-08
SQP	dimensionless	1.91E+02	1.56E+00	6.04E-02	1.06E+04	0.00E+00	5.96E-02	1.88E-01	3.03E-02	2.21E+02

Acronyms: PM = particulate matter emissions. IRP-HE = ionizing radiation potential-human exposure. ETP-fw = ecotoxicity (freshwater). HTP-c = human toxicity potential. cancer effects. HTP-nc = human toxicity potential. non-cancer effects. SQP = land use related impacts.

[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

RESOURCE USE INDICATORS

		Results per declared unit								
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.66E+02	4.22E-01	3.43E-02	1.96E+04	0.00E+00	1.53E-02	3.08E-01	2.26E-02	-3.02E+01
PERM	MJ	1.92E+01	0.00E+00	-1.90E+01	0.00E+00	0.00E+00	0.00E+00	-1.25E-01	0.00E+00	0.00E+00
PERT	MJ	2.85E+02	4.22E-01	-1.90E+01	1.96E+04	0.00E+00	1.53E-02	1.83E-01	2.26E-02	-3.02E+01
PENRE	MJ	6.03E+02	5.39E+00	2.82E-01	2.77E+04	0.00E+00	2.21E-01	1.84E+00	1.39E-01	-1.38E+02
PENRM	MJ	3.25E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.25E+00	0.00E+00	0.00E+00
PENRT	MJ	6.07E+02	5.39E+00	2.82E-01	2.77E+04	0.00E+00	2.21E-01	-1.41E+00	1.39E-01	-1.38E+02
SM	kg	9.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.50E-03
RSF	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
NRSF	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
FW	m^3	3.31E-01	1.60E-04	4.42E-04	1.42E+01	0.00E+00	4.47E-06	1.34E-03	3.22E-05	-5.00E-02

Acronyms: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

WASTE INDICATORS

		Results per declared unit								
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	9.81E-05	3.08E-10	5.13E-11	3.91E-05	0.00E+00	9.34E-12	5.31E-10	2.06E-11	-1.53E-08
Non-hazardous waste disposed	kg	5.52E+00	1.02E-03	8.50E-02	2.28E+01	0.00E+00	4.07E-05	5.29E-02	5.62E-01	-2.58E+00
Radioactive waste disposed	kg	1.13E-02	5.84E-06	3.07E-06	3.37E+00	0.00E+00	2.33E-07	4.78E-05	1.49E-06	-4.14E-03

OUTPUT FLOW INDICATORS

		Results per declared unit								
Indicator	**Unit**	**A1 – A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+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	8.06E-01	0.00E+00	8.88E-01	0.00E+00	0.00E+00	0.00E+00	1.25E+00	0.00E+00	0.00E+00
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
Exported energy. electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.57E-01	0.00E+00	2.20E-01
Exported energy. thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E+00	0.00E+00	3.99E-01

Additional LCA results
Results for additional scenarios for End-of-Life modules.
Mandatory impact category indicators according to EN 15804 + A2 (based on EF 3.1)

		100% RECYCLING			**100% INCINERATION**			**100% LANDFILL**		
Indicator	**Unit**	**C2**	**C3**	**C4**	**C2**	**C3**	**C4**	**C2**	**C3**	**C4**
GWP – fossil	kg CO_2 eq.	1.59E-02	3.12E-01	0.00E+00	2.59E-02	1.06E+00	0.00E+00	1.59E-02	0.00E+00	3.81E-02
GWP – biogenic	kg CO_2 eq.	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
GWP – luluc	kg CO_2 eq.	6.97E-05	2.21E-04	0.00E+00	1.13E-04	-2.97E-05	0.00E+00	6.97E-05	0.00E+00	5.88E-05
GWP – total	kg CO_2 eq.	1.60E-02	3.12E-01	0.00E+00	2.60E-02	1.06E+00	0.00E+00	1.60E-02	0.00E+00	3.82E-02
GWP-GHG	kg CFC 11 eq.	1.60E-02	3.12E-01	0.00E+00	2.60E-02	1.06E+00	0.00E+00	1.60E-02	0.00E+00	3.82E-02
ODP	kg CFC 11 eq.	3.35E-15	1.40E-11	0.00E+00	5.44E-15	-4.09E-12	0.00E+00	3.35E-15	0.00E+00	2.04E-13
AP	mol H+ eq.	2.53E-05	3.54E-04	0.00E+00	4.12E-05	4.45E-04	0.00E+00	2.53E-05	0.00E+00	2.49E-04
EP – freshwater	kg P eq.	4.16E-08	6.16E-07	0.00E+00	6.76E-08	-1.96E-07	0.00E+00	4.16E-08	0.00E+00	2.26E-06
EP – marine	kg N eq.	1.02E-05	1.28E-04	0.00E+00	1.66E-05	1.86E-04	0.00E+00	1.02E-05	0.00E+00	6.06E-05
EP – terrestrial	mol N eq.	1.11E-04	1.49E-03	0.00E+00	1.80E-04	2.37E-03	0.00E+00	1.11E-04	0.00E+00	6.65E-04
POCP	kg NMVOC eq.	2.24E-05	3.19E-04	0.00E+00	3.63E-05	4.81E-04	0.00E+00	2.24E-05	0.00E+00	1.87E-04
ADP – minerals & metals*	kg Sb eq.	1.19E-09	2.61E-08	0.00E+00	1.93E-09	-2.54E-08	0.00E+00	1.19E-09	0.00E+00	3.21E-09
ADP – fossil*	MJ	2.12E-01	1.51E+00	0.00E+00	3.45E-01	2.26E+00	0.00E+00	2.12E-01	0.00E+00	5.98E-01
WDP*	m^3	5.65E-05	6.48E-02	0.00E+00	9.19E-05	2.84E-01	0.00E+00	5.65E-05	0.00E+00	4.48E-03

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.

Scaling factors for other variants

The different variants of Alto W164 are very similar but show some differences in their construction. Those differences have been accounted for in the LCA. The results of the GWP-GHG above can be scaled to the corresponding variants with the following conversion factors:

VARIANT	DRIVER USED	CABLE LENGTH (m)	A1 – A3	A4	A5	B6	C1-C4	D
ALTO SUSPENDED W164S1	DALI Push dim	1.2	1.00	1.00	1.00	1.00	1.00	1.00
ALTO SUSPENDED W164S1	DALI Push dim	2.5	1.06	1.09	1.22	1.00	1.02	1.09
ALTO SUSPENDED W164S1R	DALI Push dim	1.2	0.92	0.92	1.06	1.00	0.97	0.78
ALTO SUSPENDED W164S1R	DALI Push dim	2.5	0.97	1.01	1.28	1.00	1.00	0.87
ALTO SUSPENDED W164S2	DALI Push dim	1.2	0.47	0.49	0.71	0.39	0.31	0.35
ALTO SUSPENDED W164S2	Phase-cut dim	1.2	0.45	0.48	0.71	0.39	0.29	0.35
ALTO WALL W164W1	DALI Push dim	/	0.41	0.51	0.79	0.41	0.30	0.30
ALTO WALL W164W2	DALI Push dim	/	0.29	0.28	0.40	0.22	0.22	0.18

The maximum scaling factor of -71% for the A1-A3 stages is primarily attributed to the weight of the lightest product, Alto Wall W164W2, being only 23% of the reference product's weight, combined with a 3.6-fold difference in LED driver weight. These directly correlates with the significant variation in resource use and emissions, aligning with ISO 14025 requirements for reporting product family variability.

Results for 1000 lumens during a reference life of 35000 hours (As per reference of PEP-ECO Passport PSR-0014-ed2.0-EN-2023 07 13).

A conversion factor can be used for converting the results to 1000 lumens during a reference life of 35000 hours.

VARIANT	CCT	A1-A3	A4	A5	B6	C1-C4	D
ALTO SUSPENDED W164S1	2700K	0.09	0.09	0.09	0.07	0.09	0.09
ALTO SUSPENDED W164S1	3000K	0.08	0.08	0.08	0.07	0.08	0.08
ALTO SUSPENDED W164S1R	2700K	0.09	0.09	0.09	0.07	0.09	0.09
ALTO SUSPENDED W164S1R	3000K	0.08	0.08	0.08	0.07	0.08	0.08
ALTO SUSPENDED W164S2	2700K	0.25	0.25	0.25	0.21	0.25	0.25
ALTO SUSPENDED W164S2	3000K	0.24	0.24	0.24	0.21	0.24	0.24
ALTO WALL W164W1	2700K	0.23	0.23	0.23	0.20	0.23	0.23
ALTO WALL W164W1	3000K	0.23	0.23	0.23	0.19	0.23	0.23
ALTO WALL W164W2	2700K	0.48	0.48	0.48	0.41	0.48	0.48
ALTO WALL W164W2	3000K	0.46	0.46	0.46	0.39	0.46	0.46

Information related to the sectorial EPD

This EPD is not sectoral.

Version History

1st version published 2026-04-29

2nd version published 2026-06-02

– Editorial update only

ADPE – Abiotic depletion potential non-fossil resources
ADPF – Abiotic depletion potential fossil resources
AP – Acidification potential, accumulated exceedance
AUT – Austria
CB – Certification Body
CRU – Components for re-use
d/i – direct / indirect
DALI – Digital Adressable Lighting Interface
EEE – Exported electrical energy
EET – Exported thermal energy
EPD – Environmental Product Declaration
EP-freshwater – Eutrophication potential freshwater
EP-marine – Eutrophication potential marine
EP-terrestrial – Eutrophication potential terrestrial
ETP-fw – Eco toxicity freshwater
FW – Net use of fresh water
GLO – Global
GWP-biogenic – Global warming potential biogenic
GWP-fossil – Global warming potential fossil fuels
GWP-GHG – Global warming potential
GWP-luluc – Global warming potential land use and land use change
GWP-total – Global warming potential total
HTTP-c – Human toxicity, cancer effect
HTTP-nc – Human toxicity, non-cancer effects
HWD – Hazardous waste disposed
IRP – Ionizing radiation, human health
LCA – Life Cycle Assessment
MER – Materials for energy recovery
MFR – Materials for recycling
NHWD – Non–harzardous waste disposed
NRSF – Use of non–renewable secondary fuels
ODP – Depletion potential of the stratospheric ozone layer
PCR – Product Category Rules
PENRE – Use of non renewable primary energy as energy carrier
PENRM – Use of non renewable primary energy resources used as raw materials
PENRT – Total use of non renewable primary energy resource
PERE – Use of renewable primary energy as energy carrier
PERM – Use of renewable primary energy resources used as raw materials
PERT – Total use of renewable primary energy
PM – Particulate matter emissions
PMMA – Polymethylmetacrylate
POCP – Photochemical ozone creation potential
PSR – Product Specific Rules
RE – Renewable Energy
RSF – Use of renewable secondary fuels
RWD – Radioactive waste disposed
SLO – Slovenia
SM – Use of secondary material
SQP – Land use related impacts/Soil quality
UN CPC – United Nations Central Product Classification
WDP – Water (user) deprivation potential

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