

Environmental Product Declaration



SPM Lighting
Volo Series

According to
ISO 21930
ISO 14025



1. General Information

Manufacturer Name:	SPM Lighting Inc. 2526 Qume Drive, Unit 17 San Jose, CA 95131 U.S.A
Program Operator:	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959, USA
Declaration Number:	EPD 752
Reference PCR:	ISO 21930: 2017 with guidance from PEP ecopassport® Program - Specific Rules for Luminaires PSR-0014-ed2-EN-2023 07 13”
Date of Issuance:	August 7, 2024
End of Validity:	August 7, 2029
Product Name:	VOLO series LED light
EPD Owner:	SPM
Declared Unit:	“One four-foot unit of SPM’s Volo Series luminaire and one eight-foot unit of SPM’s Volo Series luminaire”.
EPD Scope:	Cradle-to-gate (A1, A2, and A3)
Verification:	ISO 21930 serves as the core PCR. Independent verification of the declaration according to ISO 14025 and ISO 21930. <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
LCA Reviewer and EPD Verifier:	Timothy S. Brooke ASTM International 

2. Product Information

2.1 Company Description

SPM Lighting designs and manufactures high quality and innovative LED lighting systems for commercial, retail, and industrial applications.

2.2 Product Description

A luminaire as described in the functional unit consists of the following elements: a structure, a power supply equipment system, a light source (lamp), and if applicable a lighting management system. The specific luminaire in this EPD is called a SPM VOLO series LED light and is shown in Figure 1.



Figure 1: Visual representation of lighting product.

The product studied meets the following definition (NF EN 60598-1:2015 – Luminaires – Part 1: General requirements and tests.):

“Lighting appliance which distributes, filters or transforms the light emitted by one or more lamps and which includes, [...], all the devices necessary for the bracket, fixing, and protection of the lamps and, if necessary, the auxiliary circuits and the means for connecting them to the power grid.”

The specifications for the product are given in Table 1.

Table 1: Product specifications

Luminaire input power:	44	W/4ft
Luminaire luminous flux (system):	4673	lm/4ft
Luminaire efficacy:	105.77	lm/W
Service Life (hrs) per LM-80-15	L-70	L-90
LED Lumen Maintenance per LM-80	> 60000	> 60000

2.3 Technical Data

Table 2 provides product composition data for the VOLO series LED light – Direct/Indirect declared unit weighing 4.25 kgs.

Table 2: Technical Data

Component	Weight of Component in Four Foot Volo (kgs)	Weight of Component in Eight Foot Volo (kgs)
Extruded Aluminum	4.1	8.2
Cast Aluminum	1.8	1.8
Steel Fasteners	3.9	7.8
Acrylic	0.9	1.8
Wire	.03	.07
Driver	0.37	0.68
LED	.01	.02

2.4 All Stages – Transport

All transportation data was gathered as primary data from the manufacturer. Modes included truck and ocean transport.

3. LCA Calculation Rules

3.1 Declared Unit

The declared unit is: “**One four-foot unit of SPM’s Volo Series luminaire and one eight-foot unit of SPM’s Volo Series luminaire**”.

3.2 System Boundary

The system boundary for this study is limited to a cradle-to-gate focus. (see also Table 4):

- **A1 Raw material supply:** Extraction, handling, and processing of input materials. This includes all upstream processing of the separate lighting components: (structure, light source, etc.)
- **A2 Transportation:** Transportation of all input materials from the suppliers to the gate of the manufacturing facility.
- **A3 Manufacturing:** The assembly processes at SPM’s manufacturing facility. This phase also includes the operations of the manufacturing facility and all process emissions that occur at the production facility.

3.3 Estimates and Assumptions

All significant foreground data was gathered from the manufacturer based on measured values.

3.4 Cut-off Criteria

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.

No material or energy input or output was knowingly excluded from the system boundary.

Additionally, it is noted that EPDs are comparable only if they comply with this document, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of the construction works.

3.5 Background Data and 3.6 Data Quality

Data was gathered for the primary material and energy inputs used in production for calendar year 2023. Table 3 describes each LCI data source for raw materials (A1), transportation (A2) and the core manufacture process (A3). Table 3 also includes a data quality assessment on the basis of the technological, temporal, and geographical representativeness.

Table 3: Secondary Data Sources and Data Quality Assessment

A1: Raw Material Inputs

Inputs	LCI Data Source	Geography	Year	Data Quality Assessment
Extruded and Cast Aluminum	Aluminum Association LCA for Extruded Aluminum and Die Cast Aluminum	USA	2022	Technology: very good Time: good Data is <10 years old Geography: very good
Acrylic	Acrylonitrile-butadiene-styrene copolymer {GLO} market for Alloc Rec, S	Global	2023	Technology: very good Time: good Data is <10 years old Geography: very good
Flex LED Module	Sphera: GLO: LED SMD low-efficiency max 50mA (35mg) without Au 3.2x2.8x1.9	Global	2018	Technology: very good Time: good Data is <10 years old Geography: very good
Driver	Ecoinvent 3.7: Electronics for control units/US- US-EI U, Chemicals inorganic, at plant/GLO US-EI U, Silicone product {RoW} production Cut-off, U. World Steel Association: Cradle to gate excluding	US	2020	Technology: fair Time: very good Data is <5 years old Geography: very good

	end-of-life recycling for 1kg steel product				
	USLCI 2014: Acrylonitrile-butadiene-styrene copolymer, resin, at plant, CTR/kg/RNA				
Driver Box	USLCI 2014: Acrylonitrile-butadiene-styrene copolymer, resin, at plant, CTR/kg/RNA	US	2014	Technology: fair Time: good Data is <10 years old Geography: very good	
Wire	Ecoinvent 3.7: Copper wire, technology mix, consumption mix, at plant, cross section 1 mm ² EU-15 S	US	2020	Technology: fair Time: very good Data is <5 years old Geography: very good	

A2: Transportation

Inputs	LCI Data Source	Geography	Year	Data Quality Assessment
Trucking	USLCI: Transport, single unit truck, short-haul, diesel powered, Northwest/tkm/RNA	Global	2014	Technology: very good Time: good Data is <10 years old Geography: very good
Rail	USLCI: Transport, train, diesel powered/US	Global	2014	Technology: very good Time: good Data is <10 years old Geography: very good

A3: Manufacturing

Energy	LCI Data Source	Geography	Year	Data Quality Assessment
Electricity – LED manufacturing	Ecoinvent 3.7: Electricity, medium voltage {CN} market group for Cut-off, U	China	2018	Technology: very good Time: very good Data is <5 years old Geography: very good
Electricity – Fixture manufacturing	Ecoinvent 3.7: Electricity, medium voltage {US} market group for Cut-off, U	US	2018	Technology: very good Time: very good Data is <5 years old Geography: very good.
Packaging	USLCI: Packaging, corrugated board, mixed fibre, single wall, at plant/US- US-EI U	US	2014	Technology: very good Time: good Data is <10 years old Geography: very good.

3.7 Period under Review

Data was gathered for the primary material and energy inputs used in the production for calendar year 2023.

3.8 Allocation

SPM’s manufacturing facility produces multiple products. Since the primary data for manufacturing was only available on a facility level, the environmental load among the products produced is allocated according to its mass. For waste that is recycled, the ‘recycled content approach’ was chosen. The recycling of waste generated by the product system is cut off.

3.9 Comparability

This LCA was created using industry average data for upstream materials. Data variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency and fuel types used.

4. LCA Results

Life cycle impact assessment (LCIA) is the phase in which the set of results of the inventory analysis – the inventory flow table – is further processed and interpreted in terms of environmental impacts and resource use inventory metrics. Tables 5 and 6 below summarize the LCA results for the cradle-to-gate (A1-A3) product system.

Table 4: Description of the System Boundary (x: included in LCA; mnd: module not declared; mnr: module not reported)

Product			Construction Installation		Use							End-of-Life				Benefits Beyond the System Boundary		
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
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	mnd	mnd	mnd	mnd	mnr	mnr	mnr	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd

Table 5. LCA Results for One Four Foot Volo Series Luminaire

Environmental Indicator	Abbreviation	Units	Total	A1	A2	A3
Core Mandatory Impact Indicator						
Global warming potential	GWP	kg CO ₂ -eq	4.76E+01	4.05E+01	2.27E+00	4.82E+00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11-eq	8.95E-07	3.26E-07	5.28E-07	4.17E-08
Acidification potential of land and water	AP	kg SO ₂ -eq	2.02E-01	1.79E-01	1.19E-02	1.19E-02
Eutrophication potential	EP	kg PO ₄ -eq	1.14E-01	7.82E-02	2.49E-03	3.29E-02
Photochemical ozone creation potential	POCP	kg O ₃ -eq	2.08E+00	1.71E+00	2.13E-01	1.60E-01
Biogenic Carbon Indicators						
Biogenic Carbon Removal for Product	BCRP	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon Emission for Product	BCEP	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon Removal from Packaging	BCRK	kg CO ₂	-2.64E+00	-2.64E+00	0.00E+00	0.00E+00
Biogenic Carbon Emission from Packaging	BCEK	kg CO ₂	2.64E+00	0.00E+00	0.00E+00	2.64E+00
Use of Primary Resources						
Abiotic Depletion Potential for Fossil Resources	ADPF	MJ	5.84E+02	4.92E+02	3.31E+01	5.89E+01
Abiotic Depletion Potential for Non Fossil Resources	ADPE	Kg Sb eq	1.24E-03	1.18E-03	8.83E-06	5.23E-05
Renewable primary energy carrier used as energy	RPRE	MJ	1.84E+02	1.58E+02	4.65E-01	2.54E+01
Renewable primary energy carrier used as material	RPRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable primary energy used as energy	NRPRE	MJ	6.37E+02	5.22E+02	3.58E+01	7.89E+01
Non-renewable primary energy used as material	NRPRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Secondary Material, Secondary Fuel and Recovered Energy						
Use of secondary materials	SM	kg	4.35E+00	4.35E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy	RE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mandatory Inventory Parameters						
Use of freshwater resources	FW	m ³	3.45E+01	3.45E+01	4.83E-03	2.49E-02
Indicators Describing Waste						
Disposed of hazardous waste	HWD	kg	3.63E-06	3.63E-06	0.00E+00	0.00E+00
Disposed of non-hazardous waste	NHWD	kg	6.63E+00	6.63E+00	0.00E+00	0.00E+00

Table 6. LCA Results for One Eight Foot Volo Series Luminaire

Environmental Indicator	Abbreviation	Units	Total	A1	A2	A3
Core Mandatory Impact Indicator						
Global warming potential	GWP	kg CO ₂ -eq	8.20E+01	7.28E+01	4.41E+00	4.82E+00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11-eq	1.59E-06	5.17E-07	1.03E-06	4.17E-08
Acidification potential of land and water	AP	kg SO ₂ -eq	3.48E-01	3.15E-01	2.11E-02	1.19E-02
Eutrophication potential	EP	kg PO ₄ -eq	1.64E-01	1.27E-01	4.77E-03	3.29E-02
Photochemical ozone creation potential	POCP	kg O ₃ -eq	3.55E+00	3.00E+00	3.84E-01	1.60E-01
Biogenic Carbon Indicators						
Biogenic Carbon Removal for Product	BCRP	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon Emission for Product	BCEP	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic Carbon Removal from Packaging	BCRK	kg CO ₂	-5.28E+00	-5.28E+00	0.00E+00	0.00E+00
Biogenic Carbon Emission from Packaging	BCEK	kg CO ₂	5.28E+00	0.00E+00	0.00E+00	5.28E+00
Use of Primary Resources						
Abiotic Depletion Potential for Fossil Resources	ADPF	MJ	1.01E+03	8.88E+02	6.44E+01	5.89E+01
Abiotic Depletion Potential for Non Fossil Resources	ADPE	Kg Sb eq	1.84E-03	1.77E-03	1.76E-05	5.23E-05
Renewable primary energy carrier used as energy	RPRE	MJ	3.13E+02	2.87E+02	8.92E-01	2.54E+01
Renewable primary energy carrier used as material	RPRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable primary energy used as energy	NRPRE	MJ	1.09E+03	9.38E+02	6.97E+01	7.89E+01
Non-renewable primary energy used as material	NRPRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Secondary Material, Secondary Fuel and Recovered Energy						
Use of secondary materials	SM	kg	7.94E+00	7.94E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy	RE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mandatory Inventory Parameters						
Use of freshwater resources	FW	m ³	6.29E+01	6.29E+01	9.46E-03	2.49E-02
Indicators Describing Waste						
Disposed of hazardous waste	HWD	kg	6.63E-06	6.63E-06	0.00E+00	0.00E+00
Disposed of non-hazardous waste	NHWD	kg	1.21E+01	1.21E+01	0.00E+00	0.00E+00

6. References

1. PEP Ecopassport PROGRAM – PSR Specific Rules for Luminaires, PSR-0014-ED1.0-EN-2018 07 18.
2. WAP Sustainability: 2024 - A Cradle-to-Gate Life Cycle Assessment of Luminaires Manufactured by SPM
3. ISO 21930: 2017 Building construction – Sustainability in building construction – Environmental declaration of building products.
4. ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
5. ISO 14044:2006/AMD 1:2017/ AMD 2:2020 - Environmental management - Life cycle assessment - Requirements and guidelines.
6. 14040:2006/AMD 1:2020 - Environmental management - Life cycle assessment - Principles and framework.
7. Life-Cycle Assessment of Energy and Environmental Impacts of LED Lighting Products, Part 2: LED Manufacturing and Performance, May 2012.