

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	0.5	0.35
Copper	1.5	1.07
Glass	84.59	60.42
Non-ferrous metal	1.1	0.78
Other Mineral	10	7.14
Other Plastics	3.5	2.5
Paint	0.01	0
PCB Copper	5.27	3.76
PCB Iron	5.27	3.76
PCB Support	20.15	14.39
PCB Tin	0.31	0.22
Silica Sand	7.41	5.29
Steel	0.4	0.29

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 country energy 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 ₂ e	1.08E+01	2.33E-01	5.06E-01	1.15E+01	3.27E+00	1.68E+00	ND	ND	ND	ND	ND	4.06E-02	ND	0.00E+00	2.88E-02	5.13E-01	2.80E-01	-9.88E-01

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 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

- 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 [L/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	929004365002	CorePro LED HPL/SON M 1.8Klm13W827E27 FR	1800	13	138.5	0.565	0.565	0.424	0.424	0.311	106.9	80.2	80.2	58.8
2	929004365102	CorePro LED HPL/SON M 2Klm13W830E27 FR	2000	13	153.8	0.565	0.565	0.424	0.424	0.311	106.9	80.2	80.2	58.8
3	929004365202	CorePro LED HPL/SON M 2Klm13W840E27 FR	2000	13	153.8	0.565	0.565	0.424	0.424	0.311	106.9	80.2	80.2	58.8
4	929004365302	CorePro LED HPL/SON M2.6Klm18.3W827E27FR	2600	18.3	142.1	0.796	0.796	0.597	0.597	0.438	150.5	112.9	112.9	82.8
5	929004365402	CorePro LED HPL/SON M3Klm18.3W830E27FR	3000	18.3	163.9	0.796	0.796	0.597	0.597	0.438	150.5	112.9	112.9	82.8
6	929004365502	CorePro LED HPL/SON M3Klm18.3W840E27FR	3000	18.3	163.9	0.796	0.796	0.597	0.597	0.438	150.5	112.9	112.9	82.8
7	929004365602	CorePro LED HPL/SON M 3.6Klm23W 827E27FR	3600	23	156.5	1.000	1.000	0.750	0.750	0.550	189.2	141.9	141.9	104.0
8	929004365702	CorePro LED HPL/SON M 4Klm 23W 830E27 FR	4000	23	173.9	1.000	1.000	0.750	0.750	0.550	189.2	141.9	141.9	104.0
9	929004365802	CorePro LED HPL/SON M 4Klm 23W840E27 FR	4000	23	173.9	1.000	1.000	0.750	0.750	0.550	189.2	141.9	141.9	104.0

10	929004365902	CorePro LED HPL/SON M5.3Klm28.5W827E27FR	5300	28.5	186.0	1.239	1.239	0.929	0.929	0.682	234.4	175.8	175.8	128.9
11	929004366002	CorePro LED HPL/SON M5.5Klm29.5W830E27FR	5500	29.5	186.4	1.283	1.283	0.962	0.962	0.705	242.6	182.0	182.0	133.5
12	929004366102	CorePro LED HPL/SON M 6Klm 31W 840 E27FR	6000	31	193.5	1.348	1.348	1.011	1.011	0.741	255.0	191.2	191.2	140.2
13	929004366202	CorePro LED HPL/SON M5.3Klm28.5W827E40FR	5300	28.5	186.0	1.239	1.239	0.929	0.929	0.682	234.4	175.8	175.8	128.9
14	929004366302	CorePro LED HPL/SON M5.5Klm29.5W830E40FR	5500	29.5	186.4	1.283	1.283	0.962	0.962	0.705	242.6	182.0	182.0	133.5
15	929004366402	CorePro LED HPL/SON M 6Klm 31W 840 E40FR	6000	31	193.5	1.348	1.348	1.011	1.011	0.741	255.0	191.2	191.2	140.2

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.

$$PGSF = PSF * GSF$$

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 [L/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	929004365002	CorePro LED HPL/SON M 1.8Klm13W827E27 FR	1800	13	138.5	0.565	0.440	0.330	0.330	0.242	83.2	62.4	62.4	45.7
2	929004365102	CorePro LED HPL/SON M 2Klm13W830E27 FR	2000	13	153.8	0.565	0.396	0.297	0.297	0.218	74.8	56.1	56.1	41.2
3	929004365202	CorePro LED HPL/SON M 2Klm13W840E27 FR	2000	13	153.8	0.565	0.396	0.297	0.297	0.218	74.8	56.1	56.1	41.2
4	929004365302	CorePro LED HPL/SON M2.6Klm18.3W827E27FR	2600	18.3	142.1	0.796	0.428	0.321	0.321	0.236	81.0	60.8	60.8	44.6
5	929004365402	CorePro LED HPL/SON M3Klm18.3W830E27FR	3000	18.3	163.9	0.796	0.371	0.278	0.278	0.204	70.2	52.7	52.7	38.6
6	929004365502	CorePro LED HPL/SON M3Klm18.3W840E27FR	3000	18.3	163.9	0.796	0.371	0.278	0.278	0.204	70.2	52.7	52.7	38.6
7	929004365602	CorePro LED HPL/SON M 3.6Klm23W 827E27FR	3600	23	156.5	1.000	0.389	0.292	0.292	0.214	73.6	55.2	55.2	40.5
8	929004365702	CorePro LED HPL/SON M 4Klm 23W 830E27 FR	4000	23	173.9	1.0	0.4	0.3	0.3	0.2	66.2	49.7	49.7	36.4
9	929004365802	CorePro LED HPL/SON M 4Klm 23W840E27 FR	4000	23	173.9	1.0	0.4	0.3	0.3	0.2	66.2	49.7	49.7	36.4
10	929004365902	CorePro LED HPL/SON M5.3Klm28.5W827E27FR	5300	28.5	186.0	1.2	0.3	0.2	0.2	0.2	61.9	46.4	46.4	34.1
11	929004366002	CorePro LED HPL/SON M5.5Klm29.5W830E27FR	5500	29.5	186.4	1.3	0.3	0.2	0.2	0.2	61.8	46.3	46.3	34.0
12	929004366102	CorePro LED HPL/SON M 6Klm 31W 840 E27FR	6000	31	193.5	1.3	0.3	0.2	0.2	0.2	59.5	44.6	44.6	32.7

13	929004366202	CorePro LED HPL/SON M5.3Klm28.5W827E40FR	5300	28.5	186.0	1.2	0.3	0.2	0.2	0.2	61.9	46.4	46.4	34.1
14	929004366302	CorePro LED HPL/SON M5.5Klm29.5W830E40FR	5500	29.5	186.4	1.3	0.3	0.2	0.2	0.2	61.8	46.3	46.3	34.0
15	929004366402	CorePro LED HPL/SON M 6Klm 31W 840 E40FR	6000	31	193.5	1.3	0.3	0.2	0.2	0.2	59.5	44.6	44.6	32.7