ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Philips - DN610CI

Signify N.V.

EPD HUB, HUB-4176

Published on 08.01.2026, last updated on 08.01.2026, valid until 08.01.2031

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	TAMASI, HUNGARY
Place(s) of raw material origin	APAC, EU
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: ☐ Internal verification ☑ External verification
EPD verifier	Imane Uald Lamkaddam as an authorized verifier for EPD Hub

PRODUCT SPECIFICATION

Product name	Philips - DN610CI
Product number / reference	910771149175 / DN610C 24S/840UE PSU-E C WH
GTIN (Global Trade Item Number)	Not applicable
NOBB (Norwegian Building Product Database)	Not applicable
A1-A3 Specific data (%)	5.72

PRODUCT DESCRIPTION

Philips LuxSpace is designed to provide the perfect combination of efficiency, high visual comfort, and stylish design without compromising on lighting performance. LuxSpace offers a long lifetime and efficacy of up to 185 lm/W, along with excellent color rendering and light distribution which have a major influence on the visual and non-visual effects of light on human health and well-being. The LuxSpace downlight family offers a wide choice of options for creating the desired ambience and supporting user comfort, no matter what the application is.

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	230
Light source colour temperature, Kelvin	4000
Protection index for water and dust (IP)	IP20
Impact resistance index (IK)	IK02
Luminous flux, Lumens	2500
Electrical power, Watt	14.4
Luminous efficiency, Lm/W	173.6
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	30.23	APAC , EU
Minerals	0.05	EU
Fossil materials	69.75	APAC , EU
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	0.139

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	1.6501
Mass of packaging, kg	0.3526
Functional unit	Provide lighting that delivers an outgoing artificial luminous flux of 1000 lumens during a reference lifetime of 35000 hours
Reference service life (years)	20
Assigned lifetime (hours)	100000
GWP-total, A1-A3 (kg CO_2e)	16
GWP-fossil, A1-A3 (kg CO_2e)	16.4
Secondary material, inputs (%)	7.12
Secondary material, outputs (%)	28.7
Total energy use, A1-A3 (kWh)	64
Net freshwater use, A1-A3 (m^3)	1.23E-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 relevant = 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

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

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)

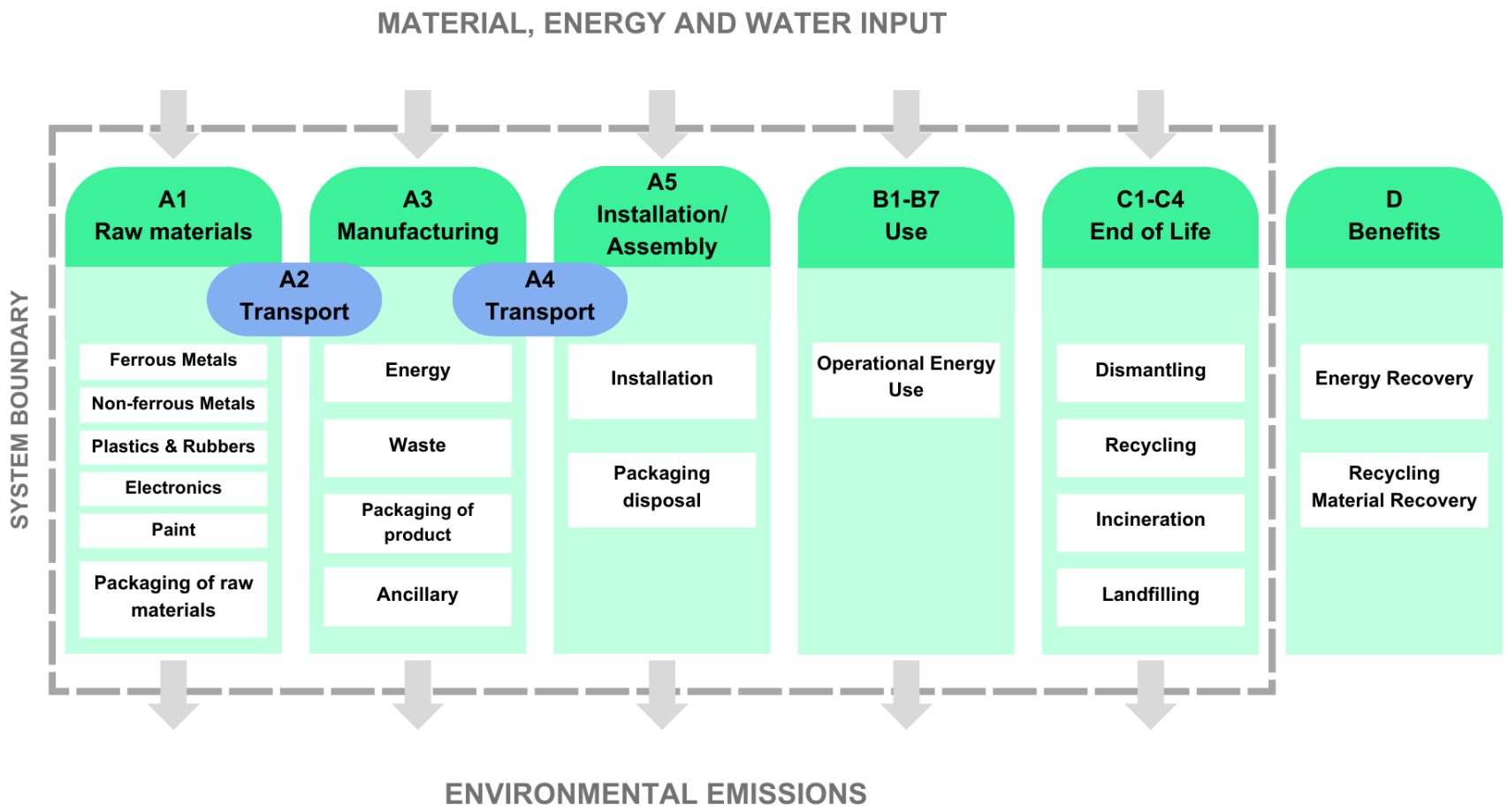
During the use phase, the product consumes electricity (B6), which is calculated multiplying the Wattage x Assigned lifetime (hours) x Country energy mix factor. To know which Country energy mix was used in this EPD, please refer to Annex 2.

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[1)]	kg CO_2e	1.52E+01	1.64E-01	6.23E-01	1.60E+01	2.11E-01	5.34E-01	ND	ND	ND	ND	ND	4.74E+02	ND	0.00E+00	4.81E-02	1.16E+00	6.00E-01	-4.17E+00
GWP – fossil	kg CO_2e	1.53E+01	1.64E-01	9.22E-01	1.64E+01	2.10E-01	2.61E-02	ND	ND	ND	ND	ND	4.71E+02	ND	0.00E+00	4.81E-02	1.16E+00	6.00E-01	-4.17E+00
GWP – biogenic	kg CO_2e	-1.43E-01	3.69E-05	-3.10E-01	-4.53E-01	4.77E-05	5.08E-01	ND	ND	ND	ND	ND	1.06E+00	ND	0.00E+00	1.05E-05	-1.47E-03	-5.48E-05	6.62E-04
GWP – LULUC	kg CO_2e	1.85E-02	7.38E-05	1.17E-02	3.03E-02	9.41E-05	8.17E-06	ND	ND	ND	ND	ND	1.45E+00	ND	0.00E+00	2.13E-05	4.63E-05	1.05E-05	-3.72E-03
Ozone depletion pot.	kg CFC_{-11}e	2.55E-07	2.42E-09	3.28E-08	2.90E-07	3.11E-09	3.05E-10	ND	ND	ND	ND	ND	8.69E-06	ND	0.00E+00	6.73E-10	6.13E-10	3.43E-10	-2.10E-08
Acidification potential	mol H^+e	9.70E-02	6.67E-04	3.29E-03	1.01E-01	7.17E-04	1.32E-04	ND	ND	ND	ND	ND	2.77E+00	ND	0.00E+00	1.60E-04	4.34E-04	1.69E-04	-3.91E-02
EP-freshwater[2)]	kg Pe	6.75E-03	1.26E-05	2.74E-04	7.04E-03	1.64E-05	2.23E-06	ND	ND	ND	ND	ND	4.39E-01	ND	0.00E+00	3.74E-06	1.40E-05	2.84E-06	-2.29E-03
EP-marine	kg Ne	1.52E-02	2.10E-04	1.38E-03	1.68E-02	2.36E-04	6.16E-05	ND	ND	ND	ND	ND	4.35E-01	ND	0.00E+00	5.19E-05	2.01E-04	5.08E-04	-4.72E-03
EP-terrestrial	mol Ne	1.59E-01	2.29E-03	9.10E-03	1.71E-01	2.56E-03	5.61E-04	ND	ND	ND	ND	ND	3.90E+00	ND	0.00E+00	5.65E-04	1.69E-03	7.91E-04	-5.02E-02
POCP ("smog")[3)]	kg NMVOCe	6.23E-02	8.95E-04	3.47E-03	6.67E-02	1.06E-03	1.60E-04	ND	ND	ND	ND	ND	1.28E+00	ND	0.00E+00	2.23E-04	4.44E-04	2.19E-04	-1.55E-02
ADP-minerals & metals[4)]	kg Sbe	6.66E-04	4.50E-07	6.17E-06	6.73E-04	5.87E-07	6.59E-08	ND	ND	ND	ND	ND	6.36E-03	ND	0.00E+00	1.58E-07	7.90E-07	5.48E-08	-1.66E-04
ADP-fossil resources	MJ	2.30E+02	2.37E+00	1.21E+01	2.44E+02	3.05E+00	2.29E-01	ND	ND	ND	ND	ND	1.10E+04	ND	0.00E+00	6.75E-01	4.81E-01	2.27E-01	-5.03E+01
Water use[5)]	m^3e depr.	4.61E+00	1.16E-02	3.51E-01	4.97E+00	1.51E-02	2.66E-02	ND	ND	ND	ND	ND	2.99E+02	ND	0.00E+00	3.13E-03	8.00E-02	3.83E-02	-7.40E-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	9.32E-07	1.61E-08	5.40E-08	1.00E-06	2.11E-08	1.64E-09	ND	ND	ND	ND	ND	9.88E-06	ND	0.00E+00	3.82E-09	4.23E-09	1.57E-09	-2.48E-07
Ionizing radiation[6)]	kBq U235e	9.27E-01	2.04E-03	3.45E-02	9.64E-01	2.66E-03	2.78E-04	ND	ND	ND	ND	ND	3.03E+02	ND	0.00E+00	5.46E-04	1.93E-03	3.26E-04	-3.25E-01
Ecotoxicity (freshwater)	CTUe	2.39E+02	3.32E-01	3.78E+00	2.44E+02	4.32E-01	6.37E-01	ND	ND	ND	ND	ND	1.67E+03	ND	0.00E+00	1.07E-01	2.38E+00	5.35E+00	-1.68E+01
Human toxicity, cancer	CTUh	1.16E-08	2.73E-11	3.64E-10	1.20E-08	3.47E-11	3.07E-11	ND	ND	ND	ND	ND	1.59E-07	ND	0.00E+00	8.18E-12	1.22E-10	5.87E-11	-2.11E-09
Human tox. non-cancer	CTUh	3.49E-07	1.52E-09	1.12E-08	3.62E-07	1.98E-09	1.25E-09	ND	ND	ND	ND	ND	8.26E-06	ND	0.00E+00	4.22E-10	4.27E-09	2.58E-09	-1.51E-07
SQP[7)]	-	8.20E+01	2.34E+00	4.21E+01	1.26E+02	3.07E+00	1.12E-01	ND	ND	ND	ND	ND	2.44E+03	ND	0.00E+00	4.03E-01	4.07E-01	2.68E-01	-1.25E+01

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 the 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	1.99E+01	3.22E-02	3.17E+00	2.32E+01	4.18E-02	-6.23E+00	ND	ND	ND	ND	ND	3.01E+03	ND	0.00E+00	9.25E-03	4.59E-02	6.58E-03	-3.88E+00
Renew. PER as material	MJ	1.89E+00	0.00E+00	2.60E+00	4.48E+00	0.00E+00	-4.48E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-9.36E-04	-1.74E-03	0.00E+00
Total use of renew. PER	MJ	2.18E+01	3.22E-02	5.77E+00	2.76E+01	4.18E-02	-1.07E+01	ND	ND	ND	ND	ND	3.01E+03	ND	0.00E+00	9.25E-03	4.50E-02	4.84E-03	-3.88E+00
Non-re. PER as energy	MJ	1.94E+02	2.37E+00	1.07E+01	2.07E+02	3.05E+00	1.67E-01	ND	ND	ND	ND	ND	1.10E+04	ND	0.00E+00	6.75E-01	-2.09E+01	-1.91E+01	-4.76E+01
Non-re. PER as material	MJ	3.52E+01	0.00E+00	-9.52E-01	3.42E+01	0.00E+00	-1.09E-01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-1.86E+01	-1.55E+01	0.00E+00
Total use of non-re. PER	MJ	2.29E+02	2.37E+00	9.74E+00	2.42E+02	3.05E+00	5.83E-02	ND	ND	ND	ND	ND	1.10E+04	ND	0.00E+00	6.75E-01	-3.95E+01	-3.46E+01	-4.76E+01
Secondary materials	kg	1.18E-01	0.00E+00	0.00E+00	1.18E-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	2.68E-02	1.26E-05	3.85E-02	6.54E-02	1.65E-05	2.86E-06	ND	ND	ND	ND	ND	1.45E-02	ND	0.00E+00	3.86E-06	1.95E-05	4.47E-06	-3.49E-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^3	1.15E-01	3.47E-04	7.97E-03	1.23E-01	4.51E-04	4.31E-04	ND	ND	ND	ND	ND	9.48E+00	ND	0.00E+00	8.94E-05	1.41E-03	-4.73E-04	-2.82E-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	1.96E+00	4.00E-03	4.81E-02	2.01E+00	5.17E-03	6.99E-03	ND	ND	ND	ND	ND	2.77E+01	ND	0.00E+00	1.18E-03	2.20E-02	2.58E-02	-6.33E-01
Non-hazardous waste	kg	4.05E+01	7.37E-02	2.76E+00	4.34E+01	9.57E-02	3.77E-01	ND	ND	ND	ND	ND	2.15E+03	ND	0.00E+00	2.21E-02	5.96E-01	1.94E+00	-8.74E+00
Radioactive waste	kg	2.31E-04	5.01E-07	8.28E-06	2.40E-04	6.51E-07	6.95E-08	ND	ND	ND	ND	ND	7.78E-02	ND	0.00E+00	1.34E-07	4.77E-07	8.17E-08	-7.92E-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	6.13E-03	6.13E-03	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	4.74E-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	5.80E+00	0.00E+00	0.00E+00
Exported energy – Electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	2.44E+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	3.36E+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_2e	1.53E+01	1.63E-01	9.68E-01	1.64E+01	2.09E-01	2.59E-02	ND	ND	ND	ND	ND	4.72E+02	ND	0.00E+00	4.78E-02	1.16E+00	5.99E-01	-4.14E+00
Ozone depletion Pot.	kg CFC_{-11}e	2.27E-07	1.93E-09	3.13E-08	2.60E-07	2.48E-09	2.59E-10	ND	ND	ND	ND	ND	7.26E-06	ND	0.00E+00	5.37E-10	5.35E-10	2.93E-10	-1.83E-08
Acidification	kg SO_2e	8.16E-02	5.14E-04	2.35E-03	8.45E-02	5.48E-04	9.68E-05	ND	ND	ND	ND	ND	2.36E+00	ND	0.00E+00	1.23E-04	3.25E-04	1.21E-04	-3.36E-02
Eutrophication	kg PO_4^3e	5.29E-02	1.12E-04	1.51E-03	5.46E-02	1.33E-04	3.01E-05	ND	ND	ND	ND	ND	3.05E-01	ND	0.00E+00	2.99E-05	8.92E-05	6.19E-05	-5.11E-03
POCP (“smog”)	kg C_2H_4e	7.43E-03	4.20E-05	2.59E-04	7.73E-03	4.88E-05	7.37E-06	ND	ND	ND	ND	ND	1.29E-01	ND	0.00E+00	1.10E-05	2.25E-05	1.28E-05	-1.89E-03
ADP-elements	kg Sbe	6.60E-04	4.39E-07	6.10E-06	6.67E-04	5.72E-07	5.50E-08	ND	ND	ND	ND	ND	6.34E-03	ND	0.00E+00	1.54E-07	7.62E-07	4.18E-08	-1.65E-04
ADP-fossil	MJ	2.14E+02	2.34E+00	1.16E+01	2.28E+02	3.01E+00	2.25E-01	ND	ND	ND	ND	ND	5.63E+03	ND	0.00E+00	6.66E-01	4.51E-01	2.22E-01	-4.49E+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 CO2e	1.53E+01	1.64E-01	9.34E-01	1.64E+01	2.10E-01	2.61E-02	ND	ND	ND	ND	ND	4.73E+02	ND	0.00E+00	4.81E-02	1.16E+00	6.00E-01	-4.18E+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 - CH4 fossil, CH4 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 CO2 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, Hungary, ecoinvent 3.10.1, 0.0326 kgCO2e/MJ
2. Energy supply, electricity production, solar photovoltaic, Electricity production, photovoltaic, 570kWp open ground installation, multi-Si, World, ecoinvent 3.10.1, 0.0829 kgCO2e/kWh

Transport scenario documentation - A4

1. Transport, freight, sea, container ship, 0.0 km
2. Transport, freight, lorry >32 metric ton, EURO5, 975.92 km

Installation scenario documentation - A5 (Waste materials data source)

1. Market for packaging film, low density polyethylene, 0.0017 kg
2. Market for printed paper, offset, 0.001 kg
3. Market for corrugated board box, 0.35 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, 1440.0 kWh

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m3	1.18E+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 / m³	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^3	0
Power output of equipment / kW	14.4
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	1.6501
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	4.74E-01
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	6.66E-01
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	110.0	6.67
Copper	13.14	0.8
Other Plastics	593.75	35.98
PCB Alu	11.93	0.72
PCB Copper	22.8	1.38
PCB Iron	21.59	1.31
PCB Non-ferrous metal	0.02	0.0
PCB Support	83.31	5.05
PCB Tin	1.36	0.08
PP / PS-High Impact PS / ABS	473.9	28.72
Silica Sand	0.78	0.05
Stainless Steel	5.0	0.3

Steel	312.95	18.96

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[1]	kg CO_2e	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) x 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 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 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 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.

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

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	DN610CI	DN610C 20S/830UE PSU-E C	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
2	DN610CI	DN610C 20S/830UE DIA-E C	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
3	DN610CI	DN610C 20S/830UE PSD-E C	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
4	DN610CI	DN610C 20S/830 PSU-E WR	2200	14	152.8	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
5	DN610CI	DN610C 20S/830 DIA-E WR	2200	15	146.7	1.042	1.042	0.782	0.782	0.573	493.7	370.5	370.5	271.5
6	DN610CI	DN610C 20S/830 PSD-E WR	2200	14	152.8	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
7	DN610CI	DN610C 20S/830 PSU-E M	2100	18	116.7	1.25	1.25	0.938	0.938	0.688	592.2	444.4	444.4	325.9
8	DN610CI	DN610C 20S/830 DIA-E M	2100	19	111.7	1.306	1.306	0.98	0.98	0.718	618.7	464.3	464.3	340.2
9	DN610CI	DN610C 20S/830 PSD-E M	2100	18	116.7	1.25	1.25	0.938	0.938	0.688	592.2	444.4	444.4	325.9
10	DN610CI	DN610C 20S/830 PSU-E BKR	2200	24	93.6	1.632	1.632	1.224	1.224	0.898	773.2	579.9	579.9	425.4

11	DN610CI	DN610C 20S/830 PSD-E BKR	2200	24	89.8	1.701	1.701	1.276	1.276	0.936	805.9	604.5	604.5	443.4
12	DN610CI	DN610C 20S/830 DIA-E BKR	2200	24	93.6	1.632	1.632	1.224	1.224	0.898	773.2	579.9	579.9	425.4
13	DN610CI	DN610C 20S/840UE PSU-E C	2200	13	174.6	0.875	0.875	0.656	0.656	0.481	414.5	310.8	310.8	227.9
14	DN610CI	DN610C 20S/840UE DIA-E C	2200	13	169.2	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
15	DN610CI	DN610C 20S/840UE PSD-E C	2200	13	169.2	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
16	DN610CI	DN610C 20S/840UE PSU-E WR	2300	14	159.7	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
17	DN610CI	DN610C 20S/840UE DIA-E WR	2300	15	153.3	1.042	1.042	0.782	0.782	0.573	493.7	370.5	370.5	271.5
18	DN610CI	DN610C 20S/840UE PSD-E WR	2300	14	159.7	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
19	DN610CI	DN610C 20S/840 PSU-E M	2100	18	116.7	1.25	1.25	0.938	0.938	0.688	592.2	444.4	444.4	325.9
20	DN610CI	DN610C 20S/840 DIA-E M	2100	19	110.5	1.319	1.319	0.989	0.989	0.725	624.9	468.5	468.5	343.5
21	DN610CI	DN610C 20S/840 PSD-E M	2100	18	116.7	1.25	1.25	0.938	0.938	0.688	592.2	444.4	444.4	325.9
22	DN610CI	DN610C 20S/840 PSU-E BKR	2300	24	97.9	1.632	1.632	1.224	1.224	0.898	773.2	579.9	579.9	425.4
23	DN610CI	DN610C 20S/840 PSD-E BKR	2300	25	92.0	1.736	1.736	1.302	1.302	0.955	822.4	616.8	616.8	452.4
24	DN610CI	DN610C 20S/840 DIA-E BKR	2300	24	97.9	1.632	1.632	1.224	1.224	0.898	773.2	579.9	579.9	425.4

25	DN610CI	DN610C 20S/930UE PSU-E C	2000	13	153.8	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
26	DN610CI	DN610C 20S/930UE PSD-E C	2000	13	153.8	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
27	DN610CI	DN610C 20S/930UE DIA-E C	2000	13	151.5	0.917	0.917	0.688	0.688	0.504	434.4	325.9	325.9	238.8
28	DN610CI	DN610C 20S/930UE PSU-E WR	2100	15	143.8	1.014	1.014	0.76	0.76	0.558	480.4	360.1	360.1	264.4
29	DN610CI	DN610C 20S/930UE PSD-E WR	2100	14	145.8	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
30	DN610CI	DN610C 20S/930UE DIA-E WR	2100	15	138.2	1.056	1.056	0.792	0.792	0.581	500.3	375.2	375.2	275.3
31	DN610CI	DN610C 20S/930 PSU-E M	2100	18	116.7	1.25	1.25	0.938	0.938	0.688	592.2	444.4	444.4	325.9
32	DN610CI	DN610C 20S/930 PSD-E M	2100	18	116.7	1.25	1.25	0.938	0.938	0.688	592.2	444.4	444.4	325.9
33	DN610CI	DN610C 20S/930 DIA-E M	2100	19	110.5	1.319	1.319	0.989	0.989	0.725	624.9	468.5	468.5	343.5
34	DN610CI	DN610C 20S/930 PSU-E BKR	2100	24	87.5	1.667	1.667	1.25	1.25	0.917	789.8	592.2	592.2	434.4
35	DN610CI	DN610C 20S/930 PSD-E BKR	2100	24	87.5	1.667	1.667	1.25	1.25	0.917	789.8	592.2	592.2	434.4
36	DN610CI	DN610C 20S/930 DIA-E BKR	2100	25	84.0	1.736	1.736	1.302	1.302	0.955	822.4	616.8	616.8	452.4
37	DN610CI	DN610C 20S/940UE PSU-E C	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
38	DN610CI	DN610C 20S/940UE PSD-E C	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5

39	DN610CI	DN610C 20S/940UE DIA-E C	2100	13	159.1	0.917	0.917	0.688	0.688	0.504	434.4	325.9	325.9	238.8
40	DN610CI	DN610C 20S/940UE PSU-E WR	2200	15	150.7	1.014	1.014	0.76	0.76	0.558	480.4	360.1	360.1	264.4
41	DN610CI	DN610C 20S/940UE PSD-E WR	2200	14	152.8	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
42	DN610CI	DN610C 20S/940UE DIA-E WR	2200	15	144.7	1.056	1.056	0.792	0.792	0.581	500.3	375.2	375.2	275.3
43	DN610CI	DN610C 20S/940 PSU-E M	2100	18	115.4	1.264	1.264	0.948	0.948	0.695	598.8	449.1	449.1	329.3
44	DN610CI	DN610C 20S/940 PSD-E M	2100	18	115.4	1.264	1.264	0.948	0.948	0.695	598.8	449.1	449.1	329.3
45	DN610CI	DN610C 20S/940 DIA-E M	2100	19	110.5	1.319	1.319	0.989	0.989	0.725	624.9	468.5	468.5	343.5
46	DN610CI	DN610C 20S/940 PSU-E BKR	2200	24	91.7	1.667	1.667	1.25	1.25	0.917	789.8	592.2	592.2	434.4
47	DN610CI	DN610C 20S/940 PSD-E BKR	2200	24	91.7	1.667	1.667	1.25	1.25	0.917	789.8	592.2	592.2	434.4
48	DN610CI	DN610C 20S/940 DIA-E BKR	2200	25	88.0	1.736	1.736	1.302	1.302	0.955	822.4	616.8	616.8	452.4
49	DN610CI	DN610C 24S/830UE PSU-E C	2400	15	162.2	1.028	1.028	0.771	0.771	0.565	487.0	365.3	365.3	267.7
50	DN610CI	DN610C 24S/830UE PSD-E C	2400	15	162.2	1.028	1.028	0.771	0.771	0.565	487.0	365.3	365.3	267.7
51	DN610CI	DN610C 24S/830UE DIA-E C	2400	15	162.2	1.028	1.028	0.771	0.771	0.565	487.0	365.3	365.3	267.7
52	DN610CI	DN610C 24S/830UE PSU-E WR	2500	16	154.3	1.125	1.125	0.844	0.844	0.619	533.0	399.9	399.9	293.3

53	DN610CI	DN610C 24S/830UE PSD-E WR	2500	16	154.3	1.125	1.125	0.844	0.844	0.619	533.0	399.9	399.9	293.3
54	DN610CI	DN610C 24S/830UE DIA-E WR	2500	17	148.8	1.167	1.167	0.875	0.875	0.642	552.9	414.5	414.5	304.2
55	DN610CI	DN610C 24S/830 PSU-E M	2300	20	117.3	1.361	1.361	1.021	1.021	0.749	644.8	483.7	483.7	354.8
56	DN610CI	DN610C 24S/830 PSD-E M	2300	20	116.2	1.375	1.375	1.031	1.031	0.756	651.4	488.4	488.4	358.2
57	DN610CI	DN610C 24S/830 DIA-E M	2300	20	112.2	1.424	1.424	1.068	1.068	0.783	674.6	506.0	506.0	371.0
58	DN610CI	DN610C 24S/830 PSU-E BKR	2500	28	87.7	1.979	1.979	1.484	1.484	1.088	937.6	703.1	703.1	515.5
59	DN610CI	DN610C 24S/830 PSD-E BKR	2500	28	90.9	1.91	1.91	1.432	1.432	1.05	904.9	678.4	678.4	497.4
60	DN610CI	DN610C 24S/830 DIA-E BKR	2500	28	87.7	1.979	1.979	1.484	1.484	1.088	937.6	703.1	703.1	515.5
61	DN610CI	DN610C 24S/840UE PSU-E C	2500	14	173.6	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
62	DN610CI	DN610C 24S/840UE PSD-E C	2500	15	168.9	1.028	1.028	0.771	0.771	0.565	487.0	365.3	365.3	267.7
63	DN610CI	DN610C 24S/840UE DIA-E C	2500	15	168.9	1.028	1.028	0.771	0.771	0.565	487.0	365.3	365.3	267.7
64	DN610CI	DN610C 24S/840UE PSU-E WR	2600	14	180.6	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
65	DN610CI	DN610C 24S/840UE PSD-E WR	2600	14	180.6	1.0	1.0	0.75	0.75	0.55	473.8	355.3	355.3	260.6
66	DN610CI	DN610C 24S/840UE DIA-E WR	2600	15	173.3	1.042	1.042	0.782	0.782	0.573	493.7	370.5	370.5	271.5

67	DN610CI	DN610C 24S/840 PSU-E M	2300	20	116.2	1.375	1.375	1.031	1.031	0.756	651.4	488.4	488.4	358.2
68	DN610CI	DN610C 24S/840 PSD-E M	2500	20	126.3	1.375	1.375	1.031	1.031	0.756	651.4	488.4	488.4	358.2
69	DN610CI	DN610C 24S/840 DIA-E M	2500	20	122.0	1.424	1.424	1.068	1.068	0.783	674.6	506.0	506.0	371.0
70	DN610CI	DN610C 24S/840 PSU-E BKR	2700	28	94.7	1.979	1.979	1.484	1.484	1.088	937.6	703.1	703.1	515.5
71	DN610CI	DN610C 24S/840 PSD-E BKR	2600	28	94.5	1.91	1.91	1.432	1.432	1.05	904.9	678.4	678.4	497.4
72	DN610CI	DN610C 24S/840 DIA-E BKR	2600	28	91.2	1.979	1.979	1.484	1.484	1.088	937.6	703.1	703.1	515.5
73	DN610CI	DN610C 24S/930UE PSU-E C	2400	15	162.2	1.028	1.028	0.771	0.771	0.565	487.0	365.3	365.3	267.7
74	DN610CI	DN610C 24S/930UE PSD-E C	2400	15	160.0	1.042	1.042	0.782	0.782	0.573	493.7	370.5	370.5	271.5
75	DN610CI	DN610C 24S/930UE DIA-E C	2400	15	157.9	1.056	1.056	0.792	0.792	0.581	500.3	375.2	375.2	275.3
76	DN610CI	DN610C 24S/930UE PSU-E WR	2400	16	148.1	1.125	1.125	0.844	0.844	0.619	533.0	399.9	399.9	293.3
77	DN610CI	DN610C 24S/930UE PSD-E WR	2400	16	148.1	1.125	1.125	0.844	0.844	0.619	533.0	399.9	399.9	293.3
78	DN610CI	DN610C 24S/930UE DIA-E WR	2400	17	141.2	1.181	1.181	0.886	0.886	0.65	559.5	419.8	419.8	307.9
79	DN610CI	DN610C 24S/930 PSU-E M	2400	22	111.6	1.493	1.493	1.12	1.12	0.821	707.3	530.6	530.6	389.0
80	DN610CI	DN610C 24S/930 PSD-E M	2400	22	109.1	1.528	1.528	1.146	1.146	0.84	723.9	542.9	542.9	398.0

81	DN610CI	DN610C 24S/930 DIA-E M	2400	22	106.7	1.562	1.562	1.171	1.171	0.859	740.0	554.8	554.8	407.0
82	DN610CI	DN610C 24S/930 PSU-E BKR	2400	29	82.8	2.014	2.014	1.51	1.51	1.108	954.2	715.4	715.4	524.9
83	DN610CI	DN610C 24S/930 PSD-E BKR	2400	28	87.3	1.91	1.91	1.432	1.432	1.05	904.9	678.4	678.4	497.4
84	DN610CI	DN610C 24S/930 DIA-E BKR	2400	28	84.2	1.979	1.979	1.484	1.484	1.088	937.6	703.1	703.1	515.5
85	DN610CI	DN610C 24S/940UE PSU-E C	2400	15	164.4	1.014	1.014	0.76	0.76	0.558	480.4	360.1	360.1	264.4
86	DN610CI	DN610C 24S/940UE PSD-E C	2400	15	160.0	1.042	1.042	0.782	0.782	0.573	493.7	370.5	370.5	271.5
87	DN610CI	DN610C 24S/940UE DIA-E C	2400	15	160.0	1.042	1.042	0.782	0.782	0.573	493.7	370.5	370.5	271.5
88	DN610CI	DN610C 24S/940UE PSU-E WR	2500	16	154.3	1.125	1.125	0.844	0.844	0.619	533.0	399.9	399.9	293.3
89	DN610CI	DN610C 24S/940UE PSD-E WR	2500	16	154.3	1.125	1.125	0.844	0.844	0.619	533.0	399.9	399.9	293.3
90	DN610CI	DN610C 24S/940UE DIA-E WR	2500	17	147.1	1.181	1.181	0.886	0.886	0.65	559.5	419.8	419.8	307.9
91	DN610CI	DN610C 24S/940 PSU-E M	2500	22	116.3	1.493	1.493	1.12	1.12	0.821	707.3	530.6	530.6	389.0
92	DN610CI	DN610C 24S/940 PSD-E M	2500	22	113.6	1.528	1.528	1.146	1.146	0.84	723.9	542.9	542.9	398.0
93	DN610CI	DN610C 24S/940 DIA-E M	2500	23	108.7	1.597	1.597	1.198	1.198	0.878	756.6	567.6	567.6	416.0
94	DN610CI	DN610C 24S/940 PSU-E BKR	2500	29	86.2	2.014	2.014	1.51	1.51	1.108	954.2	715.4	715.4	524.9

95	DN610CI	DN610C 24S/940 PSD-E BKR	2500	28	90.9	1.91	1.91	1.432	1.432	1.05	904.9	678.4	678.4	497.4
96	DN610CI	DN610C 24S/940 DIA-E BKR	2500	29	86.2	2.014	2.014	1.51	1.51	1.108	954.2	715.4	715.4	524.9
97	DN610CI	DN610C 20S/830UE PSU-E FLR	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
98	DN610CI	DN610C 20S/830UE DIA-E FLR	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
99	DN610CI	DN610C 20S/830UE PSD-E FLR	2100	13	161.5	0.903	0.903	0.677	0.677	0.497	427.8	320.7	320.7	235.5
100	DN610CI	DN610C 20S/840UE PSU-E FLR	2200	13	174.6	0.875	0.875	0.656	0.656	0.481	414.5	310.8	310.8	227.9

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. 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 (Olum) and reference service lifetime (RSL) of the product to estimate the final environmental impact. The scaled impact (SIpep) 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 (P*GSF*), by multiplying the PSF by the GSF.

$$PGSF = PSF * GSF$$

4. 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

5. 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	DN610CI	DN610C 20S/830UE PSU-E C	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
2	DN610CI	DN610C 20S/830UE DIA-E C	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
3	DN610CI	DN610C 20S/830UE PSD-E C	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
4	DN610CI	DN610C 20S/830 PSU-E WR	2200	14	152.8	1.0	0.159	0.119	0.119	0.087	75.3	56.4	56.4	41.2
5	DN610CI	DN610C 20S/830 DIA-E WR	2200	15	146.7	1.042	0.166	0.124	0.124	0.091	78.6	58.7	58.7	43.1
6	DN610CI	DN610C 20S/830 PSD-E WR	2200	14	152.8	1.0	0.159	0.119	0.119	0.087	75.3	56.4	56.4	41.2
7	DN610CI	DN610C 20S/830 PSU-E M	2100	18	116.7	1.25	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
8	DN610CI	DN610C 20S/830 DIA-E M	2100	19	111.7	1.306	0.218	0.164	0.164	0.12	103.3	77.7	77.7	56.9
9	DN610CI	DN610C 20S/830 PSD-E M	2100	18	116.7	1.25	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
10	DN610CI	DN610C 20S/830 PSU-E BKR	2200	24	93.6	1.632	0.259	0.194	0.194	0.142	122.7	91.9	91.9	67.3
11	DN610CI	DN610C 20S/830 PSD-E BKR	2200	24	89.8	1.701	0.27	0.203	0.203	0.149	127.9	96.2	96.2	70.6
12	DN610CI	DN610C 20S/830 DIA-E BKR	2200	24	93.6	1.632	0.259	0.194	0.194	0.142	122.7	91.9	91.9	67.3

13	DN610CI	DN610C 20S/840UE PSU-E C	2200	13	174.6	0.875	0.139	0.104	0.104	0.076	65.9	49.3	49.3	36.0
14	DN610CI	DN610C 20S/840UE DIA-E C	2200	13	169.2	0.903	0.144	0.108	0.108	0.079	68.2	51.2	51.2	37.4
15	DN610CI	DN610C 20S/840UE PSD-E C	2200	13	169.2	0.903	0.144	0.108	0.108	0.079	68.2	51.2	51.2	37.4
16	DN610CI	DN610C 20S/840UE PSU-E WR	2300	14	159.7	1.0	0.152	0.114	0.114	0.084	72.0	54.0	54.0	39.8
17	DN610CI	DN610C 20S/840UE DIA-E WR	2300	15	153.3	1.042	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2
18	DN610CI	DN610C 20S/840UE PSD-E WR	2300	14	159.7	1.0	0.152	0.114	0.114	0.084	72.0	54.0	54.0	39.8
19	DN610CI	DN610C 20S/840 PSU-E M	2100	18	116.7	1.25	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
20	DN610CI	DN610C 20S/840 DIA-E M	2100	19	110.5	1.319	0.22	0.165	0.165	0.121	104.2	78.2	78.2	57.3
21	DN610CI	DN610C 20S/840 PSD-E M	2100	18	116.7	1.25	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
22	DN610CI	DN610C 20S/840 PSU-E BKR	2300	24	97.9	1.632	0.248	0.186	0.186	0.136	117.5	88.1	88.1	64.4
23	DN610CI	DN610C 20S/840 PSD-E BKR	2300	25	92.0	1.736	0.264	0.198	0.198	0.145	125.1	93.8	93.8	68.7
24	DN610CI	DN610C 20S/840 DIA-E BKR	2300	24	97.9	1.632	0.248	0.186	0.186	0.136	117.5	88.1	88.1	64.4
25	DN610CI	DN610C 20S/930UE PSU-E C	2000	13	153.8	0.903	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2
26	DN610CI	DN610C 20S/930UE PSD-E C	2000	13	153.8	0.903	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2

27	DN610CI	DN610C 20S/930UE DIA-E C	2000	13	151.5	0.917	0.16	0.12	0.12	0.088	75.8	56.9	56.9	41.7
28	DN610CI	DN610C 20S/930UE PSU-E WR	2100	15	143.8	1.014	0.169	0.127	0.127	0.093	80.1	60.2	60.2	44.1
29	DN610CI	DN610C 20S/930UE PSD-E WR	2100	14	145.8	1.0	0.167	0.125	0.125	0.092	79.1	59.2	59.2	43.6
30	DN610CI	DN610C 20S/930UE DIA-E WR	2100	15	138.2	1.056	0.176	0.132	0.132	0.097	83.4	62.5	62.5	46.0
31	DN610CI	DN610C 20S/930 PSU-E M	2100	18	116.7	1.25	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
32	DN610CI	DN610C 20S/930 PSD-E M	2100	18	116.7	1.25	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
33	DN610CI	DN610C 20S/930 DIA-E M	2100	19	110.5	1.319	0.22	0.165	0.165	0.121	104.2	78.2	78.2	57.3
34	DN610CI	DN610C 20S/930 PSU-E BKR	2100	24	87.5	1.667	0.278	0.209	0.209	0.153	131.7	99.0	99.0	72.5
35	DN610CI	DN610C 20S/930 PSD-E BKR	2100	24	87.5	1.667	0.278	0.209	0.209	0.153	131.7	99.0	99.0	72.5
36	DN610CI	DN610C 20S/930 DIA-E BKR	2100	25	84.0	1.736	0.29	0.217	0.217	0.16	137.4	102.8	102.8	75.8
37	DN610CI	DN610C 20S/940UE PSU-E C	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
38	DN610CI	DN610C 20S/940UE PSD-E C	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
39	DN610CI	DN610C 20S/940UE DIA-E C	2100	13	159.1	0.917	0.153	0.115	0.115	0.084	72.5	54.5	54.5	39.8
40	DN610CI	DN610C 20S/940UE PSU-E WR	2200	15	150.7	1.014	0.161	0.121	0.121	0.089	76.3	57.3	57.3	42.2

41	DN610CI	DN610C 20S/940UE PSD-E WR	2200	14	152.8	1.0	0.159	0.119	0.119	0.087	75.3	56.4	56.4	41.2
42	DN610CI	DN610C 20S/940UE DIA-E WR	2200	15	144.7	1.056	0.168	0.126	0.126	0.092	79.6	59.7	59.7	43.6
43	DN610CI	DN610C 20S/940 PSU-E M	2100	18	115.4	1.264	0.211	0.158	0.158	0.116	100.0	74.9	74.9	55.0
44	DN610CI	DN610C 20S/940 PSD-E M	2100	18	115.4	1.264	0.211	0.158	0.158	0.116	100.0	74.9	74.9	55.0
45	DN610CI	DN610C 20S/940 DIA-E M	2100	19	110.5	1.319	0.22	0.165	0.165	0.121	104.2	78.2	78.2	57.3
46	DN610CI	DN610C 20S/940 PSU-E BKR	2200	24	91.7	1.667	0.265	0.199	0.199	0.146	125.5	94.3	94.3	69.2
47	DN610CI	DN610C 20S/940 PSD-E BKR	2200	24	91.7	1.667	0.265	0.199	0.199	0.146	125.5	94.3	94.3	69.2
48	DN610CI	DN610C 20S/940 DIA-E BKR	2200	25	88.0	1.736	0.276	0.207	0.207	0.152	130.8	98.1	98.1	72.0
49	DN610CI	DN610C 24S/830UE PSU-E C	2400	15	162.2	1.028	0.15	0.112	0.112	0.083	71.1	53.1	53.1	39.3
50	DN610CI	DN610C 24S/830UE PSD-E C	2400	15	162.2	1.028	0.15	0.112	0.112	0.083	71.1	53.1	53.1	39.3
51	DN610CI	DN610C 24S/830UE DIA-E C	2400	15	162.2	1.028	0.15	0.112	0.112	0.083	71.1	53.1	53.1	39.3
52	DN610CI	DN610C 24S/830UE PSU-E WR	2500	16	154.3	1.125	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2
53	DN610CI	DN610C 24S/830UE PSD-E WR	2500	16	154.3	1.125	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2
54	DN610CI	DN610C 24S/830UE DIA-E WR	2500	17	148.8	1.167	0.163	0.122	0.122	0.09	77.2	57.8	57.8	42.6

55	DN610CI	DN610C 24S/830 PSU-E M	2300	20	117.3	1.361	0.207	0.155	0.155	0.114	98.1	73.4	73.4	54.0
56	DN610CI	DN610C 24S/830 PSD-E M	2300	20	116.2	1.375	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
57	DN610CI	DN610C 24S/830 DIA-E M	2300	20	112.2	1.424	0.216	0.162	0.162	0.119	102.3	76.7	76.7	56.4
58	DN610CI	DN610C 24S/830 PSU-E BKR	2500	28	87.7	1.979	0.277	0.208	0.208	0.152	131.2	98.5	98.5	72.0
59	DN610CI	DN610C 24S/830 PSD-E BKR	2500	28	90.9	1.91	0.267	0.2	0.2	0.147	126.5	94.8	94.8	69.6
60	DN610CI	DN610C 24S/830 DIA-E BKR	2500	28	87.7	1.979	0.277	0.208	0.208	0.152	131.2	98.5	98.5	72.0
61	DN610CI	DN610C 24S/840UE PSU-E C	2500	14	173.6	1.0	0.14	0.105	0.105	0.077	66.3	49.7	49.7	36.5
62	DN610CI	DN610C 24S/840UE PSD-E C	2500	15	168.9	1.028	0.144	0.108	0.108	0.079	68.2	51.2	51.2	37.4
63	DN610CI	DN610C 24S/840UE DIA-E C	2500	15	168.9	1.028	0.144	0.108	0.108	0.079	68.2	51.2	51.2	37.4
64	DN610CI	DN610C 24S/840UE PSU-E WR	2600	14	180.6	1.0	0.135	0.101	0.101	0.074	64.0	47.8	47.8	35.1
65	DN610CI	DN610C 24S/840UE PSD-E WR	2600	14	180.6	1.0	0.135	0.101	0.101	0.074	64.0	47.8	47.8	35.1
66	DN610CI	DN610C 24S/840UE DIA-E WR	2600	15	173.3	1.042	0.141	0.106	0.106	0.078	66.8	50.2	50.2	37.0
67	DN610CI	DN610C 24S/840 PSU-E M	2300	20	116.2	1.375	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
68	DN610CI	DN610C 24S/840 PSD-E M	2500	20	126.3	1.375	0.193	0.145	0.145	0.106	91.4	68.7	68.7	50.2

69	DN610CI	DN610C 24S/840 DIA-E M	2500	20	122.0	1.424	0.199	0.149	0.149	0.109	94.3	70.6	70.6	51.6
70	DN610CI	DN610C 24S/840 PSU-E BKR	2700	28	94.7	1.979	0.257	0.193	0.193	0.141	121.8	91.4	91.4	66.8
71	DN610CI	DN610C 24S/840 PSD-E BKR	2600	28	94.5	1.91	0.258	0.194	0.194	0.142	122.2	91.9	91.9	67.3
72	DN610CI	DN610C 24S/840 DIA-E BKR	2600	28	91.2	1.979	0.267	0.2	0.2	0.147	126.5	94.8	94.8	69.6
73	DN610CI	DN610C 24S/930UE PSU-E C	2400	15	162.2	1.028	0.15	0.112	0.112	0.083	71.1	53.1	53.1	39.3
74	DN610CI	DN610C 24S/930UE PSD-E C	2400	15	160.0	1.042	0.152	0.114	0.114	0.084	72.0	54.0	54.0	39.8
75	DN610CI	DN610C 24S/930UE DIA-E C	2400	15	157.9	1.056	0.154	0.115	0.115	0.085	73.0	54.5	54.5	40.3
76	DN610CI	DN610C 24S/930UE PSU-E WR	2400	16	148.1	1.125	0.164	0.123	0.123	0.09	77.7	58.3	58.3	42.6
77	DN610CI	DN610C 24S/930UE PSD-E WR	2400	16	148.1	1.125	0.164	0.123	0.123	0.09	77.7	58.3	58.3	42.6
78	DN610CI	DN610C 24S/930UE DIA-E WR	2400	17	141.2	1.181	0.172	0.129	0.129	0.095	81.5	61.1	61.1	45.0
79	DN610CI	DN610C 24S/930 PSU-E M	2400	22	111.6	1.493	0.218	0.164	0.164	0.12	103.3	77.7	77.7	56.9
80	DN610CI	DN610C 24S/930 PSD-E M	2400	22	109.1	1.528	0.223	0.167	0.167	0.123	105.6	79.1	79.1	58.3
81	DN610CI	DN610C 24S/930 DIA-E M	2400	22	106.7	1.562	0.228	0.171	0.171	0.125	108.0	81.0	81.0	59.2
82	DN610CI	DN610C 24S/930 PSU-E BKR	2400	29	82.8	2.014	0.294	0.22	0.22	0.162	139.3	104.2	104.2	76.7

83	DN610CI	DN610C 24S/930 PSD-E BKR	2400	28	87.3	1.91	0.279	0.209	0.209	0.153	132.2	99.0	99.0	72.5
84	DN610CI	DN610C 24S/930 DIA-E BKR	2400	28	84.2	1.979	0.289	0.217	0.217	0.159	136.9	102.8	102.8	75.3
85	DN610CI	DN610C 24S/940UE PSU-E C	2400	15	164.4	1.014	0.148	0.111	0.111	0.081	70.1	52.6	52.6	38.4
86	DN610CI	DN610C 24S/940UE PSD-E C	2400	15	160.0	1.042	0.152	0.114	0.114	0.084	72.0	54.0	54.0	39.8
87	DN610CI	DN610C 24S/940UE DIA-E C	2400	15	160.0	1.042	0.152	0.114	0.114	0.084	72.0	54.0	54.0	39.8
88	DN610CI	DN610C 24S/940UE PSU-E WR	2500	16	154.3	1.125	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2
89	DN610CI	DN610C 24S/940UE PSD-E WR	2500	16	154.3	1.125	0.158	0.118	0.118	0.087	74.9	55.9	55.9	41.2
90	DN610CI	DN610C 24S/940UE DIA-E WR	2500	17	147.1	1.181	0.165	0.124	0.124	0.091	78.2	58.7	58.7	43.1
91	DN610CI	DN610C 24S/940 PSU-E M	2500	22	116.3	1.493	0.209	0.157	0.157	0.115	99.0	74.4	74.4	54.5
92	DN610CI	DN610C 24S/940 PSD-E M	2500	22	113.6	1.528	0.214	0.161	0.161	0.118	101.4	76.3	76.3	55.9
93	DN610CI	DN610C 24S/940 DIA-E M	2500	23	108.7	1.597	0.224	0.168	0.168	0.123	106.1	79.6	79.6	58.3
94	DN610CI	DN610C 24S/940 PSU-E BKR	2500	29	86.2	2.014	0.282	0.211	0.211	0.155	133.6	100.0	100.0	73.4
95	DN610CI	DN610C 24S/940 PSD-E BKR	2500	28	90.9	1.91	0.267	0.2	0.2	0.147	126.5	94.8	94.8	69.6
96	DN610CI	DN610C 24S/940 DIA-E BKR	2500	29	86.2	2.014	0.282	0.211	0.211	0.155	133.6	100.0	100.0	73.4

97	DN610CI	DN610C 20S/830UE PSU-E FLR	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
98	DN610CI	DN610C 20S/830UE DIA-E FLR	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
99	DN610CI	DN610C 20S/830UE PSD-E FLR	2100	13	161.5	0.903	0.151	0.113	0.113	0.083	71.5	53.5	53.5	39.3
100	DN610CI	DN610C 20S/840UE PSU-E FLR	2200	13	174.6	0.875	0.139	0.104	0.104	0.076	65.9	49.3	49.3	36.0