

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	18.69
Paint	27	3.25
PCB Copper	28.13	3.38
PCB Iron	25.5	3.07
PCB Non-ferrous metal	0.09	0.01
PCB Support	128.25	15.43
PCB Tin	2.03	0.24
PMMA - Polymethyl Methacrylate	14.41	1.73
PS - Polystyrene	14.67	1.76
PVC - Polyvinyl Chloride	264.6	31.83
Steel	171.2	20.59

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	L300 8S 830 MICB PSD ELDC	800	7.1	112.7	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
2	RC720SI	L300 8S 830 MICB PSD ELP3	800	7.1	112.7	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
3	RC720SI	L300 8S 830 MICB PSU ELDC	800	7.2	111.1	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
4	RC720SI	L300 8S 830 MICB PSU ELP3	800	7.2	111.1	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
5	RC720SI	L300 8S 830 MICB SIA ELDC	800	7.2	111.1	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
6	RC720SI	L300 8S 830 MICS PSD ELDC	900	7.1	126.8	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
7	RC720SI	L300 8S 830 MICS PSD ELP3	900	7.1	126.8	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
8	RC720SI	L300 8S 830 MICS PSU ELDC	900	7.3	123.3	1.028	1.028	0.771	0.771	0.565	120.1	90.1	90.1	66.0

9	RC720SI	L300 8S 830 MICS PSU ELP3	900	7.2	125.0	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
10	RC720SI	L300 8S 830 MICS SIA ELDC	900	7.2	125.0	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
11	RC720SI	L300 8S 840 MICB PSD ELDC	840	7.1	118.3	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
12	RC720SI	L300 8S 840 MICB PSD ELP3	840	7.1	118.3	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
13	RC720SI	L300 8S 840 MICB PSU ELDC	840	7.2	116.7	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
14	RC720SI	L300 8S 840 MICB PSU ELP3	840	7.2	116.7	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
15	RC720SI	L300 8S 840 MICB SIA ELDC	840	7.2	116.7	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
16	RC720SI	L300 8S 840 MICS PSD ELDC	960	7.1	135.2	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
17	RC720SI	L300 8S 840 MICS PSD ELP3	960	7.1	135.2	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
18	RC720SI	L300 8S 840 MICS PSU ELDC	960	7.3	131.5	1.028	1.028	0.771	0.771	0.565	120.1	90.1	90.1	66.0
19	RC720SI	L300 8S 840 MICS PSU ELP3	960	7.3	131.5	1.028	1.028	0.771	0.771	0.565	120.1	90.1	90.1	66.0
20	RC720SI	L300 8S 840 MICS SIA ELDC	960	7.1	135.2	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
21	RC720SI	L300 8S 930 MICB PSD ELDC	780	7.1	109.9	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
22	RC720SI	L300 8S 930 MICB PSD ELP3	780	7.1	109.9	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2

23	RC720SI	L300 8S 930 MICB PSU ELDC	780	7.2	108.3	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
24	RC720SI	L300 8S 930 MICB PSU ELP3	780	6.7	116.4	0.944	0.944	0.708	0.708	0.519	110.2	82.7	82.7	60.6
25	RC720SI	L300 8S 930 MICB SIA ELDC	780	7.2	108.3	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
26	RC720SI	L300 8S 930 MICS PSD ELDC	880	7.1	123.9	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
27	RC720SI	L300 8S 930 MICS PSD ELP3	880	7.1	123.9	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
28	RC720SI	L300 8S 930 MICS PSU ELDC	880	7.3	120.5	1.028	1.028	0.771	0.771	0.565	120.1	90.1	90.1	66.0
29	RC720SI	L300 8S 930 MICS PSU ELP3	880	6.7	131.3	0.944	0.944	0.708	0.708	0.519	110.2	82.7	82.7	60.6
30	RC720SI	L300 8S 930 MICS SIA ELDC	880	7.2	122.2	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
31	RC720SI	L300 8S 940 MICB PSD ELDC	800	7.1	112.7	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
32	RC720SI	L300 8S 940 MICB PSD ELP3	800	7.1	112.7	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
33	RC720SI	L300 8S 940 MICB PSU ELDC	800	7.2	111.1	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
34	RC720SI	L300 8S 940 MICB PSU ELP3	800	6.7	119.4	0.944	0.944	0.708	0.708	0.519	110.2	82.7	82.7	60.6
35	RC720SI	L300 8S 940 MICB SIA ELDC	800	7.2	111.1	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1
36	RC720SI	L300 8S 940 MICS PSD ELDC	920	7.1	129.6	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2

37	RC720SI	L300 8S 940 MICS PSD ELP3	920	7.1	129.6	1.000	1.000	0.750	0.750	0.550	116.8	87.6	87.6	64.2
38	RC720SI	L300 8S 940 MICS PSU ELDC	920	7.3	126.0	1.028	1.028	0.771	0.771	0.565	120.1	90.1	90.1	66.0
39	RC720SI	L300 8S 940 MICS PSU ELP3	920	6.7	137.3	0.944	0.944	0.708	0.708	0.519	110.2	82.7	82.7	60.6
40	RC720SI	L300 8S 940 MICS SIA ELDC	920	7.2	127.8	1.014	1.014	0.761	0.761	0.558	118.4	88.8	88.8	65.1

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	L300 8S 830 MICB PSD ELDC	800	7.1	112.7	1.000	0.875	0.656	0.656	0.481	102.2	76.6	76.6	56.2
2	RC720SI	L300 8S 830 MICB PSD ELP3	800	7.1	112.7	1.000	0.875	0.656	0.656	0.481	102.2	76.6	76.6	56.2
3	RC720SI	L300 8S 830 MICB PSU ELDC	800	7.2	111.1	1.014	0.887	0.665	0.665	0.488	103.6	77.7	77.7	57.0
4	RC720SI	L300 8S 830 MICB PSU ELP3	800	7.2	111.1	1.014	0.887	0.665	0.665	0.488	103.6	77.7	77.7	57.0
5	RC720SI	L300 8S 830 MICB SIA ELDC	800	7.2	111.1	1.014	0.887	0.665	0.665	0.488	103.6	77.7	77.7	57.0
6	RC720SI	L300 8S 830 MICS PSD ELDC	900	7.1	126.8	1.000	0.778	0.583	0.583	0.428	90.8	68.1	68.1	50.0
7	RC720SI	L300 8S 830 MICS PSD ELP3	900	7.1	126.8	1.000	0.778	0.583	0.583	0.428	90.8	68.1	68.1	50.0
8	RC720SI	L300 8S 830 MICS PSU ELDC	900	7.3	123.3	1.0	0.8	0.6	0.6	0.4	93.4	70.0	70.0	51.4
9	RC720SI	L300 8S 830 MICS PSU ELP3	900	7.2	125.0	1.0	0.8	0.6	0.6	0.4	92.1	69.1	69.1	50.7
10	RC720SI	L300 8S 830 MICS SIA ELDC	900	7.2	125.0	1.0	0.8	0.6	0.6	0.4	92.1	69.1	69.1	50.7
11	RC720SI	L300 8S 840 MICB PSD ELDC	840	7.1	118.3	1.0	0.8	0.6	0.6	0.5	97.3	73.0	73.0	53.5
12	RC720SI	L300 8S 840 MICB PSD ELP3	840	7.1	118.3	1.0	0.8	0.6	0.6	0.5	97.3	73.0	73.0	53.5

13	RC720SI	L300 8S 840 MICB PSU ELDC	840	7.2	116.7	1.0	0.8	0.6	0.6	0.5	98.7	74.0	74.0	54.3
14	RC720SI	L300 8S 840 MICB PSU ELP3	840	7.2	116.7	1.0	0.8	0.6	0.6	0.5	98.7	74.0	74.0	54.3
15	RC720SI	L300 8S 840 MICB SIA ELDC	840	7.2	116.7	1.0	0.8	0.6	0.6	0.5	98.7	74.0	74.0	54.3
16	RC720SI	L300 8S 840 MICS PSD ELDC	960	7.1	135.2	1.0	0.7	0.5	0.5	0.4	85.2	63.9	63.9	46.8
17	RC720SI	L300 8S 840 MICS PSD ELP3	960	7.1	135.2	1.0	0.7	0.5	0.5	0.4	85.2	63.9	63.9	46.8
18	RC720SI	L300 8S 840 MICS PSU ELDC	960	7.3	131.5	1.0	0.7	0.6	0.6	0.4	87.6	65.7	65.7	48.2
19	RC720SI	L300 8S 840 MICS PSU ELP3	960	7.3	131.5	1.0	0.7	0.6	0.6	0.4	87.6	65.7	65.7	48.2
20	RC720SI	L300 8S 840 MICS SIA ELDC	960	7.1	135.2	1.0	0.7	0.5	0.5	0.4	85.2	63.9	63.9	46.8
21	RC720SI	L300 8S 930 MICB PSD ELDC	780	7.1	109.9	1.0	0.9	0.7	0.7	0.5	104.8	78.6	78.6	57.6
22	RC720SI	L300 8S 930 MICB PSD ELP3	780	7.1	109.9	1.0	0.9	0.7	0.7	0.5	104.8	78.6	78.6	57.6
23	RC720SI	L300 8S 930 MICB PSU ELDC	780	7.2	108.3	1.0	0.9	0.7	0.7	0.5	106.3	79.7	79.7	58.5
24	RC720SI	L300 8S 930 MICB PSU ELP3	780	6.7	116.4	0.9	0.8	0.6	0.6	0.5	98.9	74.2	74.2	54.4
25	RC720SI	L300 8S 930 MICB SIA ELDC	780	7.2	108.3	1.0	0.9	0.7	0.7	0.5	106.3	79.7	79.7	58.5
26	RC720SI	L300 8S 930 MICS PSD ELDC	880	7.1	123.9	1.0	0.8	0.6	0.6	0.4	92.9	69.7	69.7	51.1

27	RC720SI	L300 8S 930 MICS PSD ELP3	880	7.1	123.9	1.0	0.8	0.6	0.6	0.4	92.9	69.7	69.7	51.1
28	RC720SI	L300 8S 930 MICS PSU ELDC	880	7.3	120.5	1.0	0.8	0.6	0.6	0.4	95.5	71.6	71.6	52.5
29	RC720SI	L300 8S 930 MICS PSU ELP3	880	6.7	131.3	0.9	0.8	0.6	0.6	0.4	87.7	65.8	65.8	48.2
30	RC720SI	L300 8S 930 MICS SIA ELDC	880	7.2	122.2	1.0	0.8	0.6	0.6	0.4	94.2	70.7	70.7	51.8
31	RC720SI	L300 8S 940 MICB PSD ELDC	800	7.1	112.7	1.0	0.9	0.7	0.7	0.5	102.2	76.6	76.6	56.2
32	RC720SI	L300 8S 940 MICB PSD ELP3	800	7.1	112.7	1.0	0.9	0.7	0.7	0.5	102.2	76.6	76.6	56.2
33	RC720SI	L300 8S 940 MICB PSU ELDC	800	7.2	111.1	1.0	0.9	0.7	0.7	0.5	103.6	77.7	77.7	57.0
34	RC720SI	L300 8S 940 MICB PSU ELP3	800	6.7	119.4	0.9	0.8	0.6	0.6	0.5	96.4	72.3	72.3	53.0
35	RC720SI	L300 8S 940 MICB SIA ELDC	800	7.2	111.1	1.0	0.9	0.7	0.7	0.5	103.6	77.7	77.7	57.0
36	RC720SI	L300 8S 940 MICS PSD ELDC	920	7.1	129.6	1.0	0.8	0.6	0.6	0.4	88.9	66.6	66.6	48.9
37	RC720SI	L300 8S 940 MICS PSD ELP3	920	7.1	129.6	1.0	0.8	0.6	0.6	0.4	88.9	66.6	66.6	48.9
38	RC720SI	L300 8S 940 MICS PSU ELDC	920	7.3	126.0	1.0	0.8	0.6	0.6	0.4	91.4	68.5	68.5	50.3
39	RC720SI	L300 8S 940 MICS PSU ELP3	920	6.7	137.3	0.9	0.7	0.5	0.5	0.4	83.9	62.9	62.9	46.1
40	RC720SI	L300 8S 940 MICS SIA ELDC	920	7.2	127.8	1.0	0.8	0.6	0.6	0.4	90.1	67.6	67.6	49.6

