



## ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Towntune Asymmetric Lyre DR BDP271

Signify N.V.



**EPD HUB, HUB-4984**

Published on 22.01.2026, last updated on 22.01.2026, valid until 22.01.2031

## MANUFACTURER AND SITE

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
Place of production	VALLADOLID, SPAIN
Place(s) of raw material origin	EU, APAC
Place(s) of installation and use	EU
Period for data	Calendar Year 2023

## EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR version 1.2, 24 Mar 2025
Sector	Electrical product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, B6, and modules C1-C4, D
EPD author	Signify / Sustainability
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Imane Uald Lamkaddam as an authorized verifier for EPD Hub

## PRODUCT SPECIFICATION

Product name	Towntune Asymmetric Lyre DR BDP271
Product number / reference	912300024465 / BDP271 LED50-4S/830 II DM10 62P
GTIN (Global Trade Item Number)	Not applicable
NOBB (Norwegian Building Product Database)	Not applicable
A1-A3 Specific data (%)	2.51

## PRODUCT DESCRIPTION

Designed to enhance existing and scalable urban spaces, the TownTune family offers all the latest lighting innovations in terms of performance, quality of light and connectivity. The family consists of four solutions: a Central Post Top (CPT), an Asymmetric Spigot Post Top / Side Entry version (ASY), a version with an extending Lyre post top bracket (Lyre), and a Central Post Top with a Conical Comfort Bowl (CCB). Each TownTune luminaire can be customized with a choice of different shapes on top of the housing, plus there's the option to add a decorative ring, which comes in two colors (excluding CCB). Design options that enable you to create your very own lighting signature and bring a distinctive identity to districts and cities. In addition, every luminaire in the TownTune family is uniquely identifiable, thanks to the Signify Service tag app. By simply scanning a QR code, placed inside the door of the mast or directly on the luminaire, you can instantly access the configuration of the luminaire. This makes maintenance and programming operations faster and easier and enables you to create your digital library of lighting assets and spare parts. TownTune also uses the Philips LEDGINE-O lighting platform, ensuring you always have the right amount and direction of light on your street. Furthermore, thanks to being system ready (SR), TownTune is also future proof. A solution that's ready to be paired with both standalone and advanced control and lighting software applications such as Interact City.

This EPD is intended for business-to-business and/or business-to-consumer communication. Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1. 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 construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

### PRODUCT CLASSIFICATION

Declared operating voltage, Volt	240
Light source colour temperature, Kelvin	3000
Protection index for water and dust (IP)	66
Impact resistance index (IK)	10
Luminous flux, Lumens	3950
Electrical power, Watt	36
Luminous efficiency, Lm/W	110
Additional characteristic	Not applicable

### 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 RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	74.52	EU , APAC
Minerals	0	EU
Fossil materials	25.48	EU , APAC
Bio-based materials	0	EU

### 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	0.599

### ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	8.459
Mass of packaging, kg	1.513
Functional unit (from PEP PSR0014)	Provide lighting that delivers an outgoing artificial luminous flux of 1000 lumens during a reference lifetime of 35000 hours
Reference service life (years)	25
Assigned lifetime (hours)	100000
GWP-total, A1-A3 (kg CO <sub>2</sub> e)	73.7
GWP-fossil, A1-A3 (kg CO <sub>2</sub> e)	75.3
Secondary material, inputs (%)	52.4
Secondary material, outputs (%)	52.5
Total energy use, A1-A3 (kWh)	266
Net freshwater use, A1-A3 (m <sup>3</sup> )	3.25E-01

# LIFE CYCLE ASSESSMENT

## SYSTEM BOUNDARY

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

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

Modules not declared = ND.

## 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. 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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

## VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product’s manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

## 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
Manufacturing energy and waste	Allocated by mass

Proxy data is used for certain materials due to their unavailability in the database. Conservative choices have been adopted when exact information was missing. Regarding module C1-C4: EOL scenarios are based on default values from EN 50693. For stages description please refer to section Product life cycle in this EPD report.

### LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA Luminaire EPD Generator v2.2.7. The LCA and EPD have been prepared according to the reference standards, EN 50693, and ISO 14040/14044. Ecoinvent v 3.10.1 and One Click LCA databases were used as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, cut-off, EN 15804+A2'.

No other sources were used in the modelling of this EPD.

### PRODUCT & MANUFACTURING SITES GROUPING

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Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	Not applicable

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### 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

### MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production. The material losses occurring during the manufacturing processes are treated as per the waste handling practices in the factory, while scenario assumptions are made in the absence of exact data. The study also considers the fuels used by machines as well as losses during electricity transmission.

The product is made of metals, plastics, and electronic components. All components are transported to the production facility, where the main manufacturing processes primarily are associated with assembly. A2 transport distances are calculated always taking the capital city of component country of origin as a starting point and exact manufacturing location as destination. The finished product can be packaged with polyethylene, cardboard, and/or paper as packaging material before shipment to customers. Manufacturing loss, ancillaries and wastes are calculated according to the data that each manufacturing site is sharing with Signify. The total annual amount of waste in kg is allocated to the total annual production in kg at the specific manufacturing site responsible to produce the studied product. Thus, it is possible to allocate it according to the weight of the product analysed in this study.

Co-product allocation is neglected as revenue of co-product is very low, hence, the waste undergoes a conservative waste treatment.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc), and its use is ensured throughout the validity period of this EPD.

### TRANSPORT AND INSTALLATION (A4-A5)

A4 transport distances are calculated always taking the exact manufacturing location to customer location. If the customer's location is defined as a country or its capital city, the calculation is made to the respective capital city. If the

customer's location is specified as a region, the distance is calculated to the capital city of the best-performing sales country within that region. The transportation method is a combination of lorry and container ship where needed. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Environmental impacts from installation include waste packaging materials (A5). The packaging waste treatment is assumed to be conservative with incineration without energy recovery. 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 (B6), which is calculated multiplying the Wattage x Assigned lifetime (hours) x Country energy mix factor. To know which Country energy mix was used in this EPD, please refer to Annex 2.

The Reference service life in years is calculated according to the main application type of the product, based on annual operating hours. Impacts due to electricity production include direct emissions to air, transformation, and transmission losses.

### 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. The transport distance is 150 km while 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.

# LIFE CYCLE FLOW DIAGRAM - SYSTEM BOUNDARY



# ENVIRONMENTAL IMPACT DATA, RESULTS PER DECLARED UNIT

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> e	7.20E+01	5.36E-01	1.19E+00	7.37E+01	2.96E+00	2.29E+00	ND	ND	ND	ND	ND	1.18E+03	ND	0.00E+00	2.48E-01	2.30E+00	1.10E+00	-3.35E+00
GWP – fossil	kg CO <sub>2</sub> e	7.17E+01	5.36E-01	3.07E+00	7.53E+01	2.96E+00	9.83E-02	ND	ND	ND	ND	ND	1.18E+03	ND	0.00E+00	2.48E-01	2.30E+00	1.19E+00	-3.34E+00
GWP – biogenic	kg CO <sub>2</sub> e	2.27E-01	1.21E-04	-1.93E+00	-1.71E+00	6.71E-04	2.19E+00	ND	ND	ND	ND	ND	2.64E+00	ND	0.00E+00	5.41E-05	-5.68E-04	-9.22E-02	-4.41E-03
GWP – LULUC	kg CO <sub>2</sub> e	1.06E-01	2.40E-04	4.98E-02	1.56E-01	1.33E-03	3.50E-05	ND	ND	ND	ND	ND	3.62E+00	ND	0.00E+00	1.10E-04	1.81E-04	9.25E-05	-6.11E-03
Ozone depletion pot.	kg CFC-11e	8.93E-07	7.91E-09	7.25E-08	9.73E-07	4.37E-08	1.30E-09	ND	ND	ND	ND	ND	2.17E-05	ND	0.00E+00	3.47E-09	2.17E-09	1.49E-09	-2.00E-08
Acidification potential	mol H <sup>+</sup> e	4.34E-01	2.02E-03	1.28E-02	4.49E-01	1.01E-02	5.64E-04	ND	ND	ND	ND	ND	6.93E+00	ND	0.00E+00	8.26E-04	1.84E-03	6.45E-04	-3.04E-02
EP-freshwater <sup>2)</sup>	kg Pe	2.70E-02	4.14E-05	1.09E-03	2.82E-02	2.31E-04	9.53E-06	ND	ND	ND	ND	ND	1.10E+00	ND	0.00E+00	1.93E-05	7.70E-05	2.66E-05	-2.05E-03
EP-marine	kg Ne	7.41E-02	6.47E-04	5.56E-03	8.03E-02	3.32E-03	2.63E-04	ND	ND	ND	ND	ND	1.09E+00	ND	0.00E+00	2.68E-04	5.79E-04	1.62E-03	-3.58E-03
EP-terrestrial	mol Ne	7.72E-01	7.05E-03	3.54E-02	8.14E-01	3.61E-02	2.40E-03	ND	ND	ND	ND	ND	9.74E+00	ND	0.00E+00	2.91E-03	5.74E-03	2.84E-03	-3.90E-02
POCP (“smog”) <sup>3)</sup>	kg NMVOCe	2.66E-01	2.82E-03	1.38E-02	2.82E-01	1.49E-02	6.83E-04	ND	ND	ND	ND	ND	3.21E+00	ND	0.00E+00	1.15E-03	1.58E-03	8.51E-04	-1.16E-02
ADP-minerals & metals <sup>4)</sup>	kg Sbe	1.64E-03	1.48E-06	1.59E-05	1.66E-03	8.26E-06	2.82E-07	ND	ND	ND	ND	ND	1.59E-02	ND	0.00E+00	8.14E-07	7.33E-06	2.30E-07	-2.44E-04
ADP-fossil resources	MJ	8.94E+02	7.76E+00	4.11E+01	9.43E+02	4.30E+01	9.81E-01	ND	ND	ND	ND	ND	2.74E+04	ND	0.00E+00	3.48E+00	1.99E+00	1.20E+00	-4.14E+01
Water use <sup>5)</sup>	m <sup>3</sup> e depr.	1.97E+01	3.81E-02	1.15E+00	2.09E+01	2.12E-01	1.14E-01	ND	ND	ND	ND	ND	7.47E+02	ND	0.00E+00	1.61E-02	1.68E-01	8.60E-02	-8.10E-01

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, EF 3.1**

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	5.20E-06	5.31E-08	2.24E-07	5.47E-06	2.97E-07	7.03E-09	ND	ND	ND	ND	ND	2.47E-05	ND	0.00E+00	1.97E-08	2.11E-08	8.82E-09	-2.34E-07
Ionizing radiation <sup>6)</sup>	kBq U235e	3.49E+00	6.72E-03	1.33E-01	3.63E+00	3.74E-02	1.19E-03	ND	ND	ND	ND	ND	7.58E+02	ND	0.00E+00	2.81E-03	7.32E-03	1.90E-03	-3.91E-01
Ecotoxicity (freshwater)	CTUe	8.59E+02	1.09E+00	1.41E+01	8.75E+02	6.08E+00	2.72E+00	ND	ND	ND	ND	ND	4.18E+03	ND	0.00E+00	5.50E-01	5.12E+00	1.67E+02	-2.00E+01
Human toxicity, cancer	CTUh	5.84E-08	8.88E-11	1.45E-09	5.99E-08	4.89E-10	1.31E-10	ND	ND	ND	ND	ND	3.98E-07	ND	0.00E+00	4.21E-11	2.86E-10	1.41E-10	-2.38E-09
Human tox. non-cancer	CTUh	1.37E-06	4.99E-09	3.88E-08	1.42E-06	2.78E-08	5.34E-09	ND	ND	ND	ND	ND	2.06E-05	ND	0.00E+00	2.18E-09	1.30E-08	9.51E-09	-2.28E-07
SQP <sup>7)</sup>	-	2.56E+02	7.73E+00	1.45E+02	4.09E+02	4.33E+01	4.80E-01	ND	ND	ND	ND	ND	6.10E+03	ND	0.00E+00	2.08E+00	2.85E+00	1.54E+00	-1.48E+01

**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 <sup>8)</sup>	MJ	7.68E+01	1.06E-01	1.02E+01	8.71E+01	5.89E-01	-2.68E+01	ND	ND	ND	ND	ND	7.52E+03	ND	0.00E+00	4.77E-02	2.58E-01	-1.68E+00	-6.06E+00
Renew. PER as material	MJ	2.50E+00	0.00E+00	1.68E+01	1.93E+01	0.00E+00	-1.93E+01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-4.10E-03	-7.62E-03	0.00E+00
Total use of renew. PER	MJ	7.93E+01	1.06E-01	2.71E+01	1.06E+02	5.89E-01	-4.62E+01	ND	ND	ND	ND	ND	7.52E+03	ND	0.00E+00	4.77E-02	2.54E-01	-1.68E+00	-6.06E+00
Non-re. PER as energy	MJ	8.30E+02	7.76E+00	3.32E+01	8.71E+02	4.30E+01	9.26E-01	ND	ND	ND	ND	ND	2.74E+04	ND	0.00E+00	3.48E+00	-3.14E+01	-3.53E+01	-4.12E+01
Non-re. PER as material	MJ	6.03E+01	0.00E+00	-1.70E+00	5.86E+01	0.00E+00	-2.34E-01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-2.81E+01	-3.03E+01	0.00E+00
Total use of non-re. PER	MJ	8.90E+02	7.76E+00	3.15E+01	9.30E+02	4.30E+01	6.93E-01	ND	ND	ND	ND	ND	2.74E+04	ND	0.00E+00	3.48E+00	-5.95E+01	-6.55E+01	-4.12E+01
Secondary materials	kg	4.44E+00	0.00E+00	0.00E+00	4.44E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ	4.09E-02	4.16E-05	1.61E-01	2.02E-01	2.32E-04	1.22E-05	ND	ND	ND	ND	ND	3.62E-02	ND	0.00E+00	1.99E-05	9.37E-05	1.84E-05	-5.26E-04
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m <sup>3</sup>	2.98E-01	1.14E-03	2.61E-02	3.25E-01	6.36E-03	1.84E-03	ND	ND	ND	ND	ND	2.37E+01	ND	0.00E+00	4.61E-04	3.14E-03	-4.60E-03	-2.72E-02

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	1.14E+01	1.31E-02	1.68E-01	1.16E+01	7.28E-02	2.99E-02	ND	ND	ND	ND	ND	6.94E+01	ND	0.00E+00	6.06E-03	4.95E-02	4.74E-02	-3.18E-01
Non-hazardous waste	kg	2.53E+02	2.42E-01	1.10E+01	2.64E+02	1.35E+00	1.62E+00	ND	ND	ND	ND	ND	5.37E+03	ND	0.00E+00	1.14E-01	1.35E+00	1.09E+01	-1.07E+01
Radioactive waste	kg	8.70E-04	1.64E-06	3.17E-05	9.03E-04	9.17E-06	2.98E-07	ND	ND	ND	ND	ND	1.95E-01	ND	0.00E+00	6.89E-07	1.81E-06	4.68E-07	-9.60E-05

### 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 reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	1.02E-01	1.02E-01	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	4.44E+00	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	1.04E+01	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	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	4.38E+00	0.00E+00	0.00E+00
Exported energy – Heat	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	6.03E+00	0.00E+00	0.00E+00

**ENVIRONMENTAL IMPACTS – EN 15804+A1, CML**

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 <sub>2</sub> e	7.17E+01	5.33E-01	3.28E+00	7.55E+01	2.95E+00	9.76E-02	ND	ND	ND	ND	ND	1.18E+03	ND	0.00E+00	2.47E-01	2.30E+00	1.28E+00	-3.33E+00
Ozone depletion Pot.	kg CFC-11e	7.97E-07	6.31E-09	7.24E-08	8.76E-07	3.49E-08	1.11E-09	ND	ND	ND	ND	ND	1.81E-05	ND	0.00E+00	2.77E-09	1.85E-09	1.23E-09	-1.68E-08
Acidification	kg SO <sub>2</sub> e	3.63E-01	1.55E-03	9.03E-03	3.73E-01	7.71E-03	4.14E-04	ND	ND	ND	ND	ND	5.90E+00	ND	0.00E+00	6.33E-04	1.44E-03	4.67E-04	-2.61E-02
Eutrophication	kg PO <sub>4</sub> <sup>3</sup> e	1.10E-01	3.55E-04	6.07E-03	1.17E-01	1.88E-03	1.29E-04	ND	ND	ND	ND	ND	7.64E-01	ND	0.00E+00	1.54E-04	2.80E-04	3.94E-04	-2.39E-03
POCP (“smog”)	kg C <sub>2</sub> H <sub>4</sub> e	3.10E-02	1.31E-04	1.02E-03	3.21E-02	6.88E-04	3.16E-05	ND	ND	ND	ND	ND	3.22E-01	ND	0.00E+00	5.67E-05	8.73E-05	6.39E-05	-1.29E-03
ADP-elements	kg Sbe	1.61E-03	1.44E-06	1.56E-05	1.63E-03	8.06E-06	2.36E-07	ND	ND	ND	ND	ND	1.59E-02	ND	0.00E+00	7.95E-07	7.26E-06	2.00E-07	-2.43E-04
ADP-fossil	MJ	8.36E+02	7.65E+00	3.89E+01	8.83E+02	4.24E+01	9.62E-01	ND	ND	ND	ND	ND	1.41E+04	ND	0.00E+00	3.43E+00	1.87E+00	1.17E+00	-3.51E+01

**ADDITIONAL INDICATOR – GWP-GHG**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG 9)	kg CO <sub>2</sub> e	7.18E+01	5.36E-01	3.12E+00	7.54E+01	2.96E+00	9.84E-02	ND	ND	ND	ND	ND	1.18E+03	ND	0.00E+00	2.48E-01	2.30E+00	1.19E+00	-3.35E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows - CH<sub>4</sub> fossil, CH<sub>4</sub> biogenic and Dinitrogen monoxide - were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO<sub>2</sub> is set to zero.

# ENVIRONMENTAL IMPACT DATA, RESULTS PER FUNCTIONAL UNIT

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> éq/FU	6.38E+00	4.75E-02	1.05E-01	6.53E+00	2.63E-01	2.03E-01	ND	ND	ND	ND	ND	1.05E+02	ND	0.00E+00	2.20E-02	2.04E-01	9.72E-02	-2.97E-01
GWP – fossil	kg CO <sub>2</sub> éq/FU	6.35E+00	4.75E-02	2.72E-01	6.67E+00	2.62E-01	8.71E-03	ND	ND	ND	ND	ND	1.04E+02	ND	0.00E+00	2.20E-02	2.04E-01	1.05E-01	-2.96E-01
GWP – biogenic	kg CO <sub>2</sub> éq/FU	2.01E-02	1.07E-05	-1.71E-01	-1.51E-01	5.95E-05	1.94E-01	ND	ND	ND	ND	ND	2.34E-01	ND	0.00E+00	4.80E-06	-5.03E-05	-8.17E-03	-3.91E-04
GWP – LULUC	kg CO <sub>2</sub> éq/FU	9.36E-03	2.13E-05	4.42E-03	1.38E-02	1.17E-04	3.10E-06	ND	ND	ND	ND	ND	3.21E-01	ND	0.00E+00	9.72E-06	1.60E-05	8.19E-06	-5.41E-04
Ozone depletion pot.	kg CFC <sub>11</sub> e/FU	7.91E-08	7.01E-10	6.42E-09	8.63E-08	3.88E-09	1.16E-10	ND	ND	ND	ND	ND	1.92E-06	ND	0.00E+00	3.07E-10	1.92E-10	1.32E-10	-1.78E-09
Acidification potential	mole H <sup>+</sup> e/FU	3.85E-02	1.79E-04	1.13E-03	3.98E-02	8.95E-04	5.00E-05	ND	ND	ND	ND	ND	6.14E-01	ND	0.00E+00	7.32E-05	1.63E-04	5.72E-05	-2.69E-03
EP-freshwater <sup>2)</sup>	kg Pe/FU	2.40E-03	3.67E-06	9.70E-05	2.50E-03	2.04E-05	8.44E-07	ND	ND	ND	ND	ND	9.72E-02	ND	0.00E+00	1.71E-06	6.82E-06	2.35E-06	-1.82E-04
EP-marine	kg Ne/FU	6.57E-03	5.73E-05	4.93E-04	7.12E-03	2.94E-04	2.33E-05	ND	ND	ND	ND	ND	9.63E-02	ND	0.00E+00	2.37E-05	5.13E-05	1.43E-04	-3.17E-04
EP-terrestrial	mol Ne/FU	6.84E-02	6.25E-04	3.14E-03	7.22E-02	3.20E-03	2.13E-04	ND	ND	ND	ND	ND	8.63E-01	ND	0.00E+00	2.58E-04	5.08E-04	2.52E-04	-3.46E-03
POCP (“smog”) <sup>3)</sup>	kg NMVOCe/	2.36E-02	2.50E-04	1.22E-03	2.50E-02	1.32E-03	6.05E-05	ND	ND	ND	ND	ND	2.84E-01	ND	0.00E+00	1.02E-04	1.40E-04	7.54E-05	-1.03E-03
ADP-minerals & metals <sup>4)</sup>	kg Sbe/FU	1.45E-04	1.31E-07	1.41E-06	1.47E-04	7.32E-07	2.50E-08	ND	ND	ND	ND	ND	1.41E-03	ND	0.00E+00	7.21E-08	6.49E-07	2.04E-08	-2.16E-05
ADP-fossil resources	MJ/FU	7.92E+01	6.88E-01	3.64E+00	8.35E+01	3.81E+00	8.69E-02	ND	ND	ND	ND	ND	2.43E+03	ND	0.00E+00	3.08E-01	1.76E-01	1.06E-01	-3.67E+00
Water use <sup>5)</sup>	m <sup>3</sup> e priv./FU	1.75E+00	3.38E-03	1.02E-01	1.85E+00	1.88E-02	1.01E-02	ND	ND	ND	ND	ND	6.62E+01	ND	0.00E+00	1.43E-03	1.49E-02	7.62E-03	-7.18E-02

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, EF 3.1**

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 /FU	4.60E-07	4.71E-09	1.99E-08	4.85E-07	2.63E-08	6.22E-10	ND	ND	ND	ND	ND	2.19E-06	ND	0.00E+00	1.74E-09	1.87E-09	7.82E-10	-2.08E-08
Ionizing radiation <sup>6)</sup>	kBq U235e/FU	3.09E-01	5.95E-04	1.18E-02	3.22E-01	3.32E-03	1.05E-04	ND	ND	ND	ND	ND	6.71E+01	ND	0.00E+00	2.49E-04	6.49E-04	1.68E-04	-3.47E-02
Ecotoxicity (freshwater)	CTUe/FU	7.62E+01	9.67E-02	1.25E+00	7.75E+01	5.39E-01	2.41E-01	ND	ND	ND	ND	ND	3.70E+02	ND	0.00E+00	4.87E-02	4.54E-01	1.48E+01	-1.77E+00
Human toxicity, cancer	CTUh/FU	5.17E-09	7.87E-12	1.28E-10	5.31E-09	4.33E-11	1.16E-11	ND	ND	ND	ND	ND	3.53E-08	ND	0.00E+00	3.73E-12	2.53E-11	1.25E-11	-2.11E-10
Human tox. non-cancer	CTUh/FU	1.22E-07	4.42E-10	3.43E-09	1.26E-07	2.47E-09	4.73E-10	ND	ND	ND	ND	ND	1.83E-06	ND	0.00E+00	1.93E-10	1.15E-09	8.43E-10	-2.02E-08
SQP <sup>7)</sup>	-/FU	2.27E+01	6.85E-01	1.28E+01	3.62E+01	3.84E+00	4.25E-02	ND	ND	ND	ND	ND	5.40E+02	ND	0.00E+00	1.84E-01	2.53E-01	1.37E-01	-1.31E+00

**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 <sup>8)</sup>	MJ/FU	6.81E+00	9.37E-03	9.05E-01	7.72E+00	5.22E-02	-2.38E+00	ND	ND	ND	ND	ND	6.67E+02	ND	0.00E+00	4.22E-03	2.29E-02	-1.49E-01	-5.37E-01
Renew. PER as material	MJ/FU	2.22E-01	0.00E+00	1.49E+00	1.71E+00	0.00E+00	-1.71E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-3.63E-04	-6.75E-04	0.00E+00
Total use of renew. PER	MJ/FU	7.03E+00	9.37E-03	2.40E+00	9.43E+00	5.22E-02	-4.09E+00	ND	ND	ND	ND	ND	6.67E+02	ND	0.00E+00	4.22E-03	2.25E-02	-1.49E-01	-5.37E-01
Non-re. PER as energy	MJ/FU	7.36E+01	6.88E-01	2.94E+00	7.72E+01	3.81E+00	8.21E-02	ND	ND	ND	ND	ND	2.43E+03	ND	0.00E+00	3.08E-01	-2.78E+00	-3.12E+00	-3.65E+00
Non-re. PER as material	MJ/FU	5.34E+00	0.00E+00	-1.51E-01	5.19E+00	0.00E+00	-2.07E-02	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-2.49E+00	-2.68E+00	0.00E+00
Total use of non-re. PER	MJ/FU	7.89E+01	6.88E-01	2.79E+00	8.24E+01	3.81E+00	6.14E-02	ND	ND	ND	ND	ND	2.43E+03	ND	0.00E+00	3.08E-01	-5.27E+00	-5.81E+00	-3.65E+00
Secondary materials	kg/FU	3.93E-01	0.00E+00	0.00E+00	3.93E-01	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ/FU	3.62E-03	3.68E-06	1.42E-02	1.79E-02	2.06E-05	1.08E-06	ND	ND	ND	ND	ND	3.21E-03	ND	0.00E+00	1.76E-06	8.30E-06	1.63E-06	-4.66E-05
Non-ren. secondary fuels	MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m <sup>3</sup> /FU	2.64E-02	1.01E-04	2.31E-03	2.88E-02	5.63E-04	1.63E-04	ND	ND	ND	ND	ND	2.10E+00	ND	0.00E+00	4.08E-05	2.78E-04	-4.08E-04	-2.41E-03

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/FU	1.01E+00	1.16E-03	1.49E-02	1.03E+00	6.45E-03	2.65E-03	ND	ND	ND	ND	ND	6.15E+00	ND	0.00E+00	5.37E-04	4.38E-03	4.20E-03	-2.82E-02
Non-hazardous waste	kg/FU	2.24E+01	2.14E-02	9.75E-01	2.34E+01	1.19E-01	1.43E-01	ND	ND	ND	ND	ND	4.75E+02	ND	0.00E+00	1.01E-02	1.20E-01	9.64E-01	-9.44E-01
Radioactive waste	kg/FU	7.71E-05	1.46E-07	2.81E-06	8.00E-05	8.12E-07	2.64E-08	ND	ND	ND	ND	ND	1.72E-02	ND	0.00E+00	6.11E-08	1.60E-07	4.15E-08	-8.50E-06

### 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 reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	9.01E-03	9.01E-03	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	3.94E-01	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	9.22E-01	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	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	3.88E-01	0.00E+00	0.00E+00
Exported energy – Heat	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	5.34E-01	0.00E+00	0.00E+00

### ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

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 <sub>2</sub> eq./FU	6.35E+00	4.72E-02	2.90E-01	6.69E+00	2.61E-01	8.65E-03	ND	ND	ND	ND	ND	1.04E+02	ND	0.00E+00	2.18E-02	2.04E-01	1.14E-01	-2.95E-01
Ozone depletion Pot.	kg CFC <sub>11</sub> /FU	7.06E-08	5.59E-10	6.42E-09	7.76E-08	3.09E-09	9.82E-11	ND	ND	ND	ND	ND	1.61E-06	ND	0.00E+00	2.45E-10	1.64E-10	1.09E-10	-1.49E-09
Acidification	kg SO <sub>2</sub> e/FU	3.21E-02	1.37E-04	8.00E-04	3.31E-02	6.84E-04	3.67E-05	ND	ND	ND	ND	ND	5.23E-01	ND	0.00E+00	5.61E-05	1.27E-04	4.14E-05	-2.31E-03
Eutrophication	kg PO <sub>4</sub> <sup>3</sup> e/FU	9.77E-03	3.14E-05	5.38E-04	1.03E-02	1.67E-04	1.14E-05	ND	ND	ND	ND	ND	6.77E-02	ND	0.00E+00	1.36E-05	2.48E-05	3.49E-05	-2.12E-04
POCP (“smog”)	kg C <sub>2</sub> H <sub>4</sub> e/FU	2.74E-03	1.16E-05	9.00E-05	2.85E-03	6.09E-05	2.80E-06	ND	ND	ND	ND	ND	2.85E-02	ND	0.00E+00	5.02E-06	7.74E-06	5.66E-06	-1.14E-04
ADP-elements	kg Sbe/FU	1.43E-04	1.28E-07	1.38E-06	1.45E-04	7.14E-07	2.09E-08	ND	ND	ND	ND	ND	1.41E-03	ND	0.00E+00	7.04E-08	6.43E-07	1.77E-08	-2.16E-05
ADP-fossil	MJ/FU	7.41E+01	6.78E-01	3.45E+00	7.82E+01	3.76E+00	8.52E-02	ND	ND	ND	ND	ND	1.25E+03	ND	0.00E+00	3.04E-01	1.66E-01	1.03E-01	-3.11E+00

### ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG <sup>9)</sup>	kg CO <sub>2</sub> e/FU	6.36E+00	4.75E-02	2.76E-01	6.68E+00	2.63E-01	8.71E-03	ND	ND	ND	ND	ND	1.05E+02	ND	0.00E+00	2.20E-02	2.04E-01	1.05E-01	-2.97E-01

*9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows - CH<sub>4</sub> fossil, CH<sub>4</sub> biogenic and Dinitrogen monoxide - were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO<sub>2</sub> is set to zero.*

## SCENARIO DOCUMENTATION

### DATA SOURCES

#### Manufacturing energy scenario documentation – A3 (Energy data source)

1. Energy supply, electricity production, co-generation oil and gas, Heat and power co-generation, natural gas, combined cycle power plant, 400MW electrical, Spain, ecoinvent 3.10.1, 0.0249 kgCO<sub>2</sub>e/MJ
2. Energy supply, electricity production, solar photovoltaic, Electricity production, photovoltaic, 570kWp open ground installation, multi-Si, Spain, ecoinvent 3.10.1, 0.0673 kgCO<sub>2</sub>e/kWh

#### Transport scenario documentation - A4

1. Transport, freight, lorry >32 metric ton, EURO5, 2760.17 km
2. Transport, freight, sea, container ship, 0.0 km

#### Installation scenario documentation - A5 (Waste materials data source)

1. Market for corrugated board box, 1.458 kg
2. Market for printed paper, offset, 0.0537 kg
3. Market for packaging film, low density polyethylene, 0.0015 kg

#### Use stages scenario documentation - B6-B7 (Energy data source)

1. Energy supply, electricity transformation and distribution, distribution low voltage, Market group for electricity, low voltage, Europe, 3600.0 kWh

## TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m <sup>3</sup>	1.03E+02
Volume capacity utilization factor (factor: =1 or <1 or ≥1 for compressed or nested packaged products)	1

## INSTALLATION SCENARIO DOCUMENTATION - A5

Scenario parameter	Value
Ancillary materials for installation (specified by material) / kg or other units as appropriate	0
Water use / m <sup>3</sup>	0
Other resource use / kg	0
Direct emissions to ambient air, soil and water / kg	0

### USE STAGES SCENARIO DOCUMENTATION - B6-B7 USE OF ENERGY AND WATER

Scenario information	Value
Ancillary materials specified by material / kg or units as appropriate	Not applicable
Net fresh water consumption / m <sup>3</sup>	0
Power output of equipment / kW	36
Characteristic performance, e.g., energy efficiency, emissions, variation of performance with capacity utilization, etc. / Units as appropriate	For more details see product classification table and product description.
Further assumptions for scenario development, e.g., frequency and period of use, number of occupants / Units as appropriate	For more details see product classification table and product description.

### END OF LIFE SCENARIO DOCUMENTATION

Scenario information	Value
Collection process – kg collected separately	8.459
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	4.44E+00
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	3.08E+00
Scenario assumptions e.g. transportation	Lorry, 16-32 metric ton, EURO5; 150 km

## THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.



Program assistant: Xinyuan Zhang



The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

### Verified tools

Tool verifier: Hai Ha Nguyen

Tool verification validity: 28 March 2025 - 27 March 2028

# APPENDIX 1

## MATERIAL COMPOSITION

The product material composition is illustrated in the table below. The material weight is given in grams and in percentage on total product weight.

**Table 1: Material composition**

Material	Weight (g)	Weight-%
Aluminium	6023.0	71.21
Copper	12.51	0.15
Other Plastics	1814.56	21.45
Paint	186.0	2.2
PCB Alu	27.9	0.33
PCB Copper	32.34	0.38
PCB Iron	30.24	0.36
PCB Non-ferrous metal	0.01	0.0
PCB Support	118.51	1.4
PCB Tin	2.11	0.02
PP / PS-High Impact PS / ABS	36.0	0.43
Stainless Steel	2.0	0.02



Steel	171.99	2.03
Tin	1.35	0.02

## APPENDIX 2

### USE PHASE (B6) VALUES FOR DIFFERENT COUNTRY MIX

In this EPD the B6 impact has been calculated using the energy mix of EU. The table in this appendix is useful for conversion and comparison of B6 values with other energy country mix. The Global Warming Potential Total (GWP tot) value is illustrated for each country. The value refers to 1 kwh.

Example on how to use the table:

If for example this EPD was done according to EU energy mix and you want to see how the GWP total changes according to a Finland country energy mix, you can take the original value in the results table here highlighted in yellow:

### ENVIRONMENTAL IMPACT DATA, RESULTS PER DECLARED UNIT

*The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.*

#### CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> e	4.44E-01	4.75E-03	2.34E-02	4.72E-01	9.50E-04	8.13E-03	ND	ND	ND	ND	ND	4.06E-02	ND	0.00E+00	5.50E-04	2.23E-03	7.33E-04	-2.82E-02

Divide that value according to the EU value from the following table (EU = 3.30E-01) and then multiplying for the Finland value from the same table (FINLAND = 1.54E-01).

Thus, the calculation of this example would be:

New B6 GWP tot for Finland =  $(4.06E-02 / 3.30E-01) \times 1.54E-01 = 1.89E-02$ .

Country	GWP tot (kg CO2 eq. per kwh)		
AFRICA	7.30E-01	GERMANY	3.90E-01
APAC	9.50E-01	INDIA	1.50E+00
AUSTRALIA	8.40E-01	ITALY	3.50E-01
AUSTRIA	2.30E-01	LATAM	3.90E-01
BELGIUM	2.00E-01	NAM	4.50E-01
CHINA	1.02E+00	NETHERLANDS	3.90E-01
DENMARK	1.60E-01	NORWAY	4.50E-02
EU	3.30E-01	ROW	7.30E-01
FINLAND	1.54E-01	SPAIN	2.10E-01
FRANCE	8.70E-02	SWEDEN	3.70E-02
		UK	2.60E-01

Source Ecoinvent 3.10.1

## APPENDIX 3 - EPD HUB ALIGNED

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

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 1: Light management function (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.

$$\text{Scaled Impact} = \text{GWP}_{\text{case}} * \text{TSF}$$

The following list of product configurations is not exhaustive. Please use the formula defined in point 1 above to calculate the exact power scaling factor (PSF) for any specific configuration.

**Table 2: GWP per scaling factor (EPD Hub aligned)**

	12NC or Product Family Code	Description	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
1	BDP271	BDP271LED8-4S740DM10 DR	640	5.6	114.3	0.156	0.156	0.117	0.117	0.086	184.8	138.6	138.6	101.9
2	BDP271	BDP271LED10-4S740DM10 DR	800	6.8	117.6	0.189	0.189	0.142	0.142	0.104	223.9	168.2	168.2	123.2
3	BDP271	BDP271LED12-4S740DM10 DR	960	7.7	124.7	0.214	0.214	0.161	0.161	0.118	253.5	190.7	190.7	139.8
4	BDP271	BDP271LED14-4S740DM10 DR	1120	8.9	125.8	0.247	0.247	0.185	0.185	0.136	292.5	219.1	219.1	161.1
5	BDP271	BDP271LED16-4S740DM10 DR	1280	10.0	128.0	0.278	0.278	0.209	0.209	0.153	329.3	247.5	247.5	181.2
6	BDP271	BDP271LED18-4S740DM10 DR	1440	11.2	128.6	0.311	0.311	0.233	0.233	0.171	368.3	276.0	276.0	202.5
7	BDP271	BDP271LED20-4S740DM10 DR	1600	12.4	129.0	0.344	0.344	0.258	0.258	0.189	407.4	305.6	305.6	223.9
8	BDP271	BDP271LED22-4S740DM10 DR	1760	13.6	129.4	0.378	0.378	0.283	0.283	0.208	447.7	335.2	335.2	246.4
9	BDP271	BDP271LED24-4S740DM10 DR	1920	15.0	128.0	0.417	0.417	0.313	0.313	0.229	493.9	370.7	370.7	271.2
10	BDP271	BDP271LED27-4S740DM10 DR	2160	17.0	127.1	0.472	0.472	0.354	0.354	0.26	559.0	419.3	419.3	307.9

11	BDP271	BDP271LED30-4S740DM10 DR	2400	19.0	126.3	0.528	0.528	0.396	0.396	0.29	625.4	469.0	469.0	343.5
12	BDP271	BDP271LED34-4S740DM10 DR	2720	20.0	136.0	0.556	0.556	0.417	0.417	0.306	658.5	493.9	493.9	362.4
13	BDP271	BDP271LED35-4S740DM10 DR	2800	20.5	136.6	0.569	0.569	0.427	0.427	0.313	673.9	505.7	505.7	370.7
14	BDP271	BDP271LED39-4S740DM10 DR	3120	23.0	135.7	0.639	0.639	0.479	0.479	0.351	756.8	567.3	567.3	415.7
15	BDP271	BDP271LED40-4S740DM10 DR	3200	23.5	136.2	0.653	0.653	0.49	0.49	0.359	773.4	580.4	580.4	425.2
16	BDP271	BDP271LED44-4S740DM10 DR	3520	26.0	135.4	0.722	0.722	0.541	0.541	0.397	855.1	640.8	640.8	470.2
17	BDP271	BDP271LED45-4S740DM10 DR	3600	27.0	133.3	0.75	0.75	0.562	0.562	0.413	888.3	665.6	665.6	489.2
18	BDP271	BDP271LED50-4S740DM10 DR	4000	28.5	140.4	0.792	0.792	0.594	0.594	0.436	938.0	703.5	703.5	516.4
19	BDP271	BDP271LED55-4S740DM10 DR	4480	31.5	142.2	0.875	0.875	0.656	0.656	0.481	1036.4	777.0	777.0	569.7
20	BDP271	BDP271LED59-4S740DM10 DR	4800	33.5	143.3	0.931	0.931	0.698	0.698	0.512	1102.7	826.7	826.7	606.4
21	BDP271	BDP271LED64-4S740DM10 DR	5056	37.0	136.6	1.028	1.028	0.771	0.771	0.565	1217.6	913.2	913.2	669.2
22	BDP271	BDP271LED69-4S740DM10 DR	5530	40.0	138.2	1.111	1.111	0.833	0.833	0.611	1315.9	986.6	986.6	723.7
23	BDP271	BDP271LED74-4S740DM10 DR	5846	43.0	136.0	1.194	1.194	0.895	0.895	0.657	1414.2	1060.0	1060.0	778.2
24	BDP271	BDP271LED79-4S740DM10 DR	6162	44.5	138.5	1.236	1.236	0.927	0.927	0.68	1463.9	1097.9	1097.9	805.4

25	BDP271	BDP271LED84-4S740DM10 DR	6636	47.5	139.7	1.319	1.319	0.989	0.989	0.725	1562.2	1171.4	1171.4	858.7
26	BDP271	BDP271LED90-4S740DM10 DR	7110	51.0	139.4	1.417	1.417	1.063	1.063	0.779	1678.3	1259.0	1259.0	922.6
27	BDP271	BDP271LED94-4S740DM10 DR	7426	54.0	137.5	1.5	1.5	1.125	1.125	0.825	1776.6	1332.5	1332.5	977.1
28	BDP271	BDP271LED109-4S740DM10 DR	8580	63.0	136.2	1.75	1.75	1.312	1.312	0.963	2072.7	1553.9	1553.9	1140.6
29	BDP271	BDP271LED120-4S740DM10 DR	9360	71.0	131.8	1.972	1.972	1.479	1.479	1.085	2335.6	1751.7	1751.7	1285.1
30	BDP271	BDP271LED130-4S740DM10 DR	10010	77.0	130.0	2.139	2.139	1.604	1.604	1.176	2533.4	1899.8	1899.8	1392.9
31	BDP271	BDP271LED8-4S730DM10 DR	640	5.9	108.5	0.164	0.164	0.123	0.123	0.09	194.2	145.7	145.7	106.6
32	BDP271	BDP271LED10-4S730DM10 DR	800	7.1	112.7	0.197	0.197	0.148	0.148	0.108	233.3	175.3	175.3	127.9
33	BDP271	BDP271LED12-4S730DM10 DR	960	8.2	117.1	0.228	0.228	0.171	0.171	0.125	270.0	202.5	202.5	148.1
34	BDP271	BDP271LED14-4S730DM10 DR	1120	9.4	119.1	0.261	0.261	0.196	0.196	0.144	309.1	232.1	232.1	170.6
35	BDP271	BDP271LED16-4S730DM10 DR	1280	10.6	120.8	0.294	0.294	0.22	0.22	0.162	348.2	260.6	260.6	191.9
36	BDP271	BDP271LED18-4S730DM10 DR	1440	11.8	122.0	0.328	0.328	0.246	0.246	0.18	388.5	291.4	291.4	213.2
37	BDP271	BDP271LED20-4S730DM10 DR	1600	13.2	121.2	0.367	0.367	0.275	0.275	0.202	434.7	325.7	325.7	239.2
38	BDP271	BDP271LED22-4S730DM10 DR	1760	14.6	120.5	0.406	0.406	0.304	0.304	0.223	480.9	360.1	360.1	264.1

39	BDP271	BDP271LED24-4S730DM10 DR	1920	16.0	120.0	0.444	0.444	0.333	0.333	0.244	525.9	394.4	394.4	289.0
40	BDP271	BDP271LED27-4S730DM10 DR	2160	18.0	120.0	0.5	0.5	0.375	0.375	0.275	592.2	444.2	444.2	325.7
41	BDP271	BDP271LED30-4S730DM10 DR	2400	20.5	117.1	0.569	0.569	0.427	0.427	0.313	673.9	505.7	505.7	370.7
42	BDP271	BDP271LED34-4S730DM10 DR	2720	21.0	129.5	0.583	0.583	0.437	0.437	0.321	690.5	517.6	517.6	380.2
43	BDP271	BDP271LED35-4S730DM10 DR	2800	22.0	127.3	0.611	0.611	0.458	0.458	0.336	723.7	542.5	542.5	398.0
44	BDP271	BDP271LED39-4S730DM10 DR	3120	24.5	127.3	0.681	0.681	0.511	0.511	0.375	806.6	605.2	605.2	444.2
45	BDP271	BDP271LED40-4S730DM10 DR	3200	25.0	128.0	0.694	0.694	0.52	0.52	0.382	822.0	615.9	615.9	452.4
46	BDP271	BDP271LED44-4S730DM10 DR	3520	28.0	125.7	0.778	0.778	0.584	0.584	0.428	921.5	691.7	691.7	506.9
47	BDP271	BDP271LED45-4S730DM10 DR	3600	28.5	126.3	0.792	0.792	0.594	0.594	0.436	938.0	703.5	703.5	516.4
48	BDP271	BDP271LED50-4S730DM10 DR	4000	30.0	133.3	0.833	0.833	0.625	0.625	0.458	986.6	740.2	740.2	542.5
49	BDP271	BDP271LED55-4S730DM10 DR	4480	33.5	133.7	0.931	0.931	0.698	0.698	0.512	1102.7	826.7	826.7	606.4
50	BDP271	BDP271LED59-4S730DM10 DR	4800	36.0	133.3	1.0	1.0	0.75	0.75	0.55	1184.4	888.3	888.3	651.4
51	BDP271	BDP271LED64-4S730DM10 DR	5056	39.0	129.6	1.083	1.083	0.812	0.812	0.596	1282.7	961.7	961.7	705.9
52	BDP271	BDP271LED69-4S730DM10 DR	5530	42.5	130.1	1.181	1.181	0.886	0.886	0.65	1398.8	1049.4	1049.4	769.9

53	BDP271	BDP271LED74-4S730DM10 DR	5846	46.0	127.1	1.278	1.278	0.959	0.959	0.703	1513.7	1135.8	1135.8	832.6
54	BDP271	BDP271LED79-4S730DM10 DR	6320	47.5	133.1	1.319	1.319	0.989	0.989	0.725	1562.2	1171.4	1171.4	858.7
55	BDP271	BDP271LED84-4S730DM10 DR	6636	51.0	130.1	1.417	1.417	1.063	1.063	0.779	1678.3	1259.0	1259.0	922.6
56	BDP271	BDP271LED90-4S730DM10 DR	7110	55.0	129.3	1.528	1.528	1.146	1.146	0.84	1809.8	1357.3	1357.3	994.9
57	BDP271	BDP271LED94-4S730DM10 DR	7426	57.0	130.3	1.583	1.583	1.187	1.187	0.871	1874.9	1405.9	1405.9	1031.6
58	BDP271	BDP271LED109-4S730DM10 DR	8580	68.0	126.2	1.889	1.889	1.417	1.417	1.039	2237.3	1678.3	1678.3	1230.6
59	BDP271	BDP271LED120-4S730DM10 DR	9240	76.0	121.6	2.111	2.111	1.583	1.583	1.161	2500.3	1874.9	1874.9	1375.1
60	BDP271	BDP271LED6-4S830DM10 DR	480	5.0	96.0	0.139	0.139	0.104	0.104	0.076	164.6	123.2	123.2	90.0
61	BDP271	BDP271LED8-4S830DM10 DR	640	6.5	98.5	0.181	0.181	0.136	0.136	0.1	214.4	161.1	161.1	118.4
62	BDP271	BDP271LED10-4S830DM10 DR	800	7.9	101.3	0.219	0.219	0.164	0.164	0.12	259.4	194.2	194.2	142.1
63	BDP271	BDP271LED12-4S830DM10 DR	960	9.1	105.5	0.253	0.253	0.19	0.19	0.139	299.7	225.0	225.0	164.6
64	BDP271	BDP271LED14-4S830DM10 DR	1120	10.4	107.7	0.289	0.289	0.217	0.217	0.159	342.3	257.0	257.0	188.3
65	BDP271	BDP271LED16-4S830DM10 DR	1280	11.8	108.5	0.328	0.328	0.246	0.246	0.18	388.5	291.4	291.4	213.2
66	BDP271	BDP271LED18-4S830DM10 DR	1440	13.2	109.1	0.367	0.367	0.275	0.275	0.202	434.7	325.7	325.7	239.2

67	BDP271	BDP271LED20-4S830DM10 DR	1600	14.8	108.1	0.411	0.411	0.308	0.308	0.226	486.8	364.8	364.8	267.7
68	BDP271	BDP271LED22-4S830DM10 DR	1760	16.4	107.3	0.456	0.456	0.342	0.342	0.251	540.1	405.1	405.1	297.3
69	BDP271	BDP271LED24-4S830DM10 DR	1920	18.0	106.7	0.5	0.5	0.375	0.375	0.275	592.2	444.2	444.2	325.7
70	BDP271	BDP271LED27-4S830DM10 DR	2160	19.0	113.7	0.528	0.528	0.396	0.396	0.29	625.4	469.0	469.0	343.5
71	BDP271	BDP271LED30-4S830DM10 DR	2400	21.0	114.3	0.583	0.583	0.437	0.437	0.321	690.5	517.6	517.6	380.2
72	BDP271	BDP271LED34-4S830DM10 DR	2720	24.0	113.3	0.667	0.667	0.5	0.5	0.367	790.0	592.2	592.2	434.7
73	BDP271	BDP271LED35-4S830DM10 DR	2800	24.5	114.3	0.681	0.681	0.511	0.511	0.375	806.6	605.2	605.2	444.2
74	BDP271	BDP271LED39-4S830DM10 DR	3120	27.5	113.5	0.764	0.764	0.573	0.573	0.42	904.9	678.7	678.7	497.4
75	BDP271	BDP271LED40-4S830DM10 DR	3200	28.5	112.3	0.792	0.792	0.594	0.594	0.436	938.0	703.5	703.5	516.4
76	BDP271	BDP271LED44-4S830DM10 DR	3476	31.5	110.3	0.875	0.875	0.656	0.656	0.481	1036.4	777.0	777.0	569.7
77	BDP271	BDP271LED45-4S830DM10 DR	3555	32.0	111.1	0.889	0.889	0.667	0.667	0.489	1052.9	790.0	790.0	579.2
78	BDP271	BDP271LED50-4S830DM10 DR	3950	36.0	109.7	1.0	1.0	0.75	0.75	0.55	1184.4	888.3	888.3	651.4
79	BDP271	BDP271LED55-4S830DM10 DR	4424	37.5	118.0	1.042	1.042	0.782	0.782	0.573	1234.1	926.2	926.2	678.7
80	BDP271	BDP271LED59-4S830DM10 DR	4740	40.5	117.0	1.125	1.125	0.844	0.844	0.619	1332.5	999.6	999.6	733.1

81	BDP271	BDP271LED64-4S830DM10 DR	5056	44.5	113.6	1.236	1.236	0.927	0.927	0.68	1463.9	1097.9	1097.9	805.4
82	BDP271	BDP271LED69-4S830DM10 DR	5460	48.0	113.8	1.333	1.333	1.0	1.0	0.733	1578.8	1184.4	1184.4	868.2
83	BDP271	BDP271LED74-4S830DM10 DR	5772	52.0	111.0	1.444	1.444	1.083	1.083	0.794	1710.3	1282.7	1282.7	940.4
84	BDP271	BDP271LED79-4S830DM10 DR	6320	54.0	117.0	1.5	1.5	1.125	1.125	0.825	1776.6	1332.5	1332.5	977.1
85	BDP271	BDP271LED84-4S830DM10 DR	6636	57.0	116.4	1.583	1.583	1.187	1.187	0.871	1874.9	1405.9	1405.9	1031.6
86	BDP271	BDP271LED90-4S830DM10 DR	7020	62.0	113.2	1.722	1.722	1.292	1.292	0.947	2039.5	1530.2	1530.2	1121.6
87	BDP271	BDP271LED94-4S830DM10 DR	7332	65.0	112.8	1.806	1.806	1.355	1.355	0.993	2139.0	1604.9	1604.9	1176.1
88	BDP271	BDP271LED109-4S830DM10 DR	8470	77.0	110.0	2.139	2.139	1.604	1.604	1.176	2533.4	1899.8	1899.8	1392.9
89	BDP271	BDP271LED8-4S722DM10 DR	640	7.1	90.1	0.197	0.197	0.148	0.148	0.108	233.3	175.3	175.3	127.9
90	BDP271	BDP271LED10-4S722DM10 DR	800	8.8	90.9	0.244	0.244	0.183	0.183	0.134	289.0	216.7	216.7	158.7
91	BDP271	BDP271LED12-4S722DM10 DR	960	10.0	96.0	0.278	0.278	0.209	0.209	0.153	329.3	247.5	247.5	181.2
92	BDP271	BDP271LED14-4S722DM10 DR	1120	11.6	96.6	0.322	0.322	0.241	0.241	0.177	381.4	285.4	285.4	209.6
93	BDP271	BDP271LED16-4S722DM10 DR	1280	13.2	97.0	0.367	0.367	0.275	0.275	0.202	434.7	325.7	325.7	239.2
94	BDP271	BDP271LED18-4S722DM10 DR	1440	14.8	97.3	0.411	0.411	0.308	0.308	0.226	486.8	364.8	364.8	267.7

95	BDP271	BDP271LED20-4S722DM10 DR	1600	16.6	96.4	0.461	0.461	0.346	0.346	0.254	546.0	409.8	409.8	300.8
96	BDP271	BDP271LED22-4S722DM10 DR	1760	18.4	95.7	0.511	0.511	0.383	0.383	0.281	605.2	453.6	453.6	332.8
97	BDP271	BDP271LED24-4S722DM10 DR	1920	20.5	93.7	0.569	0.569	0.427	0.427	0.313	673.9	505.7	505.7	370.7
98	BDP271	BDP271LED27-4S722DM10 DR	2160	21.0	102.9	0.583	0.583	0.437	0.437	0.321	690.5	517.6	517.6	380.2
99	BDP271	BDP271LED30-4S722DM10 DR	2400	23.5	102.1	0.653	0.653	0.49	0.49	0.359	773.4	580.4	580.4	425.2
100	BDP271	BDP271LED34-4S722DM10 DR	2720	27.0	100.7	0.75	0.75	0.562	0.562	0.413	888.3	665.6	665.6	489.2

## 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 reference 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 family.

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. 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.

$$GSF = \frac{FU_{pep}}{FU_p} = \frac{1,000}{O_{lum}} * \frac{35,000}{RSL}$$

3. Calculate the GWP scaling factor ( $PGSF$ ), by multiplying the PSF by the GSF.

$$PGSF = PSF * GSF$$

- 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.

$$TSF = PGSF * CSF$$

**Table 3: 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

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

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

**Table 4: Impact per scaling factor (PEP EcoPassport aligned)**

	12NC or Product Family Code	Description	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
1	BDP271	BDP271LED8-4S740DM10 DR	640	5.6	114.3	0.156	0.085	0.064	0.064	0.047	100.7	75.8	75.8	55.7
2	BDP271	BDP271LED10-4S740DM10 DR	800	6.8	117.6	0.189	0.083	0.062	0.062	0.046	98.3	73.4	73.4	54.5
3	BDP271	BDP271LED12-4S740DM10 DR	960	7.7	124.7	0.214	0.078	0.058	0.058	0.043	92.4	68.7	68.7	50.9
4	BDP271	BDP271LED14-4S740DM10 DR	1120	8.9	125.8	0.247	0.077	0.058	0.058	0.042	91.2	68.7	68.7	49.7
5	BDP271	BDP271LED16-4S740DM10 DR	1280	10.0	128.0	0.278	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
6	BDP271	BDP271LED18-4S740DM10 DR	1440	11.2	128.6	0.311	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
7	BDP271	BDP271LED20-4S740DM10 DR	1600	12.4	129.0	0.344	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
8	BDP271	BDP271LED22-4S740DM10 DR	1760	13.6	129.4	0.378	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
9	BDP271	BDP271LED24-4S740DM10 DR	1920	15.0	128.0	0.417	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
10	BDP271	BDP271LED27-4S740DM10 DR	2160	17.0	127.1	0.472	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
11	BDP271	BDP271LED30-4S740DM10 DR	2400	19.0	126.3	0.528	0.077	0.058	0.058	0.042	91.2	68.7	68.7	49.7
12	BDP271	BDP271LED34-4S740DM10 DR	2720	20.0	136.0	0.556	0.072	0.054	0.054	0.04	85.3	64.0	64.0	47.4

13	BDP271	BDP271LED35-4S740DM10 DR	2800	20.5	136.6	0.569	0.071	0.053	0.053	0.039	84.1	62.8	62.8	46.2
14	BDP271	BDP271LED39-4S740DM10 DR	3120	23.0	135.7	0.639	0.072	0.054	0.054	0.04	85.3	64.0	64.0	47.4
15	BDP271	BDP271LED40-4S740DM10 DR	3200	23.5	136.2	0.653	0.071	0.053	0.053	0.039	84.1	62.8	62.8	46.2
16	BDP271	BDP271LED44-4S740DM10 DR	3520	26.0	135.4	0.722	0.071	0.053	0.053	0.039	84.1	62.8	62.8	46.2
17	BDP271	BDP271LED45-4S740DM10 DR	3600	27.0	133.3	0.75	0.073	0.055	0.055	0.04	86.5	65.1	65.1	47.4
18	BDP271	BDP271LED50-4S740DM10 DR	4000	28.5	140.4	0.792	0.069	0.052	0.052	0.038	81.7	61.6	61.6	45.0
19	BDP271	BDP271LED55-4S740DM10 DR	4480	31.5	142.2	0.875	0.068	0.051	0.051	0.037	80.5	60.4	60.4	43.8
20	BDP271	BDP271LED59-4S740DM10 DR	4800	33.5	143.3	0.931	0.068	0.051	0.051	0.037	80.5	60.4	60.4	43.8
21	BDP271	BDP271LED64-4S740DM10 DR	5056	37.0	136.6	1.028	0.071	0.053	0.053	0.039	84.1	62.8	62.8	46.2
22	BDP271	BDP271LED69-4S740DM10 DR	5530	40.0	138.2	1.111	0.07	0.053	0.053	0.039	82.9	62.8	62.8	46.2
23	BDP271	BDP271LED74-4S740DM10 DR	5846	43.0	136.0	1.194	0.072	0.054	0.054	0.04	85.3	64.0	64.0	47.4
24	BDP271	BDP271LED79-4S740DM10 DR	6162	44.5	138.5	1.236	0.07	0.053	0.053	0.039	82.9	62.8	62.8	46.2
25	BDP271	BDP271LED84-4S740DM10 DR	6636	47.5	139.7	1.319	0.07	0.053	0.053	0.039	82.9	62.8	62.8	46.2
26	BDP271	BDP271LED90-4S740DM10 DR	7110	51.0	139.4	1.417	0.069	0.052	0.052	0.038	81.7	61.6	61.6	45.0

27	BDP271	BDP271LED94-4S740DM10 DR	7426	54.0	137.5	1.5	0.071	0.053	0.053	0.039	84.1	62.8	62.8	46.2
28	BDP271	BDP271LED109-4S740DM10 DR	8580	63.0	136.2	1.75	0.072	0.054	0.054	0.04	85.3	64.0	64.0	47.4
29	BDP271	BDP271LED120-4S740DM10 DR	9360	71.0	131.8	1.972	0.073	0.055	0.055	0.04	86.5	65.1	65.1	47.4
30	BDP271	BDP271LED130-4S740DM10 DR	10010	77.0	130.0	2.139	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
31	BDP271	BDP271LED8-4S730DM10 DR	640	5.9	108.5	0.164	0.09	0.068	0.068	0.05	106.6	80.5	80.5	59.2
32	BDP271	BDP271LED10-4S730DM10 DR	800	7.1	112.7	0.197	0.086	0.065	0.065	0.047	101.9	77.0	77.0	55.7
33	BDP271	BDP271LED12-4S730DM10 DR	960	8.2	117.1	0.228	0.083	0.062	0.062	0.046	98.3	73.4	73.4	54.5
34	BDP271	BDP271LED14-4S730DM10 DR	1120	9.4	119.1	0.261	0.081	0.061	0.061	0.045	95.9	72.2	72.2	53.3
35	BDP271	BDP271LED16-4S730DM10 DR	1280	10.6	120.8	0.294	0.08	0.06	0.06	0.044	94.8	71.1	71.1	52.1
36	BDP271	BDP271LED18-4S730DM10 DR	1440	11.8	122.0	0.328	0.08	0.06	0.06	0.044	94.8	71.1	71.1	52.1
37	BDP271	BDP271LED20-4S730DM10 DR	1600	13.2	121.2	0.367	0.08	0.06	0.06	0.044	94.8	71.1	71.1	52.1
38	BDP271	BDP271LED22-4S730DM10 DR	1760	14.6	120.5	0.406	0.081	0.061	0.061	0.045	95.9	72.2	72.2	53.3
39	BDP271	BDP271LED24-4S730DM10 DR	1920	16.0	120.0	0.444	0.081	0.061	0.061	0.045	95.9	72.2	72.2	53.3
40	BDP271	BDP271LED27-4S730DM10 DR	2160	18.0	120.0	0.5	0.081	0.061	0.061	0.045	95.9	72.2	72.2	53.3

41	BDP271	BDP271LED30-4S730DM10 DR	2400	20.5	117.1	0.569	0.083	0.062	0.062	0.046	98.3	73.4	73.4	54.5
42	BDP271	BDP271LED34-4S730DM10 DR	2720	21.0	129.5	0.583	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
43	BDP271	BDP271LED35-4S730DM10 DR	2800	22.0	127.3	0.611	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
44	BDP271	BDP271LED39-4S730DM10 DR	3120	24.5	127.3	0.681	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
45	BDP271	BDP271LED40-4S730DM10 DR	3200	25.0	128.0	0.694	0.076	0.057	0.057	0.042	90.0	67.5	67.5	49.7
46	BDP271	BDP271LED44-4S730DM10 DR	3520	28.0	125.7	0.778	0.077	0.058	0.058	0.042	91.2	68.7	68.7	49.7
47	BDP271	BDP271LED45-4S730DM10 DR	3600	28.5	126.3	0.792	0.077	0.058	0.058	0.042	91.2	68.7	68.7	49.7
48	BDP271	BDP271LED50-4S730DM10 DR	4000	30.0	133.3	0.833	0.072	0.054	0.054	0.04	85.3	64.0	64.0	47.4
49	BDP271	BDP271LED55-4S730DM10 DR	4480	33.5	133.7	0.931	0.073	0.055	0.055	0.04	86.5	65.1	65.1	47.4
50	BDP271	BDP271LED59-4S730DM10 DR	4800	36.0	133.3	1.0	0.073	0.055	0.055	0.04	86.5	65.1	65.1	47.4
51	BDP271	BDP271LED64-4S730DM10 DR	5056	39.0	129.6	1.083	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
52	BDP271	BDP271LED69-4S730DM10 DR	5530	42.5	130.1	1.181	0.074	0.055	0.055	0.041	87.6	65.1	65.1	48.6
53	BDP271	BDP271LED74-4S730DM10 DR	5846	46.0	127.1	1.278	0.077	0.058	0.058	0.042	91.2	68.7	68.7	49.7
54	BDP271	BDP271LED79-4S730DM10 DR	6320	47.5	133.1	1.319	0.073	0.055	0.055	0.04	86.5	65.1	65.1	47.4

55	BDP271	BDP271LED84-4S730DM10 DR	6636	51.0	130.1	1.417	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
56	BDP271	BDP271LED90-4S730DM10 DR	7110	55.0	129.3	1.528	0.075	0.056	0.056	0.041	88.8	66.3	66.3	48.6
57	BDP271	BDP271LED94-4S730DM10 DR	7426	57.0	130.3	1.583	0.074	0.055	0.055	0.041	87.6	65.1	65.1	48.6
58	BDP271	BDP271LED109-4S730DM10 DR	8580	68.0	126.2	1.889	0.077	0.058	0.058	0.042	91.2	68.7	68.7	49.7
59	BDP271	BDP271LED120-4S730DM10 DR	9240	76.0	121.6	2.111	0.08	0.06	0.06	0.044	94.8	71.1	71.1	52.1
60	BDP271	BDP271LED6-4S830DM10 DR	480	5.0	96.0	0.139	0.101	0.076	0.076	0.056	119.6	90.0	90.0	66.3
61	BDP271	BDP271LED8-4S830DM10 DR	640	6.5	98.5	0.181	0.099	0.074	0.074	0.054	117.3	87.6	87.6	64.0
62	BDP271	BDP271LED10-4S830DM10 DR	800	7.9	101.3	0.219	0.096	0.072	0.072	0.053	113.7	85.3	85.3	62.8
63	BDP271	BDP271LED12-4S830DM10 DR	960	9.1	105.5	0.253	0.092	0.069	0.069	0.051	109.0	81.7	81.7	60.4
64	BDP271	BDP271LED14-4S830DM10 DR	1120	10.4	107.7	0.289	0.09	0.068	0.068	0.05	106.6	80.5	80.5	59.2
65	BDP271	BDP271LED16-4S830DM10 DR	1280	11.8	108.5	0.328	0.09	0.068	0.068	0.05	106.6	80.5	80.5	59.2
66	BDP271	BDP271LED18-4S830DM10 DR	1440	13.2	109.1	0.367	0.089	0.067	0.067	0.049	105.4	79.4	79.4	58.0
67	BDP271	BDP271LED20-4S830DM10 DR	1600	14.8	108.1	0.411	0.09	0.068	0.068	0.05	106.6	80.5	80.5	59.2
68	BDP271	BDP271LED22-4S830DM10 DR	1760	16.4	107.3	0.456	0.091	0.068	0.068	0.05	107.8	80.5	80.5	59.2

69	BDP271	BDP271LED24-4S830DM10 DR	1920	18.0	106.7	0.5	0.091	0.068	0.068	0.05	107.8	80.5	80.5	59.2
70	BDP271	BDP271LED27-4S830DM10 DR	2160	19.0	113.7	0.528	0.086	0.065	0.065	0.047	101.9	77.0	77.0	55.7
71	BDP271	BDP271LED30-4S830DM10 DR	2400	21.0	114.3	0.583	0.085	0.064	0.064	0.047	100.7	75.8	75.8	55.7
72	BDP271	BDP271LED34-4S830DM10 DR	2720	24.0	113.3	0.667	0.086	0.065	0.065	0.047	101.9	77.0	77.0	55.7
73	BDP271	BDP271LED35-4S830DM10 DR	2800	24.5	114.3	0.681	0.085	0.064	0.064	0.047	100.7	75.8	75.8	55.7
74	BDP271	BDP271LED39-4S830DM10 DR	3120	27.5	113.5	0.764	0.086	0.065	0.065	0.047	101.9	77.0	77.0	55.7
75	BDP271	BDP271LED40-4S830DM10 DR	3200	28.5	112.3	0.792	0.086	0.065	0.065	0.047	101.9	77.0	77.0	55.7
76	BDP271	BDP271LED44-4S830DM10 DR	3476	31.5	110.3	0.875	0.088	0.066	0.066	0.048	104.2	78.2	78.2	56.9
77	BDP271	BDP271LED45-4S830DM10 DR	3555	32.0	111.1	0.889	0.087	0.065	0.065	0.048	103.0	77.0	77.0	56.9
78	BDP271	BDP271LED50-4S830DM10 DR	3950	36.0	109.7	1.0	0.089	0.067	0.067	0.049	105.4	79.4	79.4	58.0
79	BDP271	BDP271LED55-4S830DM10 DR	4424	37.5	118.0	1.042	0.082	0.061	0.061	0.045	97.1	72.2	72.2	53.3
80	BDP271	BDP271LED59-4S830DM10 DR	4740	40.5	117.0	1.125	0.083	0.062	0.062	0.046	98.3	73.4	73.4	54.5
81	BDP271	BDP271LED64-4S830DM10 DR	5056	44.5	113.6	1.236	0.085	0.064	0.064	0.047	100.7	75.8	75.8	55.7
82	BDP271	BDP271LED69-4S830DM10 DR	5460	48.0	113.8	1.333	0.085	0.064	0.064	0.047	100.7	75.8	75.8	55.7

83	BDP271	BDP271LED74-4S830DM10 DR	5772	52.0	111.0	1.444	0.088	0.066	0.066	0.048	104.2	78.2	78.2	56.9
84	BDP271	BDP271LED79-4S830DM10 DR	6320	54.0	117.0	1.5	0.083	0.062	0.062	0.046	98.3	73.4	73.4	54.5
85	BDP271	BDP271LED84-4S830DM10 DR	6636	57.0	116.4	1.583	0.084	0.063	0.063	0.046	99.5	74.6	74.6	54.5
86	BDP271	BDP271LED90-4S830DM10 DR	7020	62.0	113.2	1.722	0.086	0.065	0.065	0.047	101.9	77.0	77.0	55.7
87	BDP271	BDP271LED94-4S830DM10 DR	7332	65.0	112.8	1.806	0.087	0.065	0.065	0.048	103.0	77.0	77.0	56.9
88	BDP271	BDP271LED109-4S830DM10 DR	8470	77.0	110.0	2.139	0.088	0.066	0.066	0.048	104.2	78.2	78.2	56.9
89	BDP271	BDP271LED8-4S722DM10 DR	640	7.1	90.1	0.197	0.108	0.081	0.081	0.059	127.9	95.9	95.9	69.9
90	BDP271	BDP271LED10-4S722DM10 DR	800	8.8	90.9	0.244	0.107	0.08	0.08	0.059	126.7	94.8	94.8	69.9
91	BDP271	BDP271LED12-4S722DM10 DR	960	10.0	96.0	0.278	0.101	0.076	0.076	0.056	119.6	90.0	90.0	66.3
92	BDP271	BDP271LED14-4S722DM10 DR	1120	11.6	96.6	0.322	0.1	0.075	0.075	0.055	118.4	88.8	88.8	65.1
93	BDP271	BDP271LED16-4S722DM10 DR	1280	13.2	97.0	0.367	0.1	0.075	0.075	0.055	118.4	88.8	88.8	65.1
94	BDP271	BDP271LED18-4S722DM10 DR	1440	14.8	97.3	0.411	0.1	0.075	0.075	0.055	118.4	88.8	88.8	65.1
95	BDP271	BDP271LED20-4S722DM10 DR	1600	16.6	96.4	0.461	0.101	0.076	0.076	0.056	119.6	90.0	90.0	66.3
96	BDP271	BDP271LED22-4S722DM10 DR	1760	18.4	95.7	0.511	0.102	0.076	0.076	0.056	120.8	90.0	90.0	66.3

97	BDP271	BDP271LED24-4S722DM10 DR	1920	20.5	93.7	0.569	0.104	0.078	0.078	0.057	123.2	92.4	92.4	67.5
98	BDP271	BDP271LED27-4S722DM10 DR	2160	21.0	102.9	0.583	0.094	0.071	0.071	0.052	111.3	84.1	84.1	61.6
99	BDP271	BDP271LED30-4S722DM10 DR	2400	23.5	102.1	0.653	0.095	0.071	0.071	0.052	112.5	84.1	84.1	61.6
100	BDP271	BDP271LED34-4S722DM10 DR	2720	27.0	100.7	0.75	0.097	0.073	0.073	0.053	114.9	86.5	86.5	62.8