

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-%
Copper	155.4	15.12
Paint	27	2.63
PCB Copper	24.81	2.41
PCB Iron	19.55	1.9
PCB Non-ferrous metal	0.18	0.02
PCB Support	136.26	13.26
PCB Tin	2.2	0.21
PMMA - Polymethyl Methacrylate	28.82	2.8
PS - Polystyrene	29.34	2.85
PVC - Polyvinyl Chloride	264.6	25.75
Steel	339.6	33.04

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
		IRELAND	3.50E-01
		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.

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

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 [L/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	RC720SI	L600 17S 830 MICB PSD ELDC	1600	13.2	121.2	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
2	RC720SI	L600 17S 830 MICB PSD ELP3	1600	13.4	119.4	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
3	RC720SI	L600 17S 830 MICB PSU ELDC	1600	13.4	119.4	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
4	RC720SI	L600 17S 830 MICB PSU ELP3	1600	13.4	119.4	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
5	RC720SI	L600 17S 830 MICB SIA ELDC	1600	13.2	121.2	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
6	RC720SI	L600 17S 830 MICS PSD ELDC	1800	13.2	136.4	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
7	RC720SI	L600 17S 830 MICS PSD ELP3	1800	13.4	134.3	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
8	RC720SI	L600 17S 830 MICS PSU ELDC	1800	13.4	134.3	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2

9	RC720SI	L600 17S 830 MICS PSU ELP3	1800	13.4	134.3	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
10	RC720SI	L600 17S 830 MICS SIA ELDC	1800	13.2	136.4	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
11	RC720SI	L600 17S 840 MICB PSD ELDC	1700	13.2	128.8	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
12	RC720SI	L600 17S 840 MICB PSD ELP3	1700	13.4	126.9	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
13	RC720SI	L600 17S 840 MICB PSU ELDC	1700	13.4	126.9	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
14	RC720SI	L600 17S 840 MICB PSU ELP3	1700	13.4	126.9	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
15	RC720SI	L600 17S 840 MICB SIA ELDC	1700	13.2	128.8	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
16	RC720SI	L600 17S 840 MICS PSD ELDC	1600	11.2	142.9	1.018	1.018	0.764	0.764	0.560	184.2	138.2	138.2	101.3
17	RC720SI	L600 17S 840 MICS PSD ELP3	1600	11.0	145.5	1.000	1.000	0.750	0.750	0.550	181.0	135.7	135.7	99.5
18	RC720SI	L600 17S 840 MICS PSU ELDC	1600	11.2	142.9	1.018	1.018	0.764	0.764	0.560	184.2	138.2	138.2	101.3
19	RC720SI	L600 17S 840 MICS PSU ELP3	1600	11.2	142.9	1.018	1.018	0.764	0.764	0.560	184.2	138.2	138.2	101.3
20	RC720SI	L600 17S 840 MICS SIA ELDC	1600	11.2	142.9	1.018	1.018	0.764	0.764	0.560	184.2	138.2	138.2	101.3
21	RC720SI	L600 17S 930 MICB PSD ELDC	1550	13.2	117.4	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
22	RC720SI	L600 17S 930 MICB PSD ELP3	1550	13.4	115.7	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2

23	RC720SI	L600 17S 930 MICB PSU ELDC	1550	13.4	115.7	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
24	RC720SI	L600 17S 930 MICB PSU ELP3	1550	13.4	115.7	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
25	RC720SI	L600 17S 930 MICB SIA ELDC	1550	13.2	117.4	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
26	RC720SI	L600 17S 930 MICS PSD ELDC	1750	13.2	132.6	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
27	RC720SI	L600 17S 930 MICS PSD ELP3	1750	13.4	130.6	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
28	RC720SI	L600 17S 930 MICS PSU ELDC	1750	13.4	130.6	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
29	RC720SI	L600 17S 930 MICS PSU ELP3	1750	13.4	130.6	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
30	RC720SI	L600 17S 930 MICS SIA ELDC	1750	13.2	132.6	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
31	RC720SI	L600 17S 940 MICB PSD ELDC	1600	13.2	121.2	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
32	RC720SI	L600 17S 940 MICB PSD ELP3	1600	13.4	119.4	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
33	RC720SI	L600 17S 940 MICB PSU ELDC	1600	13.4	119.4	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
34	RC720SI	L600 17S 940 MICB PSU ELP3	1600	13.4	119.4	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
35	RC720SI	L600 17S 940 MICB SIA ELDC	1600	13.2	121.2	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4
36	RC720SI	L600 17S 940 MICS PSD ELDC	1850	13.2	140.2	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4

37	RC720SI	L600 17S 940 MICS PSD ELP3	1850	13.4	138.1	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
38	RC720SI	L600 17S 940 MICS PSU ELDC	1850	13.4	138.1	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
39	RC720SI	L600 17S 940 MICS PSU ELP3	1850	13.4	138.1	1.218	1.218	0.914	0.914	0.670	220.4	165.3	165.3	121.2
40	RC720SI	L600 17S 940 MICS SIA ELDC	1850	13.2	140.2	1.200	1.200	0.900	0.900	0.660	217.1	162.9	162.9	119.4

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	RC720SI	L600 17S 830 MICB PSD ELDC	1600	13.2	121.2	1.200	0.525	0.394	0.394	0.289	95.0	71.2	71.2	52.2
2	RC720SI	L600 17S 830 MICB PSD ELP3	1600	13.4	119.4	1.218	0.533	0.400	0.400	0.293	96.4	72.3	72.3	53.0
3	RC720SI	L600 17S 830 MICB PSU ELDC	1600	13.4	119.4	1.218	0.533	0.400	0.400	0.293	96.4	72.3	72.3	53.0
4	RC720SI	L600 17S 830 MICB PSU ELP3	1600	13.4	119.4	1.218	0.533	0.400	0.400	0.293	96.4	72.3	72.3	53.0
5	RC720SI	L600 17S 830 MICB SIA ELDC	1600	13.2	121.2	1.200	0.525	0.394	0.394	0.289	95.0	71.2	71.2	52.2
6	RC720SI	L600 17S 830 MICS PSD ELDC	1800	13.2	136.4	1.200	0.467	0.350	0.350	0.257	84.4	63.3	63.3	46.4
7	RC720SI	L600 17S 830 MICS PSD ELP3	1800	13.4	134.3	1.218	0.474	0.355	0.355	0.261	85.7	64.3	64.3	47.1
8	RC720SI	L600 17S 830 MICS PSU ELDC	1800	13.4	134.3	1.2	0.5	0.4	0.4	0.3	85.7	64.3	64.3	47.1
9	RC720SI	L600 17S 830 MICS PSU ELP3	1800	13.4	134.3	1.2	0.5	0.4	0.4	0.3	85.7	64.3	64.3	47.1
10	RC720SI	L600 17S 830 MICS SIA ELDC	1800	13.2	136.4	1.2	0.5	0.4	0.4	0.3	84.4	63.3	63.3	46.4
11	RC720SI	L600 17S 840 MICB PSD ELDC	1700	13.2	128.8	1.2	0.5	0.4	0.4	0.3	89.4	67.1	67.1	49.2
12	RC720SI	L600 17S 840 MICB PSD ELP3	1700	13.4	126.9	1.2	0.5	0.4	0.4	0.3	90.8	68.1	68.1	49.9

13	RC720SI	L600 17S 840 MICB PSU ELDC	1700	13.4	126.9	1.2	0.5	0.4	0.4	0.3	90.8	68.1	68.1	49.9
14	RC720SI	L600 17S 840 MICB PSU ELP3	1700	13.4	126.9	1.2	0.5	0.4	0.4	0.3	90.8	68.1	68.1	49.9
15	RC720SI	L600 17S 840 MICB SIA ELDC	1700	13.2	128.8	1.2	0.5	0.4	0.4	0.3	89.4	67.1	67.1	49.2
16	RC720SI	L600 17S 840 MICS PSD ELDC	1600	11.2	142.9	1.0	0.4	0.3	0.3	0.2	80.6	60.5	60.5	44.3
17	RC720SI	L600 17S 840 MICS PSD ELP3	1600	11.0	145.5	1.0	0.4	0.3	0.3	0.2	79.2	59.4	59.4	43.5
18	RC720SI	L600 17S 840 MICS PSU ELDC	1600	11.2	142.9	1.0	0.4	0.3	0.3	0.2	80.6	60.5	60.5	44.3
19	RC720SI	L600 17S 840 MICS PSU ELP3	1600	11.2	142.9	1.0	0.4	0.3	0.3	0.2	80.6	60.5	60.5	44.3
20	RC720SI	L600 17S 840 MICS SIA ELDC	1600	11.2	142.9	1.0	0.4	0.3	0.3	0.2	80.6	60.5	60.5	44.3
21	RC720SI	L600 17S 930 MICB PSD ELDC	1550	13.2	117.4	1.2	0.5	0.4	0.4	0.3	98.1	73.5	73.5	53.9
22	RC720SI	L600 17S 930 MICB PSD ELP3	1550	13.4	115.7	1.2	0.6	0.4	0.4	0.3	99.5	74.7	74.7	54.8
23	RC720SI	L600 17S 930 MICB PSU ELDC	1550	13.4	115.7	1.2	0.6	0.4	0.4	0.3	99.5	74.7	74.7	54.8
24	RC720SI	L600 17S 930 MICB PSU ELP3	1550	13.4	115.7	1.2	0.6	0.4	0.4	0.3	99.5	74.7	74.7	54.8
25	RC720SI	L600 17S 930 MICB SIA ELDC	1550	13.2	117.4	1.2	0.5	0.4	0.4	0.3	98.1	73.5	73.5	53.9
26	RC720SI	L600 17S 930 MICS PSD ELDC	1750	13.2	132.6	1.2	0.5	0.4	0.4	0.3	86.9	65.1	65.1	47.8

27	RC720SI	L600 17S 930 MICS PSD ELP3	1750	13.4	130.6	1.2	0.5	0.4	0.4	0.3	88.2	66.1	66.1	48.5
28	RC720SI	L600 17S 930 MICS PSU ELDC	1750	13.4	130.6	1.2	0.5	0.4	0.4	0.3	88.2	66.1	66.1	48.5
29	RC720SI	L600 17S 930 MICS PSU ELP3	1750	13.4	130.6	1.2	0.5	0.4	0.4	0.3	88.2	66.1	66.1	48.5
30	RC720SI	L600 17S 930 MICS SIA ELDC	1750	13.2	132.6	1.2	0.5	0.4	0.4	0.3	86.9	65.1	65.1	47.8
31	RC720SI	L600 17S 940 MICB PSD ELDC	1600	13.2	121.2	1.2	0.5	0.4	0.4	0.3	95.0	71.2	71.2	52.2
32	RC720SI	L600 17S 940 MICB PSD ELP3	1600	13.4	119.4	1.2	0.5	0.4	0.4	0.3	96.4	72.3	72.3	53.0
33	RC720SI	L600 17S 940 MICB PSU ELDC	1600	13.4	119.4	1.2	0.5	0.4	0.4	0.3	96.4	72.3	72.3	53.0
34	RC720SI	L600 17S 940 MICB PSU ELP3	1600	13.4	119.4	1.2	0.5	0.4	0.4	0.3	96.4	72.3	72.3	53.0
35	RC720SI	L600 17S 940 MICB SIA ELDC	1600	13.2	121.2	1.2	0.5	0.4	0.4	0.3	95.0	71.2	71.2	52.2
36	RC720SI	L600 17S 940 MICS PSD ELDC	1850	13.2	140.2	1.2	0.5	0.3	0.3	0.2	82.2	61.6	61.6	45.2
37	RC720SI	L600 17S 940 MICS PSD ELP3	1850	13.4	138.1	1.2	0.5	0.3	0.3	0.3	83.4	62.6	62.6	45.9
38	RC720SI	L600 17S 940 MICS PSU ELDC	1850	13.4	138.1	1.2	0.5	0.3	0.3	0.3	83.4	62.6	62.6	45.9
39	RC720SI	L600 17S 940 MICS PSU ELP3	1850	13.4	138.1	1.2	0.5	0.3	0.3	0.3	83.4	62.6	62.6	45.9
40	RC720SI	L600 17S 940 MICS SIA ELDC	1850	13.2	140.2	1.2	0.5	0.3	0.3	0.2	82.2	61.6	61.6	45.2

