ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Philips StoreFlow

ST762T

Signify N.V.

EPD HUB
Publishing date 13 September 2023

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Signify N.V.
Address	High Tech Campus 48, 5656 AE Eindhoven, The Netherlands
Contact details	sustainability@signify.com
Website	https://www.signify.com/global

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Lighting
Category of EPD	Pre-verified EPD
Scope of the EPD	Cradle to gate with options, A4-B7, and modules C1-C4, D
EPD author	Sustainability Signify
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☑ Internal certification
EPD verifier	#VERIFIER#

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of lighting products may not be comparable if they do not comply with EN 15804 and if they are not compared in a lighting context.

PRODUCT

Product name	Philips StoreFlow
Additional label	ST762T 49S/PW930 DIA BK
Product reference	910505102415
Place of production	Hungary
Period for data	2022
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass	1.45566 kg
GWP-fossil, A1-A3 (kgCO2e)	1,9E1
GWP-total, A1-A3 (kgCO2e)	1,88E1
Secondary material, inputs (%)	26.1
Secondary material, outputs (%)	45.9
Total energy use, A1-A3 (kWh)	86.3
Total water use, A1-A3 (m3e)	3,78E-1

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Signify is the world leader in lighting for professionals, consumers and lighting for the Internet of Things. Our energy efficient lighting products, systems and services enable our customers to enjoy a superior quality of light, and make people's lives safer and more comfortable, businesses more productive and cities more liveable.

For more information, please visit: https://www.signify.com/global

PRODUCT DESCRIPTION

Philips StoreFlow is designed to provide the optimal light effect for shelf lighting or aisle lighting, so retailers can create an appealing ambience in store. The organic, natural design of the luminaire blends easily into the store environment, while the indirect PerfectAccent optics avoid glare and support a highly energy-efficient lighting installation. StoreFlow shelf lighting is made using bio-based plastics and offers easy serviceability of the LED, driver and optic, resulting in a low carbon footprint and meets the requirements of a Circular product. This high contrast lighting is available with a single-spot head (ST761T) that's ideal for the peripheral areas of the store, or as a double-spot head (ST762T) version, which is perfect for aisle lighting.
Product family: StoreFlow
Type: Double spothead, for 3C/Dali track
Luminous flux: 4900 lm
Light color: PremiumWhite 3000K 90 CRI
Driver: DALI dimming, Interact system ready
Housing color: Black RAL 9004

For more information, please visit
https://www.lighting.philips.com/main/products/storeflow

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	66	EU, China
Minerals	0	Not applicable
Fossil materials	34	EU, China
Bio-based materials	0	Not applicable

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.101

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 unit
Mass per declared unit	1.4557 kg
Functional unit	4900 lumens over 50000 hours
Reference service life	50000 hours

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	MNR	MNR	MNR	MNR	MNR	x	MNR	MNR	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, electricity, and waste formed in the production processes at Signify's manufacturing facilities are included in this stage.

The product is made of metals, plastics, and electronic components. All components are transported to Signify's production facility, where the main manufacturing processes primarily are associated with assembly. The finished product is packaged with polyethylene, cardboard, and/or paper as packaging material before being sent to customers.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation distance is defined according to the PCR. The average distance of transportation from suppliers in Europe to manufacturing sites in Europe and from suppliers in Asia to manufacturing sites in Asia was assumed to be 2000 km by lorry. In the case of intercontinental transportation, a conservative average distance of 20000 km by a container ship (sea) was assumed. The same applies to distances from manufacturing sites to customers. Environmental impacts from installation include waste packaging materials (A5). The impacts of energy consumption and the used ancillary materials during installation are considered negligible.

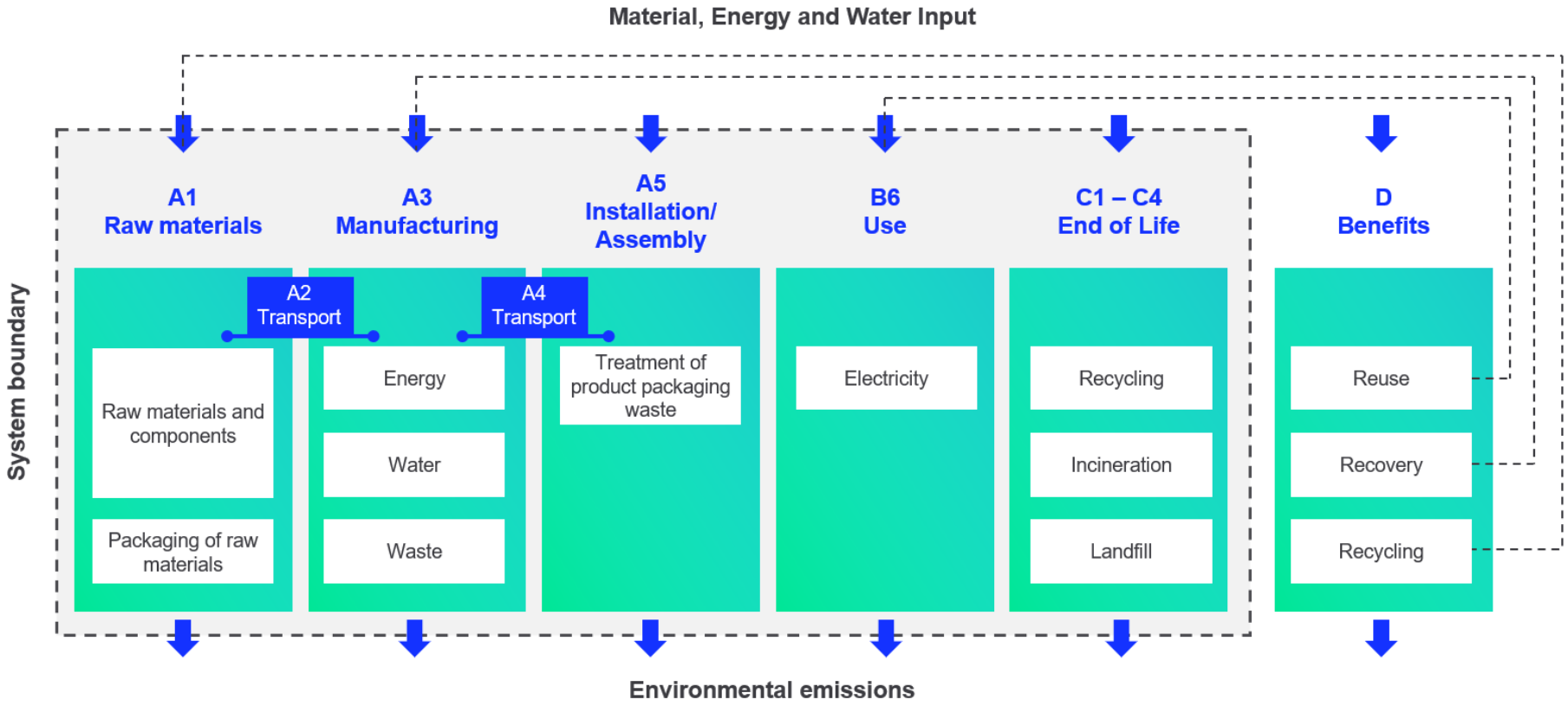
PRODUCT USE AND MAINTENANCE (B1-B7)

During the use phase, the product consumes electricity from Europe's electricity grid mix (B6). Impacts due to electricity production include direct emissions to air, transformation, and transmission losses. The non-functional parts that are replaced are disposed and sent to waste treatment in the same module. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

Consumption of energy and natural resources in demolition process is assumed to be negligible. It is assumed that the waste is collected separately and transported to the waste treatment centre. Transportation distance to treatment is assumed as 150 km and the transportation method is assumed to be lorry (C2). According to EN 50693:2019, the sequence of treatment operations occurring to the product shall include de-pollution, fractions separation and preparation (dismantling, crushing, shredding, sorting), recycling, other material recovery, energy recovery and disposal. In this study, the default values from table G.4 of EN 50693 is used for treating materials in different waste treatment methods. Due to the material and energy recovery potential of parts in the lighting system, the end-of-life product is converted into recycled raw materials, while the energy recovered from incineration displaces electricity and heat production (D). The benefits and loads of incineration and recycling are included in Module D.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, ancillary materials, energy & water consumption, material loss and waste generation at the manufacturing site are attributed to the bill of materials of the products, therefore, they are allocated by partitioning the quantities on the base of the total production in kg throughout the year. Thus, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

This EPD is created with a most conservative scenario in A1-A3 in terms of material composition.

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	Not applicable

This EPD is product and factory specific and does not contain average calculations. It is created with a most conservative scenario in A1-A3 in terms of material composition.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. EcoInvent 3.8 database was used as the source of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,78E1	1,07E0	-8,32E-2	1,88E1	3,17E-1	3,72E-1	MNR	MNR	MNR	MNR	MNR	1,54E3	MNR	0E0	2,38E-2	4,69E-1	2,63E-1	-1,13E1
GWP – fossil	kg CO_2e	1,76E1	1,07E0	2,8E-1	1,9E1	3,2E-1	7,76E-3	MNR	MNR	MNR	MNR	MNR	1,54E3	MNR	0E0	2,38E-2	4,69E-1	2,63E-1	-1,08E1
GWP – biogenic	kg CO_2e	1,92E-5	0E0	-3,65E-1	-3,65E-1	0E0	3,65E-1	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	0E0	0E0	-3,65E-1
GWP – LULUC	kg CO_2e	1,53E-1	2,02E-4	1,57E-3	1,55E-1	1,18E-4	4,52E-6	MNR	MNR	MNR	MNR	MNR	3,6E0	MNR	0E0	8,76E-6	4,35E-5	1,17E-5	-1,01E-1
Ozone depletion pot.	kg CFC_{-11}e	1,34E-6	2,44E-7	3,2E-8	1,62E-6	7,37E-8	4,59E-10	MNR	MNR	MNR	MNR	MNR	7,83E-5	MNR	0E0	5,46E-9	3,18E-9	2,28E-9	-7,98E-7
Acidification potential	mol H^+e	1,52E-1	5,11E-3	1,31E-3	1,58E-1	1,36E-3	2,74E-5	MNR	MNR	MNR	MNR	MNR	8,81E0	MNR	0E0	1,01E-4	3,51E-4	1,2E-4	-1,01E-1
EP-freshwater[2)]	kg Pe	1,78E-3	4,6E-6	1,46E-5	1,8E-3	2,62E-6	1,97E-7	MNR	MNR	MNR	MNR	MNR	1,63E-1	MNR	0E0	1,94E-7	1,5E-6	3,01E-7	-6,43E-4
EP-marine	kg Ne	1,79E-2	1,74E-3	6,48E-4	2,03E-2	4,03E-4	7,55E-6	MNR	MNR	MNR	MNR	MNR	1,17E0	MNR	0E0	2,99E-5	9,7E-5	6,86E-5	-9,81E-3
EP-terrestrial	mol Ne	1,98E-1	1,91E-2	3,89E-3	2,21E-1	4,45E-3	6,89E-5	MNR	MNR	MNR	MNR	MNR	1,33E1	MNR	0E0	3,3E-4	1,06E-3	4,62E-4	-1,15E-1
POCP ("smog")[3)]	kg NMVOCe	6,8E-2	5,32E-3	8,81E-4	7,42E-2	1,42E-3	2,09E-5	MNR	MNR	MNR	MNR	MNR	3,64E0	MNR	0E0	1,05E-4	2,75E-4	1,29E-4	-3,53E-2
ADP-minerals & metals[4)]	kg Sbe	1,77E-3	1,24E-6	1,47E-6	1,77E-3	7,51E-7	9,18E-8	MNR	MNR	MNR	MNR	MNR	1,44E-2	MNR	0E0	5,57E-8	2,18E-6	4,81E-8	-6,83E-4
ADP-fossil resources	MJ	2,53E2	1,53E1	3,66E0	2,72E2	4,81E0	6,01E-2	MNR	MNR	MNR	MNR	MNR	3,28E4	MNR	0E0	3,57E-1	4,25E-1	2,08E-1	-1,44E2
Water use[5)]	m^3e depr.	1,62E1	4,25E-2	1,21E-1	1,64E1	2,15E-2	1,44E-3	MNR	MNR	MNR	MNR	MNR	8,96E2	MNR	0E0	1,6E-3	2,43E-2	1,59E-2	-9,29E0

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,16E-6	5,7E-8	2,34E-8	1,24E-6	3,69E-8	4,58E-10	MNR	MNR	MNR	MNR	MNR	2,89E-5	MNR	0E0	2,74E-9	3,43E-9	1,63E-9	-7,94E-7
Ionizing radiation[6)]	kBq U235e	2,77E0	7,09E-2	1,07E-2	2,85E0	2,29E-2	7,04E-4	MNR	MNR	MNR	MNR	MNR	8,88E2	MNR	0E0	1,7E-3	4,05E-3	9,96E-4	-2,1E0
Ecotoxicity (freshwater)	CTUe	1,08E3	1,07E1	1,19E1	1,1E3	4,33E0	2,4E-1	MNR	MNR	MNR	MNR	MNR	2,23E4	MNR	0E0	3,21E-1	2,16E0	7,95E1	-3,76E2
Human toxicity, cancer	CTUh	4,66E-8	2,06E-10	1,88E-10	4,69E-8	1,06E-10	1,36E-11	MNR	MNR	MNR	MNR	MNR	7,31E-7	MNR	0E0	7,88E-12	7,46E-11	5,25E-10	-3,91E-9
Human tox. non-cancer	CTUh	1,23E-6	1,36E-8	3,49E-9	1,25E-6	4,28E-9	1,58E-10	MNR	MNR	MNR	MNR	MNR	2,4E-5	MNR	0E0	3,18E-10	3,15E-9	3,42E-8	-6,45E-7
SQP[7)]	-	6,43E1	8,67E0	9,61E0	8,26E1	5,54E0	5,05E-2	MNR	MNR	MNR	MNR	MNR	5,93E3	MNR	0E0	4,11E-1	4,72E-1	3,06E-1	-7,09E1

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	4,91E1	1,04E-1	2,5E0	5,17E1	5,42E-2	5,6E-3	MNR	MNR	MNR	MNR	MNR	6,68E3	MNR	0E0	4,02E-3	5,68E-2	8,02E-3	-4,24E1
Renew. PER as material	MJ	2,42E-1	0E0	-4,71E0	-4,47E0	0E0	-3,19E0	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	0E0	0E0	3,12E0
Total use of renew. PER	MJ	4,94E1	1,04E-1	-2,22E0	4,73E1	5,42E-2	-3,18E0	MNR	MNR	MNR	MNR	MNR	6,68E3	MNR	0E0	4,02E-3	5,68E-2	8,02E-3	-3,93E1
Non-re. PER as energy	MJ	2,4E2	1,53E1	3,57E0	2,59E2	4,81E0	6,01E-2	MNR	MNR	MNR	MNR	MNR	3,27E4	MNR	0E0	3,57E-1	4,25E-1	2,08E-1	-1,44E2
Non-re. PER as material	MJ	1,29E1	0E0	9,05E-2	1,3E1	0E0	-5E-2	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	-4,74E0	-4,74E0	-2,99E-2
Total use of non-re. PER	MJ	2,53E2	1,53E1	3,66E0	2,72E2	4,81E0	1,01E-2	MNR	MNR	MNR	MNR	MNR	3,27E4	MNR	0E0	3,57E-1	-4,31E0	-4,53E0	-1,44E2
Secondary materials	kg	1,28E-1	2,26E-3	2,49E-1	3,8E-1	1,34E-3	1,38E-4	MNR	MNR	MNR	MNR	MNR	3,38E0	MNR	0E0	9,91E-5	3,27E-4	1,31E-4	7,16E-1
Renew. secondary fuels	MJ	1,15E-2	2,45E-5	1,77E-2	2,92E-2	1,35E-5	6,34E-7	MNR	MNR	MNR	MNR	MNR	2,74E-2	MNR	0E0	9,99E-7	2,05E-5	4,3E-6	4,06E-3
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	3,74E-1	1,19E-3	2,87E-3	3,78E-1	6,23E-4	3,89E-5	MNR	MNR	MNR	MNR	MNR	2,82E1	MNR	0E0	4,62E-5	8,54E-4	4,12E-4	-2,44E-1

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	3,22E0	1,15E-2	1,39E-2	3,25E0	6,38E-3	6,63E-4	MNR	MNR	MNR	MNR	MNR	1,18E2	MNR	0E0	4,73E-4	2,34E-3	2,12E-2	-1,47E0
Non-hazardous waste	kg	4,44E1	1,83E-1	2,59E-1	4,48E1	1,05E-1	1,38E-2	MNR	MNR	MNR	MNR	MNR	7,45E3	MNR	0E0	7,77E-3	2,55E-1	5,87E-1	-4,25E1
Radioactive waste	kg	9,13E-4	1,07E-4	6,54E-6	1,03E-3	3,22E-5	3,2E-7	MNR	MNR	MNR	MNR	MNR	2,39E-1	MNR	0E0	2,39E-6	1,61E-6	0E0	-7,52E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	2,51E-1	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	6,68E-1	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	0E0	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	7,25E-2	7,25E-2	0E0	0E0	MNR	MNR	MNR	MNR	MNR	0E0	MNR	0E0	0E0	1,51E1	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	1,73E1	1,06E0	2,92E-1	1,87E1	3,17E-1	9,77E-3	MNR	MNR	MNR	MNR	MNR	1,53E3	MNR	0E0	2,35E-2	4,67E-1	2,58E-1	-1,07E1
Ozone depletion Pot.	kg $CFC_{-11}e$	1,19E-6	1,93E-7	2,69E-8	1,41E-6	5,84E-8	3,8E-10	MNR	MNR	MNR	MNR	MNR	6,79E-5	MNR	0E0	4,33E-9	2,67E-9	1,87E-9	-6,68E-7
Acidification	kg SO_2e	1,3E-1	3,88E-3	9,37E-4	1,34E-1	1,05E-3	2,16E-5	MNR	MNR	MNR	MNR	MNR	7,47E0	MNR	0E0	7,81E-5	2,75E-4	8,98E-5	-8,75E-2
Eutrophication	kg PO_4^3e	5,42E-2	8E-4	6,93E-4	5,57E-2	2,4E-4	2,84E-5	MNR	MNR	MNR	MNR	MNR	5,75E0	MNR	0E0	1,78E-5	1,25E-4	1,39E-3	-2,54E-2
POCP (“smog”)	kg C_2H_4e	1,02E-2	1,11E-4	6,2E-5	1,03E-2	4,11E-5	2,55E-6	MNR	MNR	MNR	MNR	MNR	3,05E-1	MNR	0E0	3,05E-6	9,39E-6	7,22E-6	-5,04E-3
ADP-elements	kg Sbe	1,76E-3	1,2E-6	1,24E-6	1,76E-3	7,27E-7	9,11E-8	MNR	MNR	MNR	MNR	MNR	1,44E-2	MNR	0E0	5,39E-8	2,17E-6	4,22E-8	-6,81E-4
ADP-fossil	MJ	2,49E2	1,53E1	3,63E0	2,68E2	4,81E0	6,01E-2	MNR	MNR	MNR	MNR	MNR	3,27E4	MNR	0E0	3,57E-1	4,25E-1	2,08E-1	-1,44E2

APPENDIX (EPD HUB ALIGNED)

This section represents the scaling method for the **B6 module**, following the PEP EcoPassport PSR for luminaries (PSR-0014-ed2.0-EN-2023 07 13). The GWP results were scaled from a refernce variant of a product family, based on various light management scenarios and power inputs of the luminaires within the same product familiy

To calculate the Scaled Impact (*SI*), we have followed the below methods:

1. Calculate the power scaling factor (PSF), which is the ratio of the power input of the variant in questions P_{in} and the power input of the base variant P_{base}.

$$PSF = \frac{P_{in}}{P_{base}}$$

2. Calculate the Total Scaling factor by multiplying the PSF by the control scaling factor (CSF), where the CSF is determined according the relevant control factor scenario (e.g. if the luminaire has a presence detection system). The presented controls factors values in Table A1 are based on BS EN 15193-1:2017. Please refer to this publication or contact Signify directly for more information.

$$TSF = PSF * CSF$$

Table A1 Light management functions (EPD Hub aligned)

Scenario	Abbrev.	CSF
No control	NC	1
Daylight dependency factor	DD	0.75
Presence sensing	PS	0.75
Daylight dependency and presence sensing	DD+PS	0.55

3. Lastly, the GWP of the base variant is then scaled by the TSF.

4. $Scaled\ Impact = GWP_{case} * TSF$

Table A2 Scaled GWP per scaling factor (EPD Hub aligned)

Flux [lm]	Power [W]	Efficacy [lm/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
				NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
6000	46	130	0.62	0.62	n.a.	0.47	n.a.	951.1	n.a.	713.3	n.a.
6000	45.5	132	0.61	0.61	0.46	0.46	0.34	940.7	705.6	705.6	517.4
6000	47.0	128	0.64	0.64	0.48	0.48	0.35	971.8	728.8	728.8	534.5
6300	46.0	137	0.62	0.62	n.a.	0.47	n.a.	951.1	n.a.	713.3	n.a.
6300	45.5	138	0.61	0.61	0.46	0.46	0.34	940.7	705.6	705.6	517.4
6300	47.0	134	0.64	0.64	0.48	0.48	0.35	971.8	728.8	728.8	534.5
5800	44.5	130	0.60	0.60	n.a.	0.45	n.a.	920.1	n.a.	690.1	n.a.
5800	44.0	132	0.59	0.59	0.45	0.45	0.33	909.7	682.3	682.3	500.4
5800	45.5	127	0.61	0.61	0.46	0.46	0.34	940.7	705.6	705.6	517.4
5900	45.0	131	0.61	0.61	n.a.	0.46	n.a.	930.4	n.a.	697.8	n.a.
5900	44	134	0.59	0.59	0.45	0.45	0.33	909.7	682.3	682.3	500.4
5900	45.5	130	0.61	0.61	0.46	0.46	0.34	940.7	705.6	705.6	517.4
5900	44.5	133	0.60	0.60	n.a.	0.45	n.a.	920.1	n.a.	690.1	n.a.
5900	44.0	134	0.59	0.59	0.45	0.45	0.33	909.7	682.3	682.3	500.4
5900	45.5	130	0.61	0.61	0.46	0.46	0.34	940.7	705.6	705.6	517.4
8500	67	127	0.91	0.91	n.a.	0.68	n.a.	1385.3	n.a.	1039.0	n.a.
8500	65	131	0.88	0.88	0.66	0.66	0.48	1343.9	1007.9	1007.9	739.2
8500	67.0	127	0.91	0.91	0.68	0.68	0.50	1385.3	1039.0	1039.0	761.9
9000	68.0	132	0.92	0.92	n.a.	0.69	n.a.	1405.9	n.a.	1054.5	n.a.
9000	66.0	136	0.89	0.89	0.67	0.67	0.49	1364.6	1023.4	1023.4	750.5
9000	68.0	132	0.92	0.92	0.69	0.69	0.51	1405.9	1054.5	1054.5	773.3
8300	67	124	0.91	0.91	n.a.	0.68	n.a.	1385.3	n.a.	1039.0	n.a.
8300	65	128	0.88	0.88	0.66	0.66	0.48	1343.9	1007.9	1007.9	739.2
8300	67.0	124	0.91	0.91	0.68	0.68	0.50	1385.3	1039.0	1039.0	761.9
8700	65.0	134	0.88	0.88	0.66	0.66	0.48	1343.9	1007.9	1007.9	739.2
8700	67.0	130	0.91	0.91	0.68	0.68	0.50	1385.3	1039.0	1039.0	761.9
8800	67	131	0.91	0.91	n.a.	0.68	n.a.	1385.3	n.a.	1039.0	n.a.
8800	65	135	0.88	0.88	0.66	0.66	0.48	1343.9	1007.9	1007.9	739.2
8800	67.0	131	0.91	0.91	0.68	0.68	0.50	1385.3	1039.0	1039.0	761.9
9600	77.0	125	1.04	1.04	n.a.	0.78	n.a.	1592.0	n.a.	1194.0	n.a.
9300	73	127	0.99	0.99	0.74	0.74	0.54	1509.3	1132.0	1132.0	830.1
10200	77	132	1.04	1.04	n.a.	0.78	n.a.	1592.0	n.a.	1194.0	n.a.
9800	73.0	134	0.99	0.99	0.74	0.74	0.54	1509.3	1132.0	1132.0	830.1
9400	77.0	122	1.04	1.04	n.a.	0.78	n.a.	1592.0	n.a.	1194.0	n.a.
9000	**74**	**122**	**1.00**	**1.00**	**0.75**	**0.75**	**0.55**	**1530.0**	**1147.5**	**1147.5**	**841.5**
9800	77	127	1.04	1.04	n.a.	0.78	n.a.	1592.0	n.a.	1194.0	n.a.
9400	74.0	127	1.00	1.00	0.75	0.75	0.55	1530.0	1147.5	1147.5	841.5
10000	77.0	130	1.04	1.04	n.a.	0.78	n.a.	1592.0	n.a.	1194.0	n.a.
9700	74	131	1.00	1.00	0.75	0.75	0.55	1530	1147.5	1148	841.5

APPENDIX (PEP ECOPASSPORT ALIGNED)

This section represents the scaling method for the **B6 module**, following the PEP EcoPassport PSR for luminaries (PSR-0014-ed2.0-EN-2023 07 13). The GWP results were scaled from a refernce variant of a product family, based on various light management functions, the lumen output (O_{lum}) and reference service life (*RSL*) of each product within the same product familiy.

To calculate the Scaled Impact (SI_{pep}), we have followed the below methods:

1. Calculate the power scaling factor (PSF), which is the ratio of the power input of the variant in questions P_{in} and the power input of the base variant P_{base}.

$$PSF = \frac{P_{in}}{P_{base}}$$

2. Calculate the Total Scaling factor by multiplying the PSF by the control scaling factor (CSF), where the CSF is determined according the relevant control factor scenario (e.g. if the luminaire has a presence detection system), as presented in Table A1.

$$TSF = PSF * CSF$$

Table A3: Light management functions (PEP EcoPassport aligned)

Scenario	Abbrev.	CSF
No control	NC	1
Daylight dependency factor	DD	0.75
Presence sensing	PS	0.75
Daylight dependency and presence sensing	DD+PS	0.55

3. Lastly, the GWP of the base variant is then scaled by the TSF.

$$Scaled\ GWP = GWP_{\ case} * TSF$$

4. Using this scaled GWP, we then can apply the PEP Ecopassport method for calculating the environmental impact of the functional unit for a luminary (1000 lumens over 35000 hours), applied to B6, where the Functional Unit application considers the lumen output (O_{lum}) and reference service lifetime (*RSL*) of the product to estimate the final environmental impact. The scaled impact (SI_{pep}) is presented in Table A4.

$$SI_{PEP} = Scaled\ GWP * \frac{1{,}000}{O_{lum}} * \frac{35{,}000}{RSL}$$

As described in the EPD, calculations are made based on dataset describing electricity available on the low voltage level in Europe for year 2022 (source Ecoinvent 3.8 database). This value should be adjusted depending on specific project requirements. Presented controls factors and functional unit conversion

values are based on the PEP EcoPassport PSR for luminaries (PSR-0014-ed2.0-EN-2023 07 13). Please refer to this publication or contact Signify directly for more information.

Table A4 Scale impact per scaling factor (PEP EcoPassport aligned)

PFC	Lamp family	Module color	Driver type	Flux [lm]	Power [W]	Efficacy [lm/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
								NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
ST762T	LED27S	830	PSU	6000	46	130	0.62	0.62	n.a.	0.47	n.a.	111.0	n.a.	83.2	n.a.
			DIA	6000	45.5	132	0.61	0.61	0.46	0.46	0.34	109.8	82.3	82.3	60.4
			WIA	6000	47.0	128	0.64	0.64	0.48	0.48	0.35	113.4	85.0	85.0	62.4
		840	PSU	6300	46.0	137	0.62	0.62	n.a.	0.47	n.a.	105.7	n.a.	79.3	n.a.
			DIA	6300	45.5	138	0.61	0.61	0.46	0.46	0.34	104.5	78.4	78.4	57.5
			WIA	6300	47.0	134	0.64	0.64	0.48	0.48	0.35	108.0	81.0	81.0	59.4
		PW930	PSU	5800	44.5	130	0.60	0.60	n.a.	0.45	n.a.	111.0	n.a.	83.3	n.a.
			DIA	5800	44.0	132	0.59	0.59	0.45	0.45	0.33	109.8	82.3	82.3	60.4
			WIA	5800	45.5	127	0.61	0.61	0.46	0.46	0.34	113.5	85.2	85.2	62.4
		PW935	PSU	5900	45.0	131	0.61	0.61	n.a.	0.46	n.a.	110.4	n.a.	82.8	n.a.
			DIA	5900	44	134	0.59	0.59	0.45	0.45	0.33	107.9	81.0	81.0	59.4
			WIA	5900	45.5	130	0.61	0.61	0.46	0.46	0.34	111.6	83.7	83.7	61.4
		PW940	PSU	5900	44.5	133	0.60	0.60	n.a.	0.45	n.a.	109.2	n.a.	81.9	n.a.
			DIA	5900	44.0	134	0.59	0.59	0.45	0.45	0.33	107.9	81.0	81.0	59.4
			WIA	5900	45.5	130	0.61	0.61	0.46	0.46	0.34	111.6	83.7	83.7	61.4
	LED39S	830	PSU	8500	67	127	0.91	0.91	n.a.	0.68	n.a.	114.1	n.a.	85.6	n.a.
			DIA	8500	65	131	0.88	0.88	0.66	0.66	0.48	110.7	83.0	83.0	60.9
			WIA	8500	67.0	127	0.91	0.91	0.68	0.68	0.50	114.1	85.6	85.6	62.7
		840	PSU	9000	68.0	132	0.92	0.92	n.a.	0.69	n.a.	109.4	n.a.	82.0	n.a.
			DIA	9000	66.0	136	0.89	0.89	0.67	0.67	0.49	106.1	79.6	79.6	58.4
			WIA	9000	68.0	132	0.92	0.92	0.69	0.69	0.51	109.4	82.0	82.0	60.1
		PW930	PSU	8300	67	124	0.91	0.91	n.a.	0.68	n.a.	116.8	n.a.	87.6	n.a.
			DIA	8300	65	128	0.88	0.88	0.66	0.66	0.48	113.3	85.0	85.0	62.3
			WIA	8300	67.0	124	0.91	0.91	0.68	0.68	0.50	116.8	87.6	87.6	64.3
		PW935	DIA	8700	65.0	134	0.88	0.88	0.66	0.66	0.48	108.1	81.1	81.1	59.5
			WIA	8700	67.0	130	0.91	0.91	0.68	0.68	0.50	111.5	83.6	83.6	61.3
		PW940	PSU	8800	67	131	0.91	0.91	n.a.	0.68	n.a.	110.2	n.a.	82.6	n.a.
			DIA	8800	65	135	0.88	0.88	0.66	0.66	0.48	106.9	80.2	80.2	58.8
			WIA	8800	67.0	131	0.91	0.91	0.68	0.68	0.50	110.2	82.6	82.6	60.6
	LED49S	830	PSU	9600	77.0	125	1.04	1.04	n.a.	0.78	n.a.	116.1	n.a.	87.1	n.a.
			DIA	9300	73	127	0.99	0.99	0.74	0.74	0.54	113.6	85.2	85.2	62.5
		840	PSU	10200	77	132	1.04	1.04	n.a.	0.78	n.a.	109.3	n.a.	81.9	n.a.
			DIA	9800	73.0	134	0.99	0.99	0.74	0.74	0.54	107.8	80.9	80.9	59.3
		PW930	PSU	9400	77.0	122	1.04	1.04	n.a.	0.78	n.a.	118.6	n.a.	88.9	n.a.
			DIA	9000	74	122	1.00	1.00	0.75	0.75	0.55	119.0	89.3	89.3	65.5
		PW935	PSU	9800	77	127	1.04	1.04	n.a.	0.78	n.a.	113.7	n.a.	85.3	n.a.
			DIA	9400	74.0	127	1.00	1.00	0.75	0.75	0.55	113.9	85.5	85.5	62.7
		PW940	PSU	10000	77.0	130	1.04	1.04	n.a.	0.78	n.a.	111.4	n.a.	83.6	n.a.
			DIA	9700	74	131	1.00	1.00	0.75	0.75	0.55	110.4	82.8	82.8	60.7