

Product Environmental Profile

Independent verification of the declaration and data in compliance with ISO 14025: 2006



SYLVANIA Deltawing family

Registration number	SYLV-00013-V01.01-EN	Drafting rules	PCR—ed4-EN-2021 09 06
Verifier accreditation number	VH44	Supplemented by	PSR-0014-ed2.0-EN-2023 07 13
Date of issue	04-2025	Information and reference documents	www.pep-ecopassport.org
PEP prepared by	Feilo Sylvania International Group Kft.	Validity period	5 years
Independent verification of the declaration and data in compliance with ISO 14025: 2006			
Internal		External	X
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)			
PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500:2022			
The components of the present PEP may not be compared with components from any other program.			
Document complies with ISO 14025: 2006 “Environmental labels and declarations. Type III environmental declarations”			

1 General information

1.1 Product information

The Sylvania Deltawing is a surface mounted luminaire range for extensive use. Its uniform light distribution combined with a slim but robust design makes it the perfect solution for a wide range of applications including circulation areas of educational premises, healthcare applications, office buildings and storage facilities. Suitable for surface, wall, cable wire and suspended mounting. The family boasts with two dimensions, variable lumen output and high performance. Two standard luminous flux level but due to the DIP switch option the flux can be manually set up from 2700 up to 7400lm and up to 135lm/W system efficacy level. The curved-profile fixtures end in polycarbonate caps. The smooth polycarbonate extruded diffuser provides high efficiency, the precision prisms are designed to optimise light output. Deltawing offers non-dimmable, DALI, SylSmart Standalone and integrated Microwave sensed options with corridor function. The integrated Microwave sensor mounted discretely behind the diffuser helps reduce energy costs further. Easy installation with removable diffuser, three terminals for through wiring, luminaires are shipped with surface mounting brackets.

Applicable product standards:

- EN 60598-1
- EN 61347-1, 2-13
- EN 62717
- EN 55015
- EN 61547
- EN 61000-3-2

The function of SYLVANIA Deltawing family with its different series are described below:

- Non dimmable: Without dimming function, only power on and off.
- MW: Integrated with Microwave (MW) sensor, which can detect movement and daylight level.
- DALI(DA): Work with DALI lighting management system.
- SSC: Work with Sylvania wireless lighting management system Sylsmart Standalone (Casambi).

The SYLVANIA Deltawing reference product: 0042938 DELTAWING 1200 4K SSC

belongs to SSC series, which can be connected to Sylvania wireless lighting management system Sylsmart Standalone (Casambi) with a wireless controller.

Its key technological data are listed below:

Table 1: Key technological data for reference product

Information	Unit	
Product code	-	0042938
Light source	-	LED
Power supply	-	External
Colour temperature	K	4000
Protection index for water and dust (IP)	-	44
Impact resistance index (IK)	-	06
Nominal operating voltage	V	220-240V
Declared lifetime of the luminaire (L70B50)	h	100,000
Declaration lifetime of the light source	h	100,000
Useful output flux	lm	4,600
Total power consumption	W	36
Luminous efficiency	lm/W	128
Length	mm	1160
Width/Diameter	mm	160
Height	mm	60
Reference use scenario	-	Logistics & Industry

SYLVANIA Deltawing family are declared with below lifetime:

- L70B50 100,000hrs
- L80B20 80,000hrs

L70B50 100,000hrs is used for LCA analysis.

For industry using scenario 4,000 annual operating hours, resulting in a lifetime of 25 years.

1.2 Overview

The general information used for the PEP are listed below:

Table 2: Basic PEP information

Information	
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours
Reference flow / declared unit*	0.0761 pieces of product
Life cycle stages cover (according to EN15804+A2)	Cradle-to-grave and Module D
Product category according to PSR	Luminaires
Product family name	Sylvania Deltawing
All products of the product family	Table 19 - Table 22
Extrapolation rules	Table 23 - Table 26

* The reference flow is calculated as: $(1,000/\text{outgoing luminous flux of the analyzed product in lumens}) \times (35,000/\text{declared product lifetime of the analyzed product in hours})$

Consequently, the reference flow of the following products corresponds to:

$$(1,000/4,600) \times (35,000/100,000) = 0.0761$$

2 Constituent materials

2.1 Overview

Table 3: Product composition

Information	Weight/product [kg]	Weight/functional unit [kg]	Share [%]
Total weight	3.395	2.58E-01	100.0%
Product	2.654	2.02E-01	78.2%
Packaging	0.742	5.64E-02	21.8%

2.2 Product

Table 4: Material composition - product

Information	Weight/product [kg]	Weight/functional unit [kg]	Share [%]
Total weight	2.654	2.02E-01	100.0%
Metals	1.434	1.09E-01	54.0%
- Steel	1.434	1.09E-01	54.0%
- Aluminium	0.000	0.00E+00	0.0%
Plastics	0.747	5.68E-02	28.1%
- Polycarbonate (PC)	0.704	5.36E-02	26.5%
- Nylon (PA)	0.043	3.27E-03	1.6%
Electronics	0.473	3.60E-02	17.8%

Note: The total weight in this table differs slightly from the total weight of the product due to rounding inaccuracies.

2.3 Packaging

Table 5: Material composition - packaging

Information	Weight/product [kg]	Weight/functional unit [kg]	Share [%]
Total weight	0.742	5.64E-02	100.0%
Paper/cardboard	0.721	5.49E-02	97.2%
Plastics	0.013	9.83E-04	1.7%
Wood	0.007	5.70E-04	1.0%

3 Information on life cycle stages

3.1 Manufacturing (A1-A3)

For the manufacturer sources all parts come from international and Chinese suppliers. Most parts of the product are assembled and tested in Chinese factory, under the quality control of Feilo Sylvania International Group Kft.. The rest parts are assembled in Sylvania European factory.

Metal scrap, plastic, waste carton/paper of the production side are mostly recycled, whereas electronic scrap is 100% incinerated with energy recovery and the waste wood is mostly considered as incinerated and landfilled.

The energy model used in manufacturing is based on Sphera's Managed LCA Content V.10:

CN: Electricity grid mix Sphera and FR: Electricity grid mix

3.2 Distribution (A4)

The main market for the product is Europe. For this reason, an intercontinental and intracontinental transport, following PEP-PCR-ed4-EN-2021 09 06, is considered in the following model:

- 14,450km by ship (heavy fuel oil driven, container ship, 5,000 to 200,000 dwt payload capacity, deep sea)
- 1,950 km by truck (diesel driven, EURO 0-6, >27t payload).

The background assumptions for transportation are listed below.

Table 6: Background information distribution

Information	Unit	Truck	Ship
Fuel type	-	Diesel	Heavy fuel oil
Fuel consumption	l/(kg*km)	2.00E-05	3.24E-06
Total distance	km	1,950	14,450
Capacity utilisation (including empty runs)	%	85	70

3.3 Installation (A5)

The product can easily be installed with hooks or poles and tool free. No energy or material input is required. Packaging waste is treated with reference to chapter 3.5.3.1 of PSR-0014-ed 2.0-2023 07 13.

3.4 Use stage (B1-B7)

During the use stage of the product, the product only consumes electricity (B6). The main market for the product is Europe. Consequently, an average European electricity grid mix (database from Sphera) has been used for the calculations.

According to [PSR-0014-ED2.0-EN- 2023 07 13](#), the theoretical energy saving coefficients for the 3 series of SYLVANIA Deltawing family are:

- Non dimmable: 1
- MW: 0.55

- DALI(DA) : 0.5
- SSC : 0.5

The SYLVANIA Deltawing reference product 0042938 is grouped under SSC series, which can be connected to Sylvania wireless lighting management system Sylsmart Standalone (Casambi). Therefore, the theoretical energy saving coefficient of the reference product is 0.5.

The declared power consumption of the reference product is 36 Watts, and its declared lifetime is 100,000 hours (L70B50).

Combining all these information leads to a total power consumption of 1,800 kWh.

All other modules of the life cycle stage have no environmental impact, since the product has no direct emissions (B1), no maintenance (B2), and no replacement (B4), repair (B3), or refurbishment activities (B5). The luminaire does not consume water during its use (B7).

3.5 End of life (C1-C4)

The product falls under the Waste from Electrical and Electronic Equipment (WEEE) directive 2012/19/EU subcategory 4. EOL model is created referring to chapter 2.5.6 End of life treatment scenarios of PCR-ed4-EN-2021 09 06.

The share of the different end of life pathways are shown below. For the energy consumed in material separation, an average European grid mix has been used.

- Incineration with energy recovery: 28.5%
- Landfilling: 25.9%
- Recycling: 45.6%

3.6 Benefits and loads beyond the system boundaries (D)

Incineration with energy recovery and recycling of the product, packaging, and manufacturing scrap generate environmental benefits by avoiding the production of primary materials or energy. The amount and type of waste streams are listed in Table 7.

Table 7: Material flows for Benefits and loads beyond the system boundaries.

Information	Unit	Value
Total weight going into reuse	kg/functional unit	0.000
Total weight going into recycling	kg/functional unit	0.1494
- Share from product	%	61.6
- Share from packaging	%	30.6
- Share from upstream packaging & manufacturing scrap	%	7.8
Total weight going into incineration with energy recovery	kg/functional unit	0.0668
- Share from product	%	86.2
- Share from packaging	%	8.2
- Share from upstream packaging & manufacturing scrap	%	5.6

4 Environmental impacts

4.1 Introduction

The following table summarizes the key information for the calculation of the environmental impacts:

Table 8: Basic information LCA model

Information	Value
Used LCA software	LCA for Experts 10
Used LCI database	LCA Managed Content Professional 2024.1 + Extension 2024.1
PCR version	PEP-PCR-ED4-EN-2021 09 06
PSR version	PEP-PSR-0014-ED2.0-EN-2023 07 13
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours

4.2 Results per functional unit

The following results of the environmental declaration have been developed by considering an outgoing artificial luminous flux of 1,000 lumens over a reference lifetime of 35,000 hours. The results refer to the core environmental impact indicators and indicators describing resource use, waste categories, and output flows according to EN 15804:2012+A2:2019.

Table 9: Results core environmental impact indicators per functional unit (0.258 kg product incl. packaging)

	Total (Excl.D)	Manufacturing				Distribution	Installation	Use				End of life					Benefits and loads beyond the system boundaries
		A1	A2	A3	Tot. A1-A3			B1-B5	B6	B7	Tot. B1-B7	C1	C2	C3	C4	Tot. C1-C4	
GWP - total [kg CO2 eq.]	4.30E+01	1.37E+00	2.58E-03	6.67E-02	1.44E+00	7.36E-02	4.31E-02	0.00E+00	4.13E+01	0.00E+00	4.13E+01	0.00E+00	1.28E-02	1.29E-01	3.10E-03	1.45E-01	-2.09E-01
GWP - fossil [kg CO2 eq.]	4.27E+01	1.47E+00	2.44E-03	6.28E-02	1.54E+00	7.18E-02	2.57E-02	0.00E+00	4.10E+01	0.00E+00	4.10E+01	0.00E+00	1.21E-02	1.29E-01	3.09E-03	1.44E-01	-2.74E-01
GWP - biogenic [kg CO2 eq.]	2.70E-01	-1.06E-01	1.15E-04	3.79E-03	-1.02E-01	1.54E-03	1.74E-02	0.00E+00	3.52E-01	0.00E+00	3.52E-01	0.00E+00	5.70E-04	3.44E-04	6.05E-06	9.20E-04	6.51E-02
GWP - luluc [kg CO2 eq.]	6.09E-03	8.68E-04	2.25E-05	3.86E-05	9.29E-04	2.96E-04	7.92E-05	0.00E+00	4.66E-03	0.00E+00	4.66E-03	0.00E+00	1.12E-04	7.61E-06	2.76E-06	1.22E-04	-1.47E-04
ODP [kg CFC-11 eq.]	8.68E-10	6.61E-12	3.16E-16	3.55E-13	6.97E-12	6.87E-15	4.84E-14	0.00E+00	8.61E-10	0.00E+00	8.61E-10	0.00E+00	1.57E-15	7.04E-13	5.17E-15	7.10E-13	-5.16E-13
AP [Mole of H+ eq.]	1.40E-01	6.60E-03	2.83E-06	2.21E-04	6.82E-03	8.12E-04	4.59E-05	0.00E+00	1.32E-01	0.00E+00	1.32E-01	0.00E+00	1.41E-05	1.18E-04	9.51E-06	1.41E-04	-6.71E-04
EP - freshwater [kg P eq.]	1.88E-04	9.36E-06	8.89E-09	5.95E-08	9.43E-06	1.26E-07	7.46E-07	0.00E+00	1.77E-04	0.00E+00	1.77E-04	0.00E+00	4.41E-08	1.60E-07	3.90E-07	5.94E-07	-9.85E-07
EP - marine [kg N eq.]	2.44E-02	1.19E-03	9.49E-07	4.83E-05	1.24E-03	3.40E-04	2.11E-05	0.00E+00	2.27E-02	0.00E+00	2.27E-02	0.00E+00	4.72E-06	3.34E-05	2.25E-06	4.04E-05	-1.82E-04
EP - terrestrial [Mole of N eq.]	2.56E-01	1.26E-02	1.12E-05	5.23E-04	1.31E-02	3.73E-03	1.93E-04	0.00E+00	2.39E-01	0.00E+00	2.39E-01	0.00E+00	5.56E-05	3.89E-04	2.48E-05	4.69E-04	-1.91E-03
POCP [kg NMVOC eq.]	6.74E-02	3.67E-03	2.47E-06	1.43E-04	3.82E-03	9.27E-04	4.44E-05	0.00E+00	6.24E-02	0.00E+00	6.24E-02	0.00E+00	1.23E-05	1.16E-04	7.12E-06	1.36E-04	-5.84E-04
ADPE [kg Sb eq.]	2.10E-04	2.02E-04	1.61E-10	3.19E-09	2.02E-04	2.48E-09	1.08E-08	0.00E+00	8.47E-06	0.00E+00	8.47E-06	0.00E+00	8.01E-10	6.77E-09	8.29E-11	7.65E-09	-1.75E-08
ADPF [MJ]	9.02E+02	2.19E+01	3.31E-02	8.60E-01	2.28E+01	9.20E-01	3.49E-01	0.00E+00	8.77E+02	0.00E+00	8.77E+02	0.00E+00	1.64E-01	5.16E-01	4.62E-02	7.27E-01	-2.83E+00
WDP [m³ world equiv.]	8.38E+00	3.00E-01	2.94E-05	2.00E-02	3.20E-01	4.52E-04	1.67E-03	0.00E+00	8.05E+00	0.00E+00	8.05E+00	0.00E+00	1.46E-04	1.17E-02	-4.31E-05	1.18E-02	-9.69E-03

Table 10: Results indicators describing resource use, waste categories, and output flows per functional unit (0.258 kg product incl. packaging)

	Total (Excl.D)	Manufacturing				Distribution	Installation	Use				End of life					Benefits and loads beyond the system boundaries
		A1	A2	A3	Tot. A1-A3			B1-B5	B6	B7	Tot. B1-B7	C1	C2	C3	C4	Tot. C1-C4	
PERE [MJ]	6.08E+02	5.30E+00	2.41E-03	2.28E-01	5.53E+00	3.38E-02	9.29E-02	0.00E+00	6.02E+02	0.00E+00	6.02E+02	0.00E+00	1.20E-02	3.44E-01	4.16E-03	3.60E-01	-1.63E+00
PERM [MJ]	8.32E-01	8.32E-01	0.00E+00	0.00E+00	8.32E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	6.09E+02	6.13E+00	2.41E-03	2.28E-01	6.36E+00	3.38E-02	9.29E-02	0.00E+00	6.02E+02	0.00E+00	6.02E+02	0.00E+00	1.20E-02	3.44E-01	4.16E-03	3.60E-01	-1.63E+00
PENRE [MJ]	9.00E+02	1.99E+01	3.32E-02	8.60E-01	2.08E+01	9.23E-01	3.49E-01	0.00E+00	8.77E+02	0.00E+00	8.77E+02	0.00E+00	1.65E-01	5.16E-01	4.63E-02	7.28E-01	-1.65E+00
PENRM [MJ]	2.13E+00	2.13E+00	0.00E+00	0.00E+00	2.13E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.19E+00
PENRT [MJ]	9.02E+02	2.20E+01	3.32E-02	8.60E-01	2.29E+01	9.23E-01	3.49E-01	0.00E+00	8.77E+02	0.00E+00	8.77E+02	0.00E+00	1.65E-01	5.16E-01	4.63E-02	7.28E-01	-2.84E+00
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.02E-01
RSF [MJ]	3.42E-02	0.00E+00	1.78E-03	0.00E+00	1.78E-03	2.33E-02	2.47E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.83E-03	0.00E+00	0.00E+00	8.83E-03	0.00E+00
NRSF [MJ]	9.81E-01	0.00E+00	2.79E-02	0.00E+00	2.79E-02	8.10E-01	3.87E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-01	0.00E+00	0.00E+00	1.39E-01	0.00E+00
FW [m3]	2.97E-01	3.03E-02	2.64E-06	5.45E-04	3.09E-02	3.75E-05	3.89E-04	0.00E+00	2.66E-01	0.00E+00	2.66E-01	0.00E+00	1.31E-05	4.29E-04	4.79E-07	4.43E-04	-5.49E-04
HWD [kg]	3.10E-08	1.01E-07	1.03E-13	-3.90E-11	1.01E-07	2.88E-12	1.23E-08	0.00E+00	-8.26E-08	0.00E+00	-8.26E-08	0.00E+00	5.11E-13	-5.65E-11	3.87E-12	-5.21E-11	-9.35E-09
NHWD [kg]	9.09E-01	4.26E-02	5.07E-06	2.88E-03	4.55E-02	1.11E-04	5.44E-03	0.00E+00	7.91E-01	0.00E+00	7.91E-01	0.00E+00	2.52E-05	1.46E-02	5.23E-02	6.69E-02	-4.60E-03
RWD [kg]	1.39E-01	5.42E-04	6.22E-08	8.07E-05	6.23E-04	1.39E-06	8.22E-06	0.00E+00	1.38E-01	0.00E+00	1.38E-01	0.00E+00	3.09E-07	3.63E-05	5.44E-07	3.71E-05	-7.12E-05
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [kg]	1.49E-01	5.51E-03	0.00E+00	6.16E-03	1.17E-02	0.00E+00	4.57E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.20E-02	0.00E+00	9.20E-02	0.00E+00
MER [kg]	6.68E-02	0.00E+00	0.00E+00	3.74E-03	3.74E-03	0.00E+00	5.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.75E-02	0.00E+00	5.75E-02	0.00E+00
EEE [MJ]	1.71E-01	8.08E-04	0.00E+00	0.00E+00	8.08E-04	0.00E+00	1.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-01	0.00E+00	1.56E-01	-3.35E-03
EET [MJ]	3.67E-01	1.87E-03	0.00E+00	0.00E+00	1.87E-03	0.00E+00	2.32E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.42E-01	0.00E+00	3.42E-01	-7.76E-03
Biog. C in product [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in packaging [kg]	0.00E+00	-2.39E-02	0.00E+00	0.00E+00	-2.39E-02	0.00E+00	2.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 11: Additional environmental impact indicators per functional unit (0.258 kg product incl. packaging)

	Total (Excl.D)	Manufacturing				Distribution	Installation	Use				End of life					Benefits and loads beyond the system boundaries
		A1	A2	A3	Tot. A1-A3			B1-B5	B6	B7	Tot. B1-B7	C1	C2	C3	C4	Tot. C1-C7	
PM [Disease incidences]	1.28E-06	9.60E-08	2.06E-11	3.01E-09	9.91E-08	2.07E-08	3.88E-10	0.00E+00	1.15E-06	0.00E+00	1.15E-06	0.00E+00	1.03E-10	1.60E-09	9.60E-11	1.80E-09	-9.28E-09
IRP [kBq. U235 eq.]	1.30E+01	6.25E-02	9.27E-06	1.76E-02	8.02E-02	2.04E-04	1.36E-03	0.00E+00	1.29E+01	0.00E+00	1.29E+01	0.00E+00	4.61E-05	3.84E-03	8.05E-05	3.96E-03	-7.54E-03
ETP-fw [CTUe]	2.34E+02	1.44E+01	2.37E-02	1.05E-01	1.45E+01	6.54E-01	4.87E-02	0.00E+00	2.18E+02	0.00E+00	2.18E+02	0.00E+00	1.18E-01	1.70E-01	3.05E-02	3.18E-01	-5.48E-01
HTP-c [CTUh]	1.99E-08	4.35E-09	4.81E-13	1.38E-11	4.36E-09	1.26E-11	5.05E-12	0.00E+00	1.55E-08	0.00E+00	1.55E-08	0.00E+00	2.39E-12	1.73E-11	1.89E-12	2.16E-11	-3.14E-10
HTP-nc [CTUh]	2.41E-07	1.98E-08	2.14E-11	2.31E-10	2.00E-08	4.81E-10	2.56E-10	0.00E+00	2.18E-07	0.00E+00	2.18E-07	0.00E+00	1.06E-10	1.08E-09	1.60E-10	1.35E-09	-1.06E-09
SQP [dimensionsless]	4.16E+02	1.86E+01	1.38E-02	1.02E-01	1.87E+01	1.83E-01	4.96E-01	0.00E+00	3.97E+02	0.00E+00	3.97E+02	0.00E+00	6.87E-02	2.54E-01	4.11E-03	3.27E-01	-8.74E+00

4.3 Results per unit of product

The following results of the environmental declaration have been developed by considering the entire life cycle of one product with the technical properties described in Table 1. The results refer to the core environmental impact indicators and indicators describing resource use, waste categories, and output flows according to EN 15804:2012+A2:2019.

Table 12: Results core environmental impact indicators per unit of product

	Total (Excl.D)	Manufacturing				Distribution	Installation	Use				End of life					Benefits and loads beyond the system boundaries
		A1	A2	A3	Tot. A1-A3			B1-B5	B6	B7	Tot. B1-B7	C1	C2	C3	C4	Tot. C1-C7	
GWP - total [kg CO ₂ eq.]	5.65E+02	1.80E+01	3.39E-02	8.76E-01	1.89E+01	9.68E-01	5.67E-01	0.00E+00	5.43E+02	0.00E+00	5.43E+02	0.00E+00	1.68E-01	1.69E+00	4.07E-02	1.90E+00	-2.75E+00
GWP - fossil [kg CO ₂ eq.]	5.62E+02	1.93E+01	3.21E-02	8.26E-01	2.02E+01	9.43E-01	3.37E-01	0.00E+00	5.38E+02	0.00E+00	5.38E+02	0.00E+00	1.59E-01	1.69E+00	4.06E-02	1.89E+00	-3.60E+00
GWP - biogenic [kg CO ₂ eq.]	3.55E+00	1.39E+00	1.51E-03	4.98E-02	-1.34E+00	2.03E-02	2.29E-01	0.00E+00	4.63E+00	0.00E+00	4.63E+00	0.00E+00	7.49E-03	4.53E-03	7.96E-05	1.21E-02	8.56E-01
GWP - luluc [kg CO ₂ eq.]	8.00E-02	1.14E-02	2.96E-04	5.07E-04	1.22E-02	3.89E-03	1.04E-03	0.00E+00	6.12E-02	0.00E+00	6.12E-02	0.00E+00	1.47E-03	1.00E-04	3.62E-05	1.61E-03	-1.93E-03
ODP [kg CFC-11 eq.]	1.14E-08	8.69E-11	4.16E-15	4.66E-12	9.16E-11	9.03E-14	6.37E-13	0.00E+00	1.13E-08	0.00E+00	1.13E-08	0.00E+00	2.06E-14	9.25E-12	6.79E-14	9.34E-12	-6.78E-12
AP [Mole of H+ eq.]	1.84E+00	8.67E-02	3.72E-05	2.91E-03	8.97E-02	1.07E-02	6.03E-04	0.00E+00	1.74E+00	0.00E+00	1.74E+00	0.00E+00	1.85E-04	1.55E-03	1.25E-04	1.86E-03	-8.82E-03
EP - freshwater [kg P eq.]	2.47E-03	1.23E-04	1.17E-07	7.81E-07	1.24E-04	1.65E-06	9.81E-06	0.00E+00	2.32E-03	0.00E+00	2.32E-03	0.00E+00	5.80E-07	2.10E-06	5.12E-06	7.80E-06	-1.29E-05
EP - marine [kg N eq.]	3.21E-01	1.57E-02	1.25E-05	6.35E-04	1.63E-02	4.47E-03	2.77E-04	0.00E+00	2.99E-01	0.00E+00	2.99E-01	0.00E+00	6.20E-05	4.39E-04	2.96E-05	5.31E-04	-2.39E-03
EP - terrestrial [Mole of N eq.]	3.37E+00	1.66E-01	1.47E-04	6.87E-03	1.73E-01	4.91E-02	2.53E-03	0.00E+00	3.14E+00	0.00E+00	3.14E+00	0.00E+00	7.30E-04	5.11E-03	3.25E-04	6.17E-03	-2.51E-02
POCP [kg NMVOC eq.]	8.85E-01	4.83E-02	3.24E-05	1.89E-03	5.02E-02	1.22E-02	5.83E-04	0.00E+00	8.21E-01	0.00E+00	8.21E-01	0.00E+00	1.61E-04	1.53E-03	9.36E-05	1.79E-03	-7.67E-03
ADPE [kg Sb eq.]	2.76E-03	2.65E-03	2.12E-09	4.20E-08	2.65E-03	3.26E-08	1.42E-07	0.00E+00	1.11E-04	0.00E+00	1.11E-04	0.00E+00	1.05E-08	8.90E-08	1.09E-09	1.01E-07	-2.30E-07
ADPF [MJ]	1.19E+04	2.88E+02	4.35E-01	1.13E+01	3.00E+02	1.21E+01	4.58E+00	0.00E+00	1.15E+04	0.00E+00	1.15E+04	0.00E+00	2.16E+00	6.78E+00	6.08E-01	9.55E+00	-3.72E+01
WDP [m ³ world equiv.]	1.10E+02	3.94E+00	3.86E-04	2.63E-01	4.20E+00	5.94E-03	2.20E-02	0.00E+00	1.06E+02	0.00E+00	1.06E+02	0.00E+00	1.92E-03	1.54E-01	-5.67E-04	1.55E-01	-1.27E-01

Table 13: Results indicators describing resource use, waste categories, and output flows per unit of product.

	Total (Excl.D)	Manufacturing					Distribution	Installation	Use				End of life					Benefits and loads beyond the system boundaries
		A1	A2	A3	Tot. A1-A3	A4			B1-B5	B6	B7	Tot. B1-B7	C1	C2	C3	C4	Tot. C1-C4	
PERE [MJ]	7.99E+03	6.96E+01	3.17E-02	2.99E+00	7.27E+01	4.44E-01	1.22E+00	0.00E+00	0.00E+00	7.91E+03	0.00E+00	7.91E+03	0.00E+00	1.57E-01	4.52E+00	5.47E-02	4.73E+00	-2.15E+01
PERM [MJ]	1.09E+01	1.09E+01	0.00E+00	0.00E+00	1.09E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	8.00E+03	8.06E+01	3.17E-02	2.99E+00	8.36E+01	4.44E-01	1.22E+00	0.00E+00	0.00E+00	7.91E+03	0.00E+00	7.91E+03	0.00E+00	1.57E-01	4.52E+00	5.47E-02	4.73E+00	-2.15E+01
PENRE [MJ]	1.18E+04	2.61E+02	4.37E-01	1.13E+01	2.73E+02	1.21E+01	4.59E+00	0.00E+00	1.15E+04	0.00E+00	1.15E+04	0.00E+00	0.00E+00	2.17E+00	6.78E+00	6.08E-01	9.56E+00	-2.17E+01
PENRM [MJ]	2.80E+01	2.80E+01	0.00E+00	0.00E+00	2.80E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.57E+01
PENRT [MJ]	1.19E+04	2.89E+02	4.37E-01	1.13E+01	3.01E+02	1.21E+01	4.59E+00	0.00E+00	1.15E+04	0.00E+00	1.15E+04	0.00E+00	0.00E+00	2.17E+00	6.78E+00	6.08E-01	9.56E+00	-3.74E+01
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.33E+00
RSF [MJ]	4.50E-01	0.00E+00	2.34E-02	0.00E+00	2.34E-02	3.07E-01	3.25E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E-01	0.00E+00	0.00E+00	1.16E-01	0.00E+00
NRSF [MJ]	1.29E+01	0.00E+00	3.67E-01	0.00E+00	3.67E-01	1.06E+01	5.09E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E+00	0.00E+00	0.00E+00	1.82E+00	0.00E+00
FW [m3]	3.91E+00	3.98E-01	3.47E-05	7.17E-03	4.06E-01	4.92E-04	5.11E-03	0.00E+00	3.49E+00	0.00E+00	3.49E+00	0.00E+00	0.00E+00	1.72E-04	5.64E-03	6.29E-06	5.82E-03	-7.22E-03
HWD [kg]	4.07E-07	1.33E-06	1.35E-12	-5.12E-10	1.33E-06	3.79E-11	1.61E-07	0.00E+00	-1.09E-06	0.00E+00	-1.09E-06	0.00E+00	0.00E+00	6.72E-12	-7.42E-10	5.08E-11	-6.85E-10	-1.23E-07
NHWD [kg]	1.19E+01	5.61E-01	6.66E-05	3.79E-02	5.98E-01	1.46E-03	7.14E-02	0.00E+00	1.04E+01	0.00E+00	1.04E+01	0.00E+00	0.00E+00	3.31E-04	1.92E-01	6.87E-01	8.80E-01	-6.04E-02
RWD [kg]	1.82E+00	7.12E-03	8.17E-07	1.06E-03	8.18E-03	1.83E-05	1.08E-04	0.00E+00	1.81E+00	0.00E+00	1.81E+00	0.00E+00	0.00E+00	4.06E-06	4.77E-04	7.15E-06	4.88E-04	-9.36E-04
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR [kg]	1.96E+00	7.24E-02	0.00E+00	8.10E-02	1.53E-01	0.00E+00	6.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E+00	0.00E+00	1.21E+00	0.00E+00
MER [kg]	8.77E-01	0.00E+00	0.00E+00	4.91E-02	4.91E-02	0.00E+00	7.20E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.56E-01	0.00E+00	7.56E-01	0.00E+00
EEE [MJ]	2.25E+00	1.06E-02	0.00E+00	0.00E+00	1.06E-02	0.00E+00	1.91E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E+00	0.00E+00	2.04E+00	-4.40E-02
EET [MJ]	4.83E+00	2.46E-02	0.00E+00	0.00E+00	2.46E-02	0.00E+00	3.05E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.50E+00	0.00E+00	4.50E+00	-1.02E-01
Biog. C in product [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biog. C in packaging [kg]	0.00E+00	-3.13E-01	0.00E+00	0.00E+00	-3.13E-01	0.00E+00	3.13E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 14: Additional environmental impact indicators per unit of product

	Total (Excl.D)	Manufacturing				Distribution	Installation	Use				End of life					Benefits and loads beyond the system boundaries
		A1	A2	A3	Tot. A1-A3			B1-B5	B6	B7	Tot. B1-B7	C1	C2	C3	C4	Tot. C1-C7	
PM [Disease incidences]	1.68E-05	1.26E-06	2.71E-10	3.95E-08	1.30E-06	2.73E-07	5.09E-09	0.00E+00	1.52E-05	0.00E+00	1.52E-05	0.00E+00	1.35E-09	2.10E-08	1.26E-09	2.36E-08	-1.22E-07
IRP [kBq, U235 eq.]	1.70E+02	8.22E-01	1.22E-04	2.32E-01	1.05E+00	2.68E-03	1.78E-02	0.00E+00	1.69E+02	0.00E+00	1.69E+02	0.00E+00	6.06E-04	5.04E-02	1.06E-03	5.21E-02	-9.92E-02
ETP-fw [CTUe]	3.07E+03	1.89E+02	3.12E-01	1.38E+00	1.91E+02	8.60E+00	6.40E-01	0.00E+00	2.87E+03	0.00E+00	2.87E+03	0.00E+00	1.55E+00	2.23E+00	4.01E-01	4.18E+00	-7.20E+00
HTP-c [CTUh]	2.62E-07	5.72E-08	6.32E-12	1.81E-10	5.74E-08	1.65E-10	6.64E-11	0.00E+00	2.04E-07	0.00E+00	2.04E-07	0.00E+00	3.14E-11	2.28E-10	2.48E-11	2.84E-10	-4.12E-09
HTP-nc [CTUh]	3.16E-06	2.60E-07	2.81E-10	3.03E-09	2.63E-07	6.32E-09	3.36E-09	0.00E+00	2.87E-06	0.00E+00	2.87E-06	0.00E+00	1.40E-09	1.42E-08	2.10E-09	1.77E-08	-1.39E-08
SQP [dimensionless]	5.47E+03	2.44E+02	1.82E-01	1.34E+00	2.45E+02	2.41E+00	6.52E+00	0.00E+00	5.21E+03	0.00E+00	5.21E+03	0.00E+00	9.03E-01	3.34E+00	5.41E-02	4.30E+00	-1.15E+02

4.4 Data comparison

The environmental profile especially for use stage B6 is very sensitive to the region of input electricity which relies on in which country the luminaires are used. Table 16 (per FU) and Table 17 (per product unit) give a comparison for Global Warming Potential GWP total [kg CO₂ eq.] of reference product for use stage B6 with electricity used from different countries of Europe. Table 15 shows the scaling factor for GWP total of energy grid mixes for different countries.

For example:

For the reference model 0042938, Multiple GWP total B6 for EU (4.13E+01/functional unit) with Scaling factor for B6 for Belgium (0.599), The GWP total result for B6 for Belgium (2.47E+01) per functional unit can be worked out.

For other concerned models, first step, need to work out the GWP total of B6 for EU per functional unit or unit of product, based on the extrapolation rules provided in chapter 5 of this report, then by the same way provided above, the GWP total of B6 for different countries can be worked out.

Table 15: Scaling factor of use stage for GWP total of energy grid mixes for different countries

Electricity grid	Scaling Factor for use stage
EU	1.000
AUSTRIA	0.821
BELGIUM	0.599
DENMARK	0.686
FINLAND	0.606
FRANCE	0.250
GERMANY	1.445
HUNGARY	1.131
IRELAND	1.339
ITALY	1.268
NETHERLANDS	1.403
NORWAY	0.126
POLAND	2.771
PORTUGUAL	1.122
ROMANIA	1.489
SPAN	0.972
SWEDEN	0.139
SWITZERLAND	0.390
UK	0.872

Table 16: GWP total [kg CO2 eq.] results for B6 for different country per functional unit (0.258kg product incl. packaging)

Electricity grid	GWP - total [kg CO2 eq.] B6
EU	4.13E+01
AUSTRIA	3.39E+01
BELGIUM	2.47E+01
DENMARK	2.83E+01
FINLAND	2.50E+01
FRANCE	1.03E+01
GERMANY	5.97E+01
HUNGARY	4.67E+01
IRELAND	5.53E+01
ITALY	5.24E+01
NETHERLANDS	5.80E+01
NORWAY	5.21E+00
POLAND	1.14E+02
POTUGAL	4.63E+01
ROMANIA	6.15E+01
SPAIN	4.01E+01
SWEDEN	5.74E+00
SWITZERLAND	1.61E+01
UK	3.60E+01

Note: The result in this table would be slightly different due to rounding inaccuracies.

Table 17: GWP total [kg CO2 eq.] results for B6 for different country per unit of product

Electricity grid	GWP - total [kg CO2 eq.] B6
EU	5.43E+02
AUSTRIA	4.46E+02
BELGIUM	3.25E+02
DENMARK	3.73E+02
FINLAND	3.29E+02
FRANCE	1.36E+02
GERMANY	7.84E+02
HUNGARY	6.14E+02
IRELAND	7.27E+02
ITALY	6.88E+02
NETHERLANDS	7.62E+02
NORWAY	6.85E+01
POLAND	1.50E+03
POTUGAL	6.09E+02
ROMANIA	8.09E+02
SPAIN	5.28E+02
SWEDEN	7.55E+01
SWITZERLAND	2.12E+02
UK	4.73E+02

Note: The result in this table would be slightly different due to rounding inaccuracies.

4.5 Data quality

The underlying LCA model has been developed in Sphera's LCA software LCA for Experts V.10 and with datasets from Sphera's Managed LCA Content. The overall DQR for the representativeness has been calculated as average of the individual ratings according to the PCR respectively the Product Environmental Footprint Guide, version 6.3. Consequently, the overall representativeness is assessed as very good (DQR = 1.74).

The individual rating for technological, time and geographical representativeness is assessed as good, excellent and very good (DQR = 2.06, 1.32 and 1.85).

5 Extrapolation Rules

The extrapolation coefficients in the PEP Eco-passport have been developed according to the valid PCR & PSR. Below shows the key properties of the reference product, with function as extrapolation basis.

Table 18: Reference values for the extrapolations.

Parameter	Unit	Reference value
Weight of structural/ mechanical parts	kg	2.249
Weight of power equipment	kg	0.194
Weight of light source	kg	0.163
Weight of light management system	kg	0.048
Weight of product (excl. packaging)	kg	2.654
Weight of packaging	kg	0.742
Weight of product (incl. packaging)	kg	3.395
Typical power consumption	W	36
Lumen output	lm	4,600
Energy saving	-	0.5

The extrapolation at the level of the functional unit needs to be done according to the following formula:

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

Lumen output of each product variant and other important properties are listed in the tables below.

Table 19: Information for product family: Non dimmable

Product code	Product name	Power (W)	Lighting output (lm)	Luminaire structure weight (kg)	Product packaging weight (kg)	Power equipment weight (kg)	Light source weight (kg)	Light management weight (kg)	Total weight (kg)	Energy saving coefficient
0042916	DELTAWING 1200 3K	35	4200	2.193	0.742	0.088	0.163	0.000	3.185	1
0042918	DELTAWING 1500 3K	55	6850	2.720	0.957	0.100	0.202	0.000	3.979	1
0042930	DELTAWING 1200 4K	35	4600	2.193	0.742	0.088	0.163	0.000	3.185	1
0042932	DELTAWING 1500 4K	55	7400	2.720	0.957	0.100	0.202	0.000	3.979	1

Table 20: Information for product family: MW

Product code	Product name	Power (W)	Lighting output (lm)	Luminaire structure weight (kg)	Product packaging weight (kg)	Power equipment weight (kg)	Light source weight (kg)	Light management weight (kg)	Total weight (kg)	Energy saving coefficient
0042925	DELTAWING 1200 3K MW	35	4200	2.249	0.742	0.172	0.163	0.030	3.355	0.55
0042927	DELTAWING 1500 3K MW	55	6850	2.777	0.957	0.172	0.202	0.030	4.137	0.55
0042939	DELTAWING 1200 4K MW	35	4600	2.249	0.742	0.172	0.163	0.030	3.355	0.55
0042941	DELTAWING 1500 4K MW	55	7400	2.777	0.957	0.172	0.202	0.030	4.137	0.55

Table 21: Information for product family: DALI

Product code	Product name	Power (W)	Lighting output (lm)	Luminaire structure weight (kg)	Product packaging weight (kg)	Power equipment weight (kg)	Light source weight (kg)	Light management weight (kg)	Total weight (kg)	Energy saving coefficient
0042917	DELTAWING 1200 3K DALI	35	4200	2.193	0.742	0.194	0.163	0.000	3.291	0.5
0042919	DELTAWING 1500 3K DALI	55	6850	2.720	0.957	0.199	0.202	0.000	4.078	0.5
0042931	DELTAWING 1200 4K DALI	35	4600	2.193	0.742	0.194	0.163	0.000	3.291	0.5
0042933	DELTAWING 1500 4K DALI	55	7400	2.720	0.957	0.199	0.202	0.000	4.078	0.5

Table 22: Information for product family: SSC

Product code	Product name	Power (W)	Lighting output (lm)	Luminaire structure weight (kg)	Product packaging weight (kg)	Power equipment weight (kg)	Light source weight (kg)	Light management weight (kg)	Total weight (kg)	Energy saving coefficient
0042924	DELTAWING 1200 3K SSC	36	4200	2.249	0.742	0.194	0.163	0.048	3.395	0.5
0042926	DELTAWING 1500 3K SSC	56	6850	2.7766	0.957	0.199	0.202	0.048	4.182	0.5
0042938	DELTAWING 1200 4K SSC	36	4600	2.249	0.742	0.194	0.163	0.048	3.395	0.5
0042940	DELTAWING 1500 4K SSC	56	7400	2.777	0.957	0.199	0.202	0.048	4.182	0.5

The required extrapolation coefficients at the product level are listed in the following tables.

Table 23: Extrapolation coefficients at product level for Non dimmable

Product code	Product name	Power (W)	Lighting output (lm)	Manufacturing stage (A1-A3)	distribution stage (A4)	installation stage (A5)	use stage (B6)	EOL stage (C1 to C4)	Benefits stage (D)
0042916	DELTAWING 1200 3K	35	4200	0.97	0.94	1.00	1.94	0.92	0.97
0042918	DELTAWING 1500 3K	55	6850	1.21	1.17	1.29	3.06	1.14	1.21
0042930	DELTAWING 1200 4K	35	4600	0.97	0.94	1.00	1.94	0.92	0.97
0042932	DELTAWING 1500 4K	55	7400	1.21	1.17	1.29	3.06	1.14	1.21

Table 24: Extrapolation coefficients at product level for MW

Product code	Product name	Power (W)	Lighting output (lm)	Manufacturing stage (A1-A3)	distribution stage (A4)	installation stage (A5)	use stage (B6)	EOL stage (C1 to C4)	Benefits stage (D)
0042925	DELTAWING 1200 3K MW	35	4200	0.99	0.99	1.00	1.07	0.98	0.99
0042927	DELTAWING 1500 3K MW	55	6850	1.23	1.22	1.29	1.68	1.20	1.23
0042939	DELTAWING 1200 4K MW	35	4600	0.99	0.99	1.00	1.07	0.98	0.99
0042941	DELTAWING 1500 4K MW	55	7400	1.23	1.22	1.29	1.68	1.20	1.23

Table 25: Extrapolation coefficients at product level for DALI

Product code	Product name	Power (W)	Lighting output (lm)	Manufacturing stage (A1-A3)	distribution stage (A4)	installation stage (A5)	use stage (B6)	EOL stage (C1 to C4)	Benefits stage (D)
0042917	DELTAWING 1200 3K DALI	35	4200	0.98	0.97	1.00	0.97	0.96	0.98
0042919	DELTAWING 1500 3K DALI	55	6850	1.22	1.20	1.29	1.53	1.18	1.22
0042931	DELTAWING 1200 4K DALI	35	4600	0.98	0.97	1.00	0.97	0.96	0.98
0042933	DELTAWING 1500 4K DALI	55	7400	1.22	1.20	1.29	1.53	1.18	1.22

Table 26: Extrapolation coefficients at product level for SSC

Product code	Product name	Power (W)	Lighting output (lm)	Manufacturing stage (A1-A3)	distribution stage (A4)	installation stage (A5)	use stage (B6)	EOL stage (C1 to C4)	Benefits stage (D)
0042924	DELTAWING 1200 3K SSC	36	4200	1.00	1.00	1.00	1.00	1.00	1.00
0042926	DELTAWING 1500 3K SSC	56	6850	1.23	1.23	1.29	1.56	1.22	1.23
0042938	DELTAWING 1200 4K SSC	36	4600	1.00	1.00	1.00	1.00	1.00	1.00
0042940	DELTAWING 1500 4K SSC	56	7400	1.23	1.23	1.29	1.56	1.22	1.23

DA /DALI Digital Addressable Lighting Interface

MW Microwave

SSC SylSmart connected systems (Casambi)