

# ENVIRONMENTAL PRODUCT DECLARATION

## IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Cascade Flex Vitality - Integral Emergency  
Whitecroft Lighting Limited



**EPD HUB, HUB-0208**

Publishing date 09 December 2022, last updated date 09 December 2022, valid until 09 December

## GENERAL INFORMATION

### MANUFACTURER

|                 |  |
|-----------------|--|
| Manufacturer    | Whitecroft Lighting Limited  |
| Address         | Burlington Street, Ashton-Under-Lyne, Lancashire OL7 0AX, United Kingdom |
| Contact details | email@whitecroftlight.com  |
| Website         | https://www.whitecroftlighting.com/                                      |

### EPD STANDARDS, SCOPE AND VERIFICATION

|                    |   |
|--------------------|---|
| Program operator   | EPD Hub, hub@epdhub.com   |
| Reference standard | EN 15804+A2:2019 and ISO 14025  |
| PCR                | EPD Hub Core PCR version 1.0, 1 Feb 2022  |
| Sector             | Construction product  |
| Category of EPD    | Third party verified EPD  |
| Scope of the EPD   | Cradle to grave with modules A1-A3, A4, A5, B3, B6, C1-C4 and D   |
| EPD author         | Iga Jakubczyk   |
| EPD verification   | Independent verification of this EPD and data, according to ISO 14025:<br><input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification |
| EPD verifier       | E.A as an authorized verifier acting for EPD Hub Limited  |

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

|                                   |  |
|-----------------------------------|--|
| Product name                      | Cascade Flex Vitality – Integral Emergency |
| Additional labels                 | N/A  |
| Product reference                 | C6PEY24K8XTEM                              |
| Place of production               | Ashton-under-Lyne, United Kingdom          |
| Period for data                   | 2021                                       |
| Averaging in EPD                  | No averaging                               |
| Variation in GWP-fossil for A1-A3 | 0 %  |

### ENVIRONMENTAL DATA SUMMARY

|   |  |
|---|--|
| Declared unit                             | 1 unit of Cascade Flex Vitality - Integral emergency |
| Declared unit mass                        | 5.28 kg  |
| GWP-fossil, A1-A3 (kgCO <sub>2</sub> e)   | 37.6   |
| GWP-total, A1-A3 (kgCO <sub>2</sub> e)    | 37.5   |
| Secondary material, inputs (%)            | 34.5   |
| Secondary material, outputs (%)           | 81.8   |
| Total energy use, A1-A3 (kWh)             | 145.0  |
| Total water use, A1-A3 (m <sup>3</sup> e) | 0.416  |

## PRODUCT AND MANUFACTURER

### ABOUT THE MANUFACTURER

Founded in 1945, and headquartered in Ashton-under-Lyne, Greater Manchester, Whitecroft Lighting is one of the UK's largest public and private sector lighting providers, working with education, healthcare, industrial and workspace projects. Whitecroft Lighting has 370 employees, an annual turnover of £55m and undertakes all R&D, product design and manufacturing in its HQ and neighbouring 10,000sqm manufacturing facility. The company continuously strives to offer its customers the best service in the industry, with extensive sales, specification, design, product development, and after-sales support teams working closely with clients nationally.

In recent years, Whitecroft Lighting has been at the forefront of sustainability and circularity in UK commercial lighting, leading the market in the development of products that minimise the use of material and promote reusability through replaceable modular hardware.

### PRODUCT DESCRIPTION

Designed with a circular approach the 'Cascade Flex Vitality – Integral Emergency' is a new generation of recessed luminaire. Careful consideration has been given to the materials used and the effect they have on people and the environment. The luminaire features a replaceable central cartridge which can be returned, refurbished, and reused multiple times ensuring that the materials remain in use without a sacrifice to the luminaire's performance, before eventually being recycled at the end of its life.

The distinctive central optics and range of lumen outputs deliver both visual comfort and efficacy. The pod optic is the preferred option for areas where a higher level of glare control is required. It directs 80% of the output onto the task, while the remaining 20% serves to illuminate the bevelled ceiling canopy. This results in an intermediate brightness zone which creates a contrasting field between the optic and the ceiling plane, adding visual interest and overall comfort.

Cascade Flex Vitality – Integral Emergency luminaires use Lithium Iron Phosphate (LiFePO<sub>4</sub>) emergency batteries as standard. Their stability and reliability can deliver benefits including reduced maintenance costs, longer lifetime and safe recycling at the end of their useful life. Furthermore, the parasitic load associated with battery charging is reduced, resulting in significant energy savings.

Cascade Flex family is Cradle to Cradle Certified® Bronze which ensures products are made with careful consideration of the materials used in construction, their effect on people, the environment and how they can be re-used and later recycled at the end of life.

Further information can be found at <https://www.whitecroftlighting.com/cascade-flex-vitality>

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass- % | Material origin |
|-----------------------|-----------------|-----------------|
| Metals                | 66              | United Kingdom  |
| Minerals              | <0.1            | Asia            |
| Fossil materials      | 34              | Europe          |
| Bio-based materials   | 0               | N/A             |

## 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 | 0.11955 |

## FUNCTIONAL UNIT AND SERVICE LIFE

|                        |   |
|------------------------|---|
| Declared unit          | 1 unit of Cascade Flex Vitality – Integral Emergency          |
| Mass per declared unit | 5.28 kg   |
| Functional unit        | 1 unit; 2500 hours per year consuming 25.3 Watts for 20 years |
| Reference service life | 20 years  |

## 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

### SYSTEM BOUNDARY

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

| Product stage |           |               | Assembly stage |          | Use stage |             |        |             |               |                        |                       | End of life stage   |           |                  |          | Beyond the system boundaries |          |           |
|---------------|-----------|---------------|----------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|---------------------|-----------|------------------|----------|------------------------------|----------|-----------|
| A1            | A2        | A3            | A4             | A5       | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                  | C2        | C3               | C4       | D                            |          |           |
| x             | x         | x             | x              | x        | MND       | MND         | x      | MND         | MND           | x                      | MND                   | x                   | x         | x                | x        | x                            |          |           |
| Raw materials | Transport | Manufacturing | Transport      | Assembly | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruct./demol. | Transport | Waste processing | Disposal | Reuse                        | Recovery | Recycling |

Modules not declared = MND. Modules not relevant = MNR.

### MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. Furthermore, the study considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The product is made of a mixture of virgin and recycled metals, plastics and electronic components. The materials are manufactured by various suppliers around the world. The main manufacturing processes involved are cold rolled, punched, and folded steel and plastic injection moulding. Components are then transported to Whitecroft Lighting's production facility in Ashton-under-Lyne, where the main manufacturing processes include LED board surface mounting and spray painting of metal components. The different parts are processed further using CNC manufacturing and undergo manual and robotic assembly.

The finished product leaves the facility packaged in cardboard and polyethylene shrink wrap. All cardboard packaging is labelled accordingly using polypropylene stick-on labels. All packages contain product leaflet, that should be kept until end of life of the product.

Certified renewable electricity and natural gas are consumed during manufacturing.

### TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The average distance of transportation from production plant to building site is assumed as 226.9km (Distance from Ashton-Under-Lyne, UK, to Northampton, UK.) The transportation method is assumed to be lorry. Vehicle capacity utilisation volume factor is assumed to be 100 % which means full load. In reality, this may vary, but as the role of transportation emissions in the total result is small, the variety in load is assumed to be negligible. Empty returns are not considered as it is assumed that the return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as products are packaged properly. Also, the volume capacity utilisation factor is assumed to be 100 % for the nested packaged products.

Transportation impacts that occur from delivery of the product cover direct exhaust emissions of fuel, environmental impacts of fuel production, as well as related infrastructure emissions.

Environmental impacts from installation into the building include waste packaging materials (A5) and release of biogenic carbon dioxide from wood pallets and cardboard. The impacts of energy consumption and the used ancillary materials during installation are considered negligible.

### PRODUCT USE AND MAINTENANCE (B1-B7)

Lifetime of the product is assumed to be 20 years and 2,500 hours a year, in line with standard for office applications (Guidance document – Evaluating performance of LED based luminaires). At this point in time, LED output >90% of initial output (L91@50K Hours). No full parts replacements were allowed for. Driver replacement rate of 10% over 100,000 hours has been included.

During the use phase (B6), the luminaire consumes power from electricity available on the low voltage level in United Kingdom (Data source: Ecoinvent 3.6).

Product energy use was calculated in line with *BS EN 15193-1:2017 Energy performance of buildings - Energy requirements for lighting - Part 1: Specifications, Module M9*.

Occupancy and application estimations, relevant for product energy use, were made in line with Whitecroft Lighting recommendations; Used scenario contains allowance for constant light output, Occupancy Detection (Manual On/Auto Off) and Daylight Factor. All used control factor values are based on *BS EN 15193-1:2017 Energy performance of buildings - Energy requirements for lighting - Part 1: Specifications, Module M9*. For more information regarding energy usage calculations, please refer to appendix table 1.1

Emergency energy use calculations are based on Lithium Iron Phosphate battery for lighting application values. Presented B6 values takes into consideration both standard and emergency power consumption combined. For more information, please contact Whitecroft Lighting

Impacts due to electricity production include direct emissions to air, transformation, and transmission losses. Air, soil, and water impacts during the use phase have not been studied.

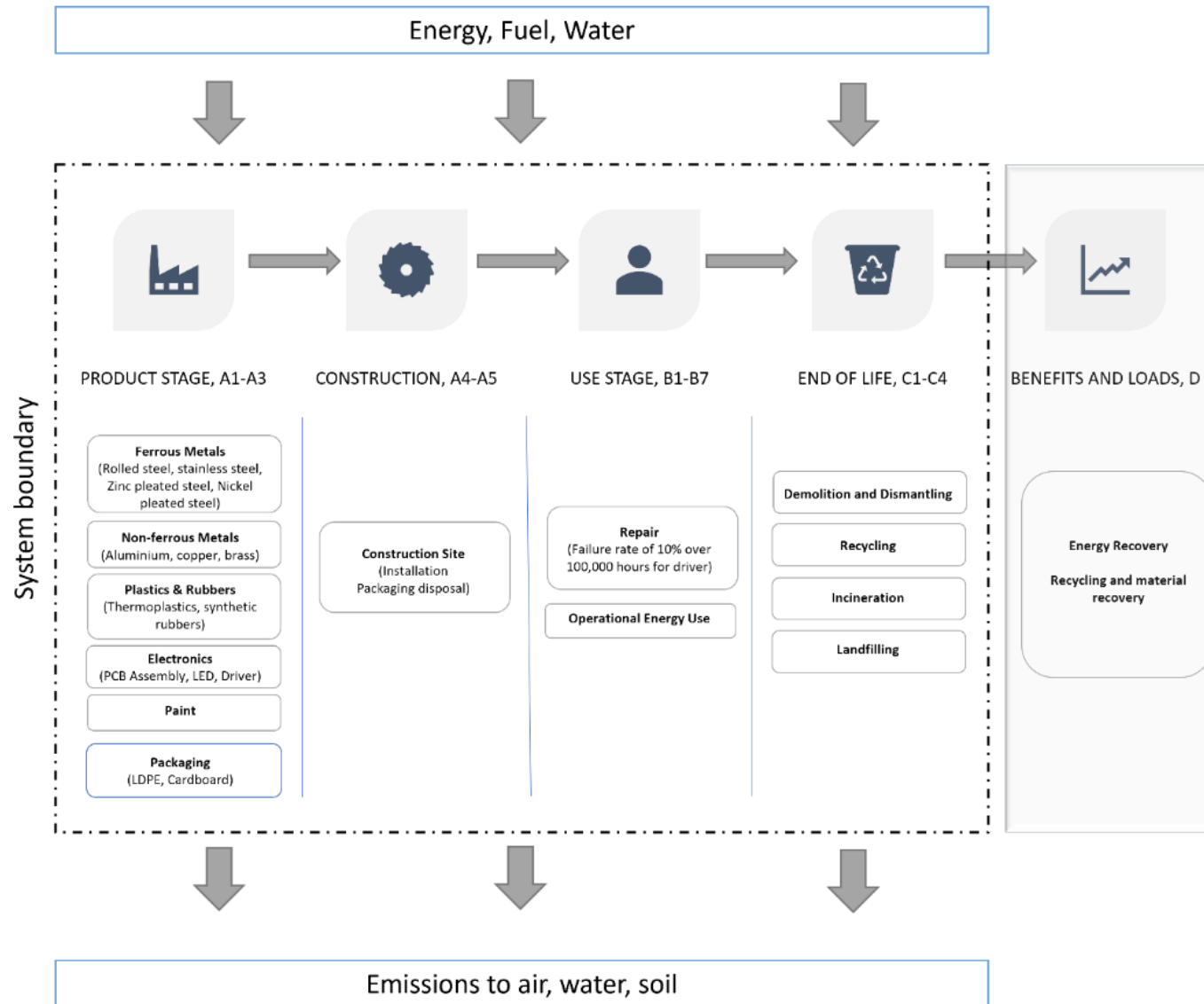
### PRODUCT END OF LIFE (C1-C4, D)

Consumption of energy and natural resources in the demolition process is assumed to be negligible. It is assumed that the waste is collected separately and transported to the nearest waste treatment centre. Transportation distance to the treatment centre is assumed as 50 km and 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.

The product undergoes manual dismantling, and the parts are divided into metals, plastics, and electronics. All plastics are assumed to be 100% recycled, and 95% of metals assumed to undergo recycling process due to their recycling potential. Electronics are shredded and sorted again into plastics and metals (WRAP, 2018). Module C3 accounts for energy and resource inputs for sorting and treating these waste streams.

The benefits and loads of incineration and recycling are included in Module D.

# MANUFACTURING PROCESS



## LIFE-CYCLE ASSESSMENT

### 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. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. 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.

### 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, allocation has been done in the following ways:

| Data type                      | Allocation        |
|--------------------------------|-------------------|
| Raw materials                  | No allocation     |
| Packaging materials            | No allocation     |
| Ancillary materials            | Not applicable    |
| Manufacturing energy and waste | Allocated by mass |

### AVERAGES AND VARIABILITY

|                                   |                |
|-----------------------------------|----------------|
| Type of average                   | No averaging   |
| Averaging method                  | Not applicable |
| Variation in GWP-fossil for A1-A3 | 0 %            |

This EPD is product and factory specific and does not contain average calculations.

### LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.



# ENVIRONMENTAL IMPACT DATA

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

| 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   | 3,24E1   | 1,85E-1 | 4,95E0  | 3,75E1   | 1,2E-1  | 2,8E-1  | MND | MND | 1,36E-1 | MND | MND | 4,29E2  | MND | 0E0 | 2,4E-2  | 6,98E-1 | 9,12E-4  | -5,45E0  |
| GWP – fossil                        | kg CO <sub>2</sub> e   | 3,24E1   | 1,85E-1 | 4,99E0  | 3,76E1   | 1,21E-1 | 2,31E-2 | MND | MND | 1,36E-1 | MND | MND | 4,28E2  | MND | 0E0 | 2,4E-2  | 6,87E-1 | 9,1E-4   | -5,66E0  |
| GWP – biogenic                      | kg CO <sub>2</sub> e   | -1,44E-2 | 9,62E-5 | -5,5E-2 | -6,93E-2 | 6,78E-5 | 2,57E-1 | MND | MND | -6,9E-4 | MND | MND | 3,09E-1 | MND | 0E0 | 1,74E-5 | 1,04E-2 | 1,8E-6   | 2,16E-1  |
| GWP – LULUC                         | kg CO <sub>2</sub> e   | 4E-2     | 6,4E-5  | 2,4E-2  | 6,4E-2   | 3,79E-5 | 1,49E-5 | MND | MND | 1,12E-4 | MND | MND | 5,6E-1  | MND | 0E0 | 7,22E-6 | 3,89E-4 | 2,7E-7   | -4,27E-4 |
| Ozone depletion pot.                | kg CFC-11e             | 1,7E-6   | 4,19E-8 | 6,77E-7 | 2,42E-6  | 2,75E-8 | 4,28E-9 | MND | MND | 1,15E-8 | MND | MND | 4,36E-5 | MND | 0E0 | 5,64E-9 | 4,18E-8 | 3,75E-10 | -1,58E-7 |
| Acidification potential             | mol H <sup>+</sup> e   | 3,09E-1  | 1,03E-3 | 8,08E-3 | 3,18E-1  | 5,16E-4 | 1,88E-4 | MND | MND | 2,16E-3 | MND | MND | 1,65E0  | MND | 0E0 | 1,01E-4 | 2,32E-3 | 8,64E-6  | -2,62E-2 |
| EP-freshwater <sup>2)</sup>         | kg Pe                  | 2,3E-3   | 1,61E-6 | 5,81E-5 | 2,36E-3  | 1,15E-6 | 3,64E-7 | MND | MND | 1,68E-5 | MND | MND | 1,39E-2 | MND | 0E0 | 1,95E-7 | 1,44E-5 | 1,1E-8   | -2,72E-4 |
| EP-marine                           | kg Ne                  | 3,46E-2  | 2,9E-4  | 2,14E-3 | 3,7E-2   | 1,53E-4 | 9,35E-5 | MND | MND | 1,83E-4 | MND | MND | 3,01E-1 | MND | 0E0 | 3,04E-5 | 5,7E-4  | 2,97E-6  | -5E-3    |
| EP-terrestrial                      | mol Ne                 | 7,54E-1  | 3,21E-3 | 2,23E-2 | 7,8E-1   | 1,69E-3 | 7,01E-4 | MND | MND | 2,34E-3 | MND | MND | 3,57E0  | MND | 0E0 | 3,35E-4 | 6,35E-3 | 3,28E-5  | -5,67E-2 |
| POCP (“smog”) <sup>3)</sup>         | kg NMVOCe              | 1,25E-1  | 9,66E-4 | 6,58E-3 | 1,33E-1  | 5,4E-4  | 2,43E-4 | MND | MND | 7,31E-4 | MND | MND | 9,05E-1 | MND | 0E0 | 1,08E-4 | 1,89E-3 | 9,52E-6  | -2,75E-2 |
| ADP-minerals & metals <sup>4)</sup> | kg Sbe                 | 1,58E-2  | 3,75E-6 | 4,22E-5 | 1,59E-2  | 2,04E-6 | 3,94E-7 | MND | MND | 1,04E-5 | MND | MND | 3,14E-3 | MND | 0E0 | 4,09E-7 | 1,03E-5 | 8,32E-9  | -7,02E-5 |
| ADP-fossil resources                | MJ                     | 4,08E2   | 2,8E0   | 8,18E1  | 4,92E2   | 1,85E0  | 3,23E-1 | MND | MND | 1,99E0  | MND | MND | 1,04E4  | MND | 0E0 | 3,73E-1 | 5,4E0   | 2,54E-2  | -9,33E1  |
| Water use <sup>5)</sup>             | m <sup>3</sup> e depr. | 1,46E1   | 1,04E-2 | 4,51E-1 | 1,51E1   | 7,85E-3 | 2,42E-3 | MND | MND | 8,29E-2 | MND | MND | 2,12E1  | MND | 0E0 | 1,39E-3 | 1,16E-1 | 1,18E-3  | -3,2E0   |

## ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

| 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 | 2,77E-6 | 1,46E-8  | 6,41E-8 | 2,85E-6 | 1,08E-8  | 7,95E-9  | MND | MND | 9,76E-9  | MND | MND | 5,34E-6 | MND | 0E0 | 2,17E-9  | 3,29E-8 | 1,68E-10 | -3,8E-7  |
| Ionizing radiation <sup>6)</sup> | kBq U235e | 1,06E0  | 1,2E-2   | 1,97E-1 | 1,27E0  | 7,82E-3  | 1,38E-3  | MND | MND | 4,15E-3  | MND | MND | 1,72E2  | MND | 0E0 | 1,63E-3  | 1,92E-2 | 1,04E-4  | -5,23E-3 |
| Ecotoxicity (freshwater)         | CTUe      | 2E3     | 2,22E0   | 6,72E1  | 2,07E3  | 1,53E0   | 4,09E-1  | MND | MND | 1,92E1   | MND | MND | 6,44E3  | MND | 0E0 | 2,85E-1  | 1,09E1  | 1,61E-2  | -2,45E2  |
| Human toxicity, cancer           | CTUh      | 1,09E-7 | 6,07E-11 | 1,04E-9 | 1,1E-7  | 3,65E-11 | 1,05E-10 | MND | MND | 7,83E-10 | MND | MND | 1,38E-7 | MND | 0E0 | 7,3E-12  | 7,8E-10 | 3,8E-13  | -2,34E-8 |
| Human tox. non-cancer            | CTUh      | 2,07E-6 | 2,47E-9  | 2,31E-8 | 2,09E-6 | 1,69E-9  | 1,03E-9  | MND | MND | 2E-8     | MND | MND | 4,72E-6 | MND | 0E0 | 3,38E-10 | 1,34E-8 | 1,17E-11 | 5,24E-7  |
| SQP <sup>7)</sup>                | -         | 6,21E1  | 3,32E0   | 3,72E0  | 6,91E1  | 2,77E0   | 2,99E-1  | MND | MND | 4,07E-1  | MND | MND | 2,84E2  | MND | 0E0 | 5,63E-1  | 2,66E0  | 4,33E-2  | -9,58E0  |

### 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             | 3,38E1  | 3,35E-2 | 2,42E1  | 5,79E1  | 1,99E-2 | 8,83E-3  | MND | MND | 1,73E-1 | MND | MND | 1,95E3 | MND | 0E0 | 4,7E-3  | 4,22E-1 | 2,06E-4 | -7,13E0  |
| Renew. PER as material             | MJ             | 0E0     | 0E0     | 6,45E-1 | 6,45E-1 | 0E0     | -6,11E-1 | MND | MND | 0E0     | MND | MND | 0E0    | MND | 0E0 | 0E0     | -3,4E-2 | 0E0     | 4,59E-1  |
| Total use of renew. PER            | MJ             | 3,38E1  | 3,35E-2 | 2,48E1  | 5,86E1  | 1,99E-2 | -6,02E-1 | MND | MND | 1,73E-1 | MND | MND | 1,95E3 | MND | 0E0 | 4,7E-3  | 3,88E-1 | 2,06E-4 | -6,68E0  |
| Non-re. PER as energy              | MJ             | 3,81E2  | 2,8E0   | 8,16E1  | 4,65E2  | 1,85E0  | 3,23E-1  | MND | MND | 1,99E0  | MND | MND | 1,04E4 | MND | 0E0 | 3,73E-1 | 5,4E0   | 2,54E-2 | -5,05E1  |
| Non-re. PER as material            | MJ             | 2,71E1  | 0E0     | 2,38E-1 | 2,73E1  | 0E0     | 0E0      | MND | MND | 0E0     | MND | MND | 0E0    | MND | 0E0 | 0E0     | 0E0     | 0E0     | -4,28E1  |
| Total use of non-re. PER           | MJ             | 4,08E2  | 2,8E0   | 8,18E1  | 4,92E2  | 1,85E0  | 3,23E-1  | MND | MND | 1,99E0  | MND | MND | 1,04E4 | MND | 0E0 | 3,73E-1 | 5,4E0   | 2,54E-2 | -9,33E1  |
| Secondary materials                | kg             | 1,82E0  | 0E0     | 7,6E-5  | 1,82E0  | 0E0     | 0E0      | MND | MND | 3,29E-3 | MND | MND | 0E0    | MND | 0E0 | 0E0     | 0E0     | 0E0     | 2,64E0   |
| Renew. secondary fuels             | MJ             | 0E0     | 0E0     | 0E0     | 0E0     | 0E0     | 0E0      | MND | MND | 0E0     | MND | MND | 0E0    | MND | 0E0 | 0E0     | 0E0     | 0E0     | 0E0      |
| Non-ren. secondary fuels           | MJ             | 0E0     | 0E0     | 0E0     | 0E0     | 0E0     | 0E0      | MND | MND | 0E0     | MND | MND | 0E0    | MND | 0E0 | 0E0     | 0E0     | 0E0     | 0E0      |
| Use of net fresh water             | m <sup>3</sup> | 3,17E-1 | 5,32E-4 | 9,86E-2 | 4,16E-1 | 3,87E-4 | 8,53E-5  | MND | MND | 1,1E-3  | MND | MND | 2,57E0 | MND | 0E0 | 7,77E-5 | 2,15E-3 | 2,78E-5 | -3,69E-2 |

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   | 5,32E0  | 3,13E-3 | 8,13E-2 | 5,4E0   | 2,24E-3 | 8,48E-4 | MND | MND | 2,17E-2 | MND | MND | 3,08E1  | MND | 0E0 | 3,63E-4 | 0E0 | 2,37E-5 | -1,7E0   |
| Non-hazardous waste | kg   | 1,13E2  | 2,54E-1 | 1,98E0  | 1,15E2  | 2,03E-1 | 9,1E-2  | MND | MND | 1,09E0  | MND | MND | 5,03E2  | MND | 0E0 | 4,01E-2 | 0E0 | 1,73E-1 | -1,42E1  |
| Radioactive waste   | kg   | 8,33E-4 | 1,9E-5  | 1,32E-4 | 9,83E-4 | 1,24E-5 | 2E-6    | MND | MND | 3,51E-6 | MND | MND | 8,04E-2 | MND | 0E0 | 2,56E-6 | 0E0 | 1,68E-7 | -1,45E-5 |

### 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 re-use    | kg   | 0E0 | 0E0 | 0E0     | 0E0     | 0E0 | 0E0     | MND | MND | 0E0 | MND | MND | 0E0 | MND | 0E0 | 0E0 | 0E0     | 0E0 | 0E0 |
| Materials for recycling  | kg   | 0E0 | 0E0 | 7,71E-1 | 7,71E-1 | 0E0 | 7,7E-1  | MND | MND | 0E0 | MND | MND | 0E0 | MND | 0E0 | 0E0 | 4,32E0  | 0E0 | 0E0 |
| Materials for energy rec | kg   | 0E0 | 0E0 | 0E0     | 0E0     | 0E0 | 5,48E-2 | MND | MND | 0E0 | MND | MND | 0E0 | MND | 0E0 | 0E0 | 0E0     | 0E0 | 0E0 |
| Exported energy          | MJ   | 0E0 | 0E0 | 0E0     | 0E0     | 0E0 | 0E0     | MND | MND | 0E0 | MND | MND | 0E0 | MND | 0E0 | 0E0 | 2,38E-1 | 0E0 | 0E0 |

### ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

| 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               | 3,06E1  | 1,84E-1 | 4,89E0  | 3,57E1  | 1,2E-1  | 1,07E-1 | MND | MND | 1,29E-1 | MND | MND | 4,21E2  | MND | 0E0 | 2,38E-2 | 6,8E-1  | 8,93E-4  | -5,32E0  |
| Ozone depletion Pot. | kg CFC <sub>11</sub> e             | 1,73E-6 | 3,33E-8 | 5,31E-7 | 2,29E-6 | 2,19E-8 | 3,44E-9 | MND | MND | 1,41E-8 | MND | MND | 4,99E-5 | MND | 0E0 | 4,48E-9 | 3,53E-8 | 2,97E-10 | -1,41E-7 |
| Acidification        | kg SO <sub>2</sub> e               | 2,06E-1 | 6,78E-4 | 6,2E-3  | 2,13E-1 | 3,63E-4 | 1,55E-4 | MND | MND | 1,94E-3 | MND | MND | 1,39E0  | MND | 0E0 | 4,88E-5 | 1,5E-3  | 3,6E-6   | -2,17E-2 |
| Eutrophication       | kg PO <sub>4</sub> <sup>3</sup> e  | 8,6E-2  | 1,23E-4 | 2,22E-3 | 8,84E-2 | 8,2E-5  | 3,51E-4 | MND | MND | 7,66E-4 | MND | MND | 4,46E-1 | MND | 0E0 | 9,86E-6 | 1,12E-3 | 6,97E-7  | -1,2E-2  |
| POCP ("smog")        | kg C <sub>2</sub> H <sub>4</sub> e | 1,35E-2 | 2,89E-5 | 4,17E-4 | 1,39E-2 | 1,56E-5 | 3,54E-5 | MND | MND | 9,47E-5 | MND | MND | 5,8E-2  | MND | 0E0 | 3,09E-6 | 1,03E-4 | 2,64E-7  | -3,33E-3 |
| ADP-elements         | kg Sbe                             | 1,58E-2 | 3,75E-6 | 4,22E-5 | 1,59E-2 | 2,04E-6 | 3,94E-7 | MND | MND | 1,04E-5 | MND | MND | 3,14E-3 | MND | 0E0 | 4,09E-7 | 1,03E-5 | 8,32E-9  | -7,02E-5 |
| ADP-fossil           | MJ                                 | 4,08E2  | 2,8E0   | 8,18E1  | 4,92E2  | 1,85E0  | 3,23E-1 | MND | MND | 1,99E0  | MND | MND | 1,04E4  | MND | 0E0 | 3,73E-1 | 5,4E0   | 2,54E-2  | -9,33E1  |

## VERIFICATION STATEMENT

### VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

### THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Elma Avdyli as an authorized verifier acting for EPD Hub Limited  
09.12.2022



# APPENDIX

**TABLE 1.1**

This table is relevant only for **B6 module**.

Calculations are made based on dataset describing electricity available on the low voltage level in United Kingdom for year 2014. (0.38 kg CO<sub>2</sub>e / kWh – source Ecoinvent 3.6 database). This value should be adjusted depending on specific project requirements. Emergency component total energy use based on Lithium Iron Phosphate battery

Operating hours shown in the table are based on standard office application with value based on guidance paper – “Evaluating performance of LED based luminaires” issued by Lighting Europe. Presented controls factors values are based on BS EN 15193-1:2017. Please refer to BSI standard publication or contact Whitecroft directly for more information.

| Luminaire data       |                                      |  |                                       |       | Working time     |                 |             |                 |              | Controls Factors |                       |                     |                   |                   |                 |           | Energy Use  |                                    |                              | Scaling          |                |                |
|----------------------|--------------------------------------|--|---------------------------------------|-------|------------------|-----------------|-------------|-----------------|--------------|------------------|-----------------------|---------------------|-------------------|-------------------|-----------------|-----------|-------------|------------------------------------|------------------------------|------------------|----------------|----------------|
|                      |                                      |  |                                       |       | Years of working | Standard light  |             | Emergency light |              | Constant Light   | Manual on/ Off switch | Manual on/ Auto off | Manual on/ Dimmed | Auto on/ Auto off | Auto on/ Dimmed | Daylight* | Total       | Energy Use - standard light output | Energy Use - Emergency light | Total energy use | Scaling factor | GWP B6         |
| Annual working hours | Total working hours - Standard light | Annual working hours - Emergency light | Total working hours - Emergency light |       |                  |                 |             |                 |              |                  |                       |                     |                   |                   |                 |           |             |                                    |                              |                  |                |                |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              | 1                     |                     |                   |                   |                 | 0.95      | 0.86        | 1526.18 kWh                        | 250.30 kWh                   | 1776.47 kWh      | 1.6            | 685.25 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       | 0.8                 |                   |                   |                 | 0.95      | 0.68        | 1220.94 kWh                        | 250.30 kWh                   | 1471.24 kWh      | 1.3            | 567.51 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       |                     | 0.9               |                   |                 | 0.95      | 0.77        | 1373.56 kWh                        | 250.30 kWh                   | 1623.85 kWh      | 1.5            | 626.38 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       |                     |                   | 0.9               |                 | 0.95      | 0.77        | 1373.56 kWh                        | 250.30 kWh                   | 1623.85 kWh      | 1.5            | 626.38 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       |                     |                   |                   | 0.95            | 0.95      | 0.81        | 1449.87 kWh                        | 250.30 kWh                   | 1700.16 kWh      | 1.5            | 655.82 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |                  | 1                     |                     |                   |                   |                 | 0.95      | 0.95        | 1695.75 kWh                        | 250.30 kWh                   | 1946.05 kWh      | 1.8            | 750.66 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |                  |                       | 0.8                 |                   |                   |                 | 0.95      | 0.76        | 1356.60 kWh                        | 250.30 kWh                   | 1606.90 kWh      | 1.4            | 619.84 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |                  |                       |                     | 0.9               |                   |                 | 0.95      | 0.86        | 1526.18 kWh                        | 250.30 kWh                   | 1776.47 kWh      | 1.6            | 685.25 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |                  |                       |                     |                   | 0.9               |                 | 0.95      | 0.86        | 1526.18 kWh                        | 250.30 kWh                   | 1776.47 kWh      | 1.6            | 685.25 kg CO2e |
| C6PEY34K9XTEM        | 4000K                                | 90                                     | 4135lm                                | 35.7W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |                  |                       |                     |                   |                   | 0.95            | 0.95      | 0.90        | 1610.96 kWh                        | 250.30 kWh                   | 1861.26 kWh      | 1.7            | 717.96 kg CO2e |
| C6PEY34K8XTEM        | 4000K                                | 80                                     | 4127lm                                | 32.6W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              | 1                     |                     |                   |                   |                 | 0.95      | 0.86        | 1393.65 kWh                        | 250.30 kWh                   | 1643.95 kWh      | 1.5            | 634.13 kg CO2e |
| C6PEY34K8XTEM        | 4000K                                | 80                                     | 4127lm                                | 32.6W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       | 0.8                 |                   |                   |                 | 0.95      | 0.68        | 1114.92 kWh                        | 250.30 kWh                   | 1365.22 kWh      | 1.2            | 526.62 kg CO2e |
| C6PEY34K8XTEM        | 4000K                                | 80                                     | 4127lm                                | 32.6W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       |                     | 0.9               |                   |                 | 0.95      | 0.77        | 1254.29 kWh                        | 250.30 kWh                   | 1504.58 kWh      | 1.4            | 580.37 kg CO2e |
| C6PEY34K8XTEM        | 4000K                                | 80                                     | 4127lm                                | 32.6W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       |                     |                   | 0.9               |                 | 0.95      | 0.77        | 1254.29 kWh                        | 250.30 kWh                   | 1504.58 kWh      | 1.4            | 580.37 kg CO2e |
| C6PEY34K8XTEM        | 4000K                                | 80                                     | 4127lm                                | 32.6W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9              |                       |                     |                   |                   | 0.95            | 0.81      | 1323.97 kWh | 250.30 kWh                         | 1574.26 kWh                  | 1.4              | 607.25 kg CO2e |                |
| C6PEY34K8XTEM        | 4000K                                | 80                                     | 4127lm                                | 32.6W | 20 years         | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |                  | 1                     |                     |                   |                   |                 | 0.95      | 0.95        | 1548.50 kWh                        | 250.30 kWh                   | 1798.80 kWh      | 1.6            | 693.86 kg CO2e |









|                |       |    |        |       |          |                 |             |                 |              |     |     |     |     |      |      |      |             |            |             |     |                |
|----------------|-------|----|--------|-------|----------|-----------------|-------------|-----------------|--------------|-----|-----|-----|-----|------|------|------|-------------|------------|-------------|-----|----------------|
| C6PEY23K9STEM  | 3000K | 90 | 3323lm | 30.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1   |     |     |      | 0.95 | 0.95 | 1453.50 kWh | 250.30 kWh | 1703.80 kWh | 1.5 | 657.22 kg CO2e |
| C6PEY23K9STEM  | 3000K | 90 | 3323lm | 30.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 0.8 |     |     |      | 0.95 | 0.76 | 1162.80 kWh | 250.30 kWh | 1413.10 kWh | 1.3 | 545.08 kg CO2e |
| C6PEY23K9STEM  | 3000K | 90 | 3323lm | 30.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     | 0.9 |      | 0.95 | 0.86 | 1308.15 kWh | 250.30 kWh | 1558.45 kWh | 1.4 | 601.15 kg CO2e |
| C6PEY23K9STEM  | 3000K | 90 | 3323lm | 30.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     | 0.9 |      | 0.95 | 0.86 | 1308.15 kWh | 250.30 kWh | 1558.45 kWh | 1.4 | 601.15 kg CO2e |
| C6PEY23K9STEM  | 3000K | 90 | 3323lm | 30.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.95 | 0.95 | 0.90 | 1380.83 kWh | 250.30 kWh | 1631.12 kWh | 1.5 | 629.18 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1   |     |     |      | 0.95 | 0.86 | 1094.40 kWh | 250.30 kWh | 1344.70 kWh | 1.2 | 518.70 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     | 0.8 |     |      | 0.95 | 0.68 | 875.52 kWh  | 250.30 kWh | 1125.82 kWh | 1.0 | 434.27 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     | 0.9 |      | 0.95 | 0.77 | 984.96 kWh  | 250.30 kWh | 1235.26 kWh | 1.1 | 476.48 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     | 0.9 |      | 0.95 | 0.77 | 984.96 kWh  | 250.30 kWh | 1235.26 kWh | 1.1 | 476.48 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     |     | 0.95 | 0.95 | 0.81 | 1039.68 kWh | 250.30 kWh | 1289.98 kWh | 1.2 | 497.59 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1   |     |     |      | 0.95 | 0.95 | 1216.00 kWh | 250.30 kWh | 1466.30 kWh | 1.3 | 565.61 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     | 0.8 |     |      | 0.95 | 0.76 | 972.80 kWh  | 250.30 kWh | 1223.10 kWh | 1.1 | 471.79 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     | 0.9 |      | 0.95 | 0.86 | 1094.40 kWh | 250.30 kWh | 1344.70 kWh | 1.2 | 518.70 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.9  | 0.95 | 0.86 | 1094.40 kWh | 250.30 kWh | 1344.70 kWh | 1.2 | 518.70 kg CO2e |
| C6PEY23K8STEM  | 3000K | 80 | 3302lm | 25.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.95 | 0.95 | 0.90 | 1155.20 kWh | 250.30 kWh | 1405.50 kWh | 1.3 | 542.15 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1   |     |     |      | 0.95 | 0.86 | 1483.43 kWh | 250.30 kWh | 1733.72 kWh | 1.6 | 668.76 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     | 0.8 |     |      | 0.95 | 0.68 | 1186.74 kWh | 250.30 kWh | 1437.04 kWh | 1.3 | 554.32 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     | 0.9 |      | 0.95 | 0.77 | 1335.08 kWh | 250.30 kWh | 1585.38 kWh | 1.4 | 611.54 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     | 0.9 |      | 0.95 | 0.77 | 1335.08 kWh | 250.30 kWh | 1585.38 kWh | 1.4 | 611.54 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     |     | 0.95 | 0.95 | 0.81 | 1409.25 kWh | 250.30 kWh | 1659.55 kWh | 1.5 | 640.15 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1   |     |     |      | 0.95 | 0.95 | 1648.25 kWh | 250.30 kWh | 1898.55 kWh | 1.7 | 732.34 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     | 0.8 |     |      | 0.95 | 0.76 | 1318.60 kWh | 250.30 kWh | 1568.90 kWh | 1.4 | 605.18 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     | 0.9 |      | 0.95 | 0.86 | 1483.43 kWh | 250.30 kWh | 1733.72 kWh | 1.6 | 668.76 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.9  | 0.95 | 0.86 | 1483.43 kWh | 250.30 kWh | 1733.72 kWh | 1.6 | 668.76 kg CO2e |
| C12PEY34K9STEM | 4000K | 90 | 4140lm | 34.7W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.95 | 0.95 | 0.90 | 1565.84 kWh | 250.30 kWh | 1816.13 kWh | 1.6 | 700.55 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1   |     |     |      | 0.95 | 0.86 | 1316.70 kWh | 250.30 kWh | 1567.00 kWh | 1.4 | 604.45 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     | 0.8 |     |      | 0.95 | 0.68 | 1053.36 kWh | 250.30 kWh | 1303.66 kWh | 1.2 | 502.87 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     | 0.9 |      | 0.95 | 0.77 | 1185.03 kWh | 250.30 kWh | 1435.33 kWh | 1.3 | 553.66 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     |     | 0.9  | 0.95 | 0.77 | 1185.03 kWh | 250.30 kWh | 1435.33 kWh | 1.3 | 553.66 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     |     |      | 0.95 | 0.81 | 1250.87 kWh | 250.30 kWh | 1501.16 kWh | 1.4 | 579.05 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1   |     |     |      | 0.95 | 0.95 | 1463.00 kWh | 250.30 kWh | 1713.30 kWh | 1.5 | 660.88 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     | 0.8 |     |      | 0.95 | 0.76 | 1170.40 kWh | 250.30 kWh | 1420.70 kWh | 1.3 | 548.02 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     | 0.9 |      | 0.95 | 0.86 | 1316.70 kWh | 250.30 kWh | 1567.00 kWh | 1.4 | 604.45 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.9  | 0.95 | 0.86 | 1316.70 kWh | 250.30 kWh | 1567.00 kWh | 1.4 | 604.45 kg CO2e |
| C12PEY34K8STEM | 4000K | 80 | 4132lm | 30.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     |     | 0.95 | 0.95 | 0.90 | 1389.85 kWh | 250.30 kWh | 1640.15 kWh | 1.5 | 632.67 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1   |     |     |      | 0.95 | 0.86 | 1573.20 kWh | 250.30 kWh | 1823.50 kWh | 1.6 | 703.39 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     | 0.8 |     |      | 0.95 | 0.68 | 1258.56 kWh | 250.30 kWh | 1508.86 kWh | 1.4 | 582.02 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     | 0.9 |      | 0.95 | 0.77 | 1415.88 kWh | 250.30 kWh | 1666.18 kWh | 1.5 | 642.71 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     |     | 0.9  | 0.95 | 0.77 | 1415.88 kWh | 250.30 kWh | 1666.18 kWh | 1.5 | 642.71 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |     |     |     | 0.95 | 0.95 | 0.81 | 1494.54 kWh | 250.30 kWh | 1744.84 kWh | 1.6 | 673.05 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1   |     |     |      | 0.95 | 0.95 | 1748.00 kWh | 250.30 kWh | 1998.30 kWh | 1.8 | 770.82 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     | 0.8 |     |      | 0.95 | 0.76 | 1398.40 kWh | 250.30 kWh | 1648.70 kWh | 1.5 | 635.96 kg CO2e |
| C12PEY33K9STEM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |     |     | 0.9 |      | 0.95 | 0.86 | 1573.20 kWh | 250.30 kWh | 1823.50 kWh | 1.6 | 703.39 kg CO2e |

|              |       |    |        |       |          |                 |             |                 |              |     |   |     |     |     |      |      |      |             |            |             |     |                |
|--------------|-------|----|--------|-------|----------|-----------------|-------------|-----------------|--------------|-----|---|-----|-----|-----|------|------|------|-------------|------------|-------------|-----|----------------|
| C12PEY33K9EM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     | 0.9 |      | 0.95 | 0.86 | 1573.20 kWh | 250.30 kWh | 1823.50 kWh | 1.6 | 703.39 kg CO2e |
| C12PEY33K9EM | 4000K | 90 | 4099lm | 36.8W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     |     | 0.95 | 0.95 | 0.90 | 1660.60 kWh | 250.30 kWh | 1910.90 kWh | 1.7 | 737.10 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1 |     |     |     |      | 0.95 | 0.86 | 1342.35 kWh | 250.30 kWh | 1592.65 kWh | 1.4 | 614.34 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   | 0.8 |     |     |      | 0.95 | 0.68 | 1073.88 kWh | 250.30 kWh | 1324.18 kWh | 1.2 | 510.78 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     | 0.9 |     |      | 0.95 | 0.77 | 1208.12 kWh | 250.30 kWh | 1458.41 kWh | 1.3 | 562.56 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     | 0.9 |      | 0.95 | 0.77 | 1208.12 kWh | 250.30 kWh | 1458.41 kWh | 1.3 | 562.56 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     |     | 0.95 | 0.95 | 0.81 | 1275.23 kWh | 250.30 kWh | 1525.53 kWh | 1.4 | 588.45 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1 |     |     |     |      | 0.95 | 0.95 | 1491.50 kWh | 250.30 kWh | 1741.80 kWh | 1.6 | 671.88 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   | 0.8 |     |     |      | 0.95 | 0.76 | 1193.20 kWh | 250.30 kWh | 1443.50 kWh | 1.3 | 556.81 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     | 0.9 |     |      | 0.95 | 0.86 | 1342.35 kWh | 250.30 kWh | 1592.65 kWh | 1.4 | 614.34 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     | 0.9 |      | 0.95 | 0.86 | 1342.35 kWh | 250.30 kWh | 1592.65 kWh | 1.4 | 614.34 kg CO2e |
| C12PEY33K8EM | 4000K | 80 | 4121lm | 31.4W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     |     | 0.95 | 0.95 | 0.90 | 1416.93 kWh | 250.30 kWh | 1667.22 kWh | 1.5 | 643.11 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1 |     |     |     |      | 0.95 | 0.86 | 1158.53 kWh | 250.30 kWh | 1408.82 kWh | 1.3 | 543.44 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   | 0.8 |     |     |      | 0.95 | 0.68 | 926.82 kWh  | 250.30 kWh | 1177.12 kWh | 1.1 | 454.06 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     | 0.9 |     |      | 0.95 | 0.77 | 1042.67 kWh | 250.30 kWh | 1292.97 kWh | 1.2 | 498.75 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     | 0.9 |      | 0.95 | 0.77 | 1042.67 kWh | 250.30 kWh | 1292.97 kWh | 1.2 | 498.75 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     |     | 0.95 | 0.95 | 0.81 | 1100.60 kWh | 250.30 kWh | 1350.90 kWh | 1.2 | 521.09 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1 |     |     |     |      | 0.95 | 0.95 | 1287.25 kWh | 250.30 kWh | 1537.55 kWh | 1.4 | 593.09 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   | 0.8 |     |     |      | 0.95 | 0.76 | 1029.80 kWh | 250.30 kWh | 1280.10 kWh | 1.2 | 493.78 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     | 0.9 |     |      | 0.95 | 0.86 | 1158.53 kWh | 250.30 kWh | 1408.82 kWh | 1.3 | 543.44 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     | 0.9 |      | 0.95 | 0.86 | 1158.53 kWh | 250.30 kWh | 1408.82 kWh | 1.3 | 543.44 kg CO2e |
| C12PEY24K9EM | 4000K | 90 | 3296lm | 27.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     |     | 0.95 | 0.95 | 0.90 | 1222.89 kWh | 250.30 kWh | 1473.18 kWh | 1.3 | 568.26 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1 |     |     |     |      | 0.95 | 0.86 | 1051.65 kWh | 250.30 kWh | 1301.95 kWh | 1.2 | 502.21 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   | 0.8 |     |     |      | 0.95 | 0.68 | 841.32 kWh  | 250.30 kWh | 1091.62 kWh | 1.0 | 421.08 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     | 0.9 |     |      | 0.95 | 0.77 | 946.49 kWh  | 250.30 kWh | 1196.78 kWh | 1.1 | 461.64 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     | 0.9 |      | 0.95 | 0.77 | 946.49 kWh  | 250.30 kWh | 1196.78 kWh | 1.1 | 461.64 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     |     | 0.95 | 0.95 | 0.81 | 999.07 kWh  | 250.30 kWh | 1249.36 kWh | 1.1 | 481.93 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1 |     |     |     |      | 0.95 | 0.95 | 1168.50 kWh | 250.30 kWh | 1418.80 kWh | 1.3 | 547.28 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   | 0.8 |     |     |      | 0.95 | 0.76 | 934.80 kWh  | 250.30 kWh | 1185.10 kWh | 1.1 | 457.14 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     | 0.9 |     |      | 0.95 | 0.86 | 1051.65 kWh | 250.30 kWh | 1301.95 kWh | 1.2 | 502.21 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     | 0.9 |      | 0.95 | 0.86 | 1051.65 kWh | 250.30 kWh | 1301.95 kWh | 1.2 | 502.21 kg CO2e |
| C12PEY24K8EM | 4000K | 80 | 3356lm | 24.6W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     |     | 0.95 | 0.95 | 0.90 | 1110.08 kWh | 250.30 kWh | 1360.37 kWh | 1.2 | 524.75 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1 |     |     |     |      | 0.95 | 0.86 | 1244.03 kWh | 250.30 kWh | 1494.32 kWh | 1.3 | 576.42 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   | 0.8 |     |     |      | 0.95 | 0.68 | 995.22 kWh  | 250.30 kWh | 1245.52 kWh | 1.1 | 480.44 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     | 0.9 |     |      | 0.95 | 0.77 | 1119.62 kWh | 250.30 kWh | 1369.92 kWh | 1.2 | 528.43 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     | 0.9 |      | 0.95 | 0.77 | 1119.62 kWh | 250.30 kWh | 1369.92 kWh | 1.2 | 528.43 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     |     | 0.95 | 0.95 | 0.81 | 1181.82 kWh | 250.30 kWh | 1432.12 kWh | 1.3 | 552.42 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1 |     |     |     |      | 0.95 | 0.95 | 1382.25 kWh | 250.30 kWh | 1632.55 kWh | 1.5 | 629.73 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   | 0.8 |     |     |      | 0.95 | 0.76 | 1105.80 kWh | 250.30 kWh | 1356.10 kWh | 1.2 | 523.10 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     | 0.9 |     |      | 0.95 | 0.86 | 1244.03 kWh | 250.30 kWh | 1494.32 kWh | 1.3 | 576.42 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     | 0.9 |      | 0.95 | 0.86 | 1244.03 kWh | 250.30 kWh | 1494.32 kWh | 1.3 | 576.42 kg CO2e |
| C12PEY23K9EM | 4000K | 90 | 3313lm | 29.1W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     |     | 0.95 | 0.95 | 0.90 | 1313.14 kWh | 250.30 kWh | 1563.43 kWh | 1.4 | 603.07 kg CO2e |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 | 1 |     |     |     |      | 0.95 | 0.86 | 1068.75 kWh | 250.30 kWh | 1319.05 kWh | 1.2 | 508.81 kg CO2e |

|              |       |    |        |       |          |                 |             |                 |              |     |   |     |     |      |      |      |             |             |             |             |                |                |
|--------------|-------|----|--------|-------|----------|-----------------|-------------|-----------------|--------------|-----|---|-----|-----|------|------|------|-------------|-------------|-------------|-------------|----------------|----------------|
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   | 0.8 |     |      | 0.95 | 0.68 | 855.00 kWh  | 250.30 kWh  | 1105.30 kWh | 1.0         | 426.35 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     | 0.9 |      | 0.95 | 0.77 | 961.88 kWh  | 250.30 kWh  | 1212.17 kWh | 1.1         | 467.58 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     | 0.9  | 0.95 | 0.77 | 961.88 kWh  | 250.30 kWh  | 1212.17 kWh | 1.1         | 467.58 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours | 0.9 |   |     |     | 0.95 | 0.95 | 0.81 | 1015.31 kWh | 250.30 kWh  | 1265.61 kWh | 1.1         | 488.19 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     | 1 |     |     |      | 0.95 | 0.95 | 1187.50 kWh | 250.30 kWh  | 1437.80 kWh | 1.3         | 554.61 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   | 0.8 |     |      | 0.95 | 0.76 | 950.00 kWh  | 250.30 kWh  | 1200.30 kWh | 1.1         | 463.00 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     | 0.9 |      | 0.95 | 0.86 | 1068.75 kWh | 250.30 kWh  | 1319.05 kWh | 1.2         | 508.81 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     | 0.9  | 0.95 | 0.86 | 1068.75 kWh | 250.30 kWh  | 1319.05 kWh | 1.2         | 508.81 kg CO2e |                |
| C12PEY23K8EM | 4000K | 80 | 3343lm | 25.0W | 20 years | 2500 hours/year | 50000 hours | 8760 hours/year | 175200 hours |     |   |     |     |      | 0.95 | 0.95 | 0.90        | 1128.13 kWh | 250.30 kWh  | 1378.42 kWh | 1.2            | 531.71 kg CO2e |

**TABLE 1.2**

This table refers to non-linearly scaling options within range. Reported A1-A3 GWP was calculated separately. Product specific energy consumption differences values are stated in table 1.1

| Product      |               |                    |      | Dimensions      |        |       |        | A1     | A2            | A3            | A1-A3         |               |
|--------------|---------------|--------------------|------|-----------------|--------|-------|--------|--------|---------------|---------------|---------------|---------------|
| Ceiling Type | Part Code     | Colour temperature | CRI  | Driver Type     | Length | Width | Height | Weight | GWP – total   |               |               |               |
| Exposed Tee  | C6PEY24K8XTEM | 4000K              | Ra80 | DALI LED Driver | 584mm  | 584mm | 69mm   | 5.28kg | 32.4 kg CO2e  | 0.185 kg CO2e | 4.95 kg CO2e  | 37.5 kg CO2e  |
|              | C6PEY34K8XTEM | 4000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY23K8XTEM | 3000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY33K8XTEM | 3000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY24K9XTEM | 4000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY34K9XTEM | 4000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY23K9XTEM | 3000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY33K9XTEM | 3000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
| Spring Tee   | C6PEY24K8STEM | 4000K              | Ra80 | DALI LED Driver | 599mm  | 599mm | 83mm   | 5.48kg | 33.5 kg CO2e  | 0.220 kg CO2e | 4.957 kg CO2e | 38.74 kg CO2e |
|              | C6PEY34K8STEM | 4000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY23K8STEM | 3000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY33K8STEM | 3000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY24K9STEM | 4000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY34K9STEM | 4000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY23K9STEM | 3000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C6PEY33K9STEM | 3000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
| SAS 330      | C12PEY24K8EM  | 4000K              | Ra80 | DALI LED Driver | 1194mm | 297mm | 68mm   | 7.48kg | 48.75 kg CO2e | 0.323 kg CO2e | 6.897 kg CO2e | 55.97 kg CO2e |
|              | C12PEY34K8EM  | 4000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C12PEY23K8EM  | 3000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C12PEY33K8EM  | 3000K              | Ra80 |                 |        |       |        |        |               |               |               |               |
|              | C12PEY24K9EM  | 4000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C12PEY34K9EM  | 4000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C12PEY23K9EM  | 3000K              | Ra90 |                 |        |       |        |        |               |               |               |               |
|              | C12PEY33K9EM  | 3000K              | Ra90 |                 |        |       |        |        |               |               |               |               |

**TABLE 1.3**

PEP ecopassport program (PSR-0014-ed1.0-EN-2018 07 18) requires unified functional unit for all lighting fittings published with their program. (“Lighting that delivers an outgoing artificial luminous flux of 1,000 lumens during a reference lifetime of 35,000 hours)

To achieve results compatibility while using PEP ecopassport or comparing product published by them, calculations of environmental impacts of the manufacturing, distribution, installation, use and end-of-life stages needs to be carried as follows for each life cycle stages (PSR-0014-ed1.0-EN-2018 07 18):

$$\text{Environmental impact of PEP (for 1,000 lumens over 35,000 hours)} = \text{Environmental impact of the reference product} \times \text{Scaling factor}$$

Where

$$\text{Scaling Factor} = (1,000 / \text{Outgoing luminous flux of the reference product in lumens}) \times (35,000 / \text{Assigned product lifetime of the reference product in hours})$$

Please note that emergency light usage was not calculated in this table.

| Part Number             | Reference product  |     |                          |                  | Ecopassport functional unit |                 |                              |                     | Energy use      |                                | Scaling Factor |
|-------------------------|--------------------|-----|--------------------------|------------------|-----------------------------|-----------------|------------------------------|---------------------|-----------------|--------------------------------|----------------|
|                         | Colour temperature | CRI | Reference Product Lumens | Product efficacy | Luminous Flux               | reduced Wattage | % of actual luminaire output | Total working hours | Controls Factor | Energy Usage (1,000lm 35,000h) | Scaling factor |
| C6PEY34K9XT/C6PEY34K9ST | 4000K              | 90  | 4135lm                   | 115.83 lm/W      | 1000lm                      | 8.6W            | 24%                          | 35000 hours         | 0.68            | 205.48 kWh                     | 0.17           |
| C6PEY34K8XT/C6PEY34K8ST | 4000K              | 80  | 4127lm                   | 126.60 lm/W      | 1000lm                      | 7.9W            | 24%                          | 35000 hours         | 0.68            | 188.00 kWh                     | 0.17           |
| C6PEY33K9XT/C6PEY33K9ST | 3000K              | 90  | 4092lm                   | 106.01 lm/W      | 1000lm                      | 9.4W            | 24%                          | 35000 hours         | 0.68            | 224.51 kWh                     | 0.17           |
| C6PEY33K8XT/C6PEY33K8ST | 3000K              | 80  | 4062lm                   | 126.54 lm/W      | 1000lm                      | 7.9W            | 25%                          | 35000 hours         | 0.68            | 188.08 kWh                     | 0.17           |
| C6PEY24K9XT/C6PEY24K9ST | 4000K              | 90  | 3332lm                   | 116.91 lm/W      | 1000lm                      | 8.6W            | 30%                          | 35000 hours         | 0.68            | 203.57 kWh                     | 0.21           |
| C6PEY24K8XT/C6PEY24K8ST | 4000K              | 80  | 3316lm                   | 131.07 lm/W      | 1000lm                      | 7.6W            | 30%                          | 35000 hours         | 0.68            | 181.59 kWh                     | 0.21           |
| C6PEY23K9XT/C6PEY23K9ST | 3000K              | 90  | 3323lm                   | 108.59 lm/W      | 1000lm                      | 9.2W            | 30%                          | 35000 hours         | 0.68            | 219.16 kWh                     | 0.21           |
| C6PEY23K8XT/C6PEY23K8ST | 3000K              | 80  | 3302lm                   | 128.98 lm/W      | 1000lm                      | 7.8W            | 30%                          | 35000 hours         | 0.68            | 184.52 kWh                     | 0.21           |
| C12PEY34K9              | 4000K              | 90  | 4140lm                   | 119.31 lm/W      | 1000lm                      | 8.4W            | 24%                          | 35000 hours         | 0.68            | 199.48 kWh                     | 0.17           |
| C12PEY34K8              | 4000K              | 80  | 4132lm                   | 134.16 lm/W      | 1000lm                      | 7.5W            | 24%                          | 35000 hours         | 0.68            | 177.41 kWh                     | 0.17           |
| C12PEY33K9              | 4000K              | 90  | 4099lm                   | 111.39 lm/W      | 1000lm                      | 9.0W            | 24%                          | 35000 hours         | 0.68            | 213.67 kWh                     | 0.17           |
| C12PEY33K8              | 4000K              | 80  | 4121lm                   | 131.24 lm/W      | 1000lm                      | 7.6W            | 24%                          | 35000 hours         | 0.68            | 181.34 kWh                     | 0.17           |
| C12PEY24K9              | 4000K              | 90  | 3296lm                   | 121.62 lm/W      | 1000lm                      | 8.2W            | 30%                          | 35000 hours         | 0.68            | 195.69 kWh                     | 0.21           |
| C12PEY24K8              | 4000K              | 80  | 3356lm                   | 136.42 lm/W      | 1000lm                      | 7.3W            | 30%                          | 35000 hours         | 0.68            | 174.46 kWh                     | 0.21           |
| C12PEY23K9              | 4000K              | 90  | 3313lm                   | 113.85 lm/W      | 1000lm                      | 8.8W            | 30%                          | 35000 hours         | 0.68            | 209.05 kWh                     | 0.21           |
| C12PEY23K8              | 4000K              | 80  | 3343lm                   | 133.72 lm/W      | 1000lm                      | 7.5W            | 30%                          | 35000 hours         | 0.68            | 177.98 kWh                     | 0.21           |