Efficient White Lighting Units
Date added to ETL 2001. Revised 2018.

1. Definition of Technology

Efficient White Lighting Units are products that are specifically designed to provide efficient, high quality, illumination. These criteria shall only apply to the complete lighting unit.

2. Technology Description

Efficient White Lighting Units are a combination of a light fitting (or luminaire), one or more light sources, and associated control gear that have been assembled either into a single packaged unit or a luminaire with remote control gear. Neither light fitting, light sources nor control gear alone can be said to 'comply with the ETL'. Efficient White Lighting Units may also incorporate lighting control devices such as dimming and 'presence' controls. The luminaire could also include an optical system that reflects and/or focuses the product’s light output onto the item(s) being illuminated. An Efficient White Lighting Unit may be equipped with any high efficiency light source, such that it meets the eligibility criteria set down in this document.

Efficient White Lighting Units have been included in the Enhanced Capital Allowance (ECA) scheme because they offer substantial energy and carbon savings. A wide variety of products are available with a range of performance levels. The ECA scheme aims to encourage the purchase of higher efficiency products that meet certain minimum quality, design and performance standards.

The ECA Scheme covers four categories of products:

1. Amenity, accent and display lighting units
2. General interior lighting units
3. Exterior area lighting units
4. Exterior floodlighting units

Where:

- **Amenity lighting** is decorative lighting intended to enhance the appearance of a building or outdoor area in order to promote the activities of a business. It can include ‘mood’ lighting of hotels, bars and restaurants and other leisure activities; and decorative lighting for public areas of buildings and parts of buildings or the surrounding grounds (where such lighting is necessary to the enhancement of the business function). It does not include lighting to provide general illumination or circulation, or building lighting that would be present regardless of the type of business being carried out.

- **Display lighting** comprises lighting intended to highlight displays of exhibits, merchandise and other associated uses. It includes for instance spot or projector lighting in shops, theatres, galleries and studios.

- **Accent lighting** comprises lighting that is intended to provide additional light over a specific small area in order to carry out or promote the activities of a business. This may include lighting required for a particular task (e.g. medical or dental examination,
supplementary lighting for fine machining work or critical inspection work). It does not cover general lighting for an entire room or a large part of a room.

- **General interior lighting** covers all other interior lighting.

- **Exterior area lighting** covers all exterior lighting which is intended to provide downward light onto horizontal or near horizontal surfaces, including roadways, car parks, paths, stairs, ramps, gardens and other open spaces. This includes illuminated bollards and post-top lanterns.

- **Exterior floodlighting** covers exterior lighting that is intended to light vertical or near vertical surfaces, including floodlighting of buildings, monuments and statues.

Investments in Efficient White Lighting Units can only qualify for Enhanced Capital Allowances if the products meet the eligibility criteria set out below. The individual products purchased do not need to be named on the Energy Technology Product List.

3. **Eligibility Criteria**

To be eligible, products shall:

- Include one or more light sources, a luminaire and associated control gear.
- **Not** be luminaires designed to incorporate or be supplied with light sources that retrofit to existing light fittings.
- Not be exclusively for emergency lighting. However combined emergency/general lighting is acceptable.\(^1\)

In addition:

- The luminaire, lamps and control gear shall be CE marked.
- Where products incorporate fluorescent or compact fluorescent lamps, they shall be controlled by non-dimmable ‘warm start’ or ‘dimmable’ (regulating) type, high frequency (HF) electronic control gear.
- Where products incorporate compact fluorescent lamps, they shall be of the non-integral type (i.e. those types that do not incorporate the control gear in the lamp cap).
- Where products incorporate high intensity discharge lamps rated below 200W, they shall use electronic control gear.
- Where products incorporate LEDs, they shall use electronic control gear, and be capable of producing white light. White light is defined in Annex 2, paragraph 3b of EC Regulation 245/2009 “Implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to Ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps”\(^1\)

\(^1\) A luminaire containing two or more light sources, at least one of which is energised from the emergency supply and the remainder from the normal supply.
Only include components that are compliant with the Ecodesign requirements and energy labelling regulations in force, where applicable. At the finalisation of this ETL criteria, the relevant regulations were:


In addition, lamps and control gear shall comply with the following performance standards (where relevant):


Performance criteria

Eligible efficient white lighting units shall:

- Have a luminaire efficacy (i.e. lighting efficiency) that is greater than, or equal to, the thresholds set out in Table 1 below, when tested after 100 hours of continuous operation.
- Have a power factor that is greater than, or equal to, 0.9 at its highest light output level.
• Be able to provide a light output (in lumens) after 6000 hours of continuous operation that is not less than 90% of their initial light output (in lumens).

In addition:

• With the exception of combined emergency lighting, individual control gear shall have a standby power not exceeding 0.5 Watts when the lighting unit incorporates an electronically addressed dimming or switching circuit. If the product is not fitted with an automatic switching or dimming circuit, the product shall not consume power when it is switched off.
• White LED, Fluorescent and compact fluorescent lamps in all categories, and all light sources used in amenity, accent and display lighting fittings shall have a colour rendering index that is at least Ra 80. All other light sources shall have a colour rendering index of at least Ra 40.
• If the product incorporates dimming control it shall be tested at its highest light output level.
• Amenity, accent and display lighting units to be installed indoors shall have a minimum light output of at least 100 lumens after 100 hours of continuous operation. All other fittings shall have a minimum light output of at least 200 lumens after 100 hours of continuous operation.

**Table 1 - Minimum luminaire efficacies for efficient white lighting units**

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum luminaire efficacy (in luminaire lumens per circuit watt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amenity, accent and display lighting units</td>
<td>≥ 95</td>
</tr>
<tr>
<td>General interior lighting, using downlighting units (DLOR/LOR≥0.9)</td>
<td>≥ 105</td>
</tr>
<tr>
<td>General interior lighting using uplighting units (DLOR/LOR&lt;0.1)</td>
<td>≥ 125</td>
</tr>
<tr>
<td>General interior lighting using combined up and down lighting units (DLOR/LOR≥0.1 and &lt;0.9)</td>
<td>≥ 125- (20 x DLOR/LOR)</td>
</tr>
<tr>
<td>Exterior area lighting units</td>
<td>≥ 105</td>
</tr>
<tr>
<td>Exterior floodlighting units</td>
<td>≥ 105</td>
</tr>
</tbody>
</table>

Where:

• “≥” means “greater than or equal to”.

---

- Downward Light Output Ratio (DLOR) is the ratio of the light emitted by the unit in a downward direction to that emitted by the bare lamp(s) in any direction.
- Light Output Ratio (LOR) is the ratio of the total light emitted by the unit to that emitted by the bare lamp(s).
- Luminaire efficacy is defined in terms of lumens of light output emitted by the luminaire per circuit watt of electrical power consumed.
- The electrical power consumed (in circuit watts) is defined as the total power consumed by the whole lighting unit from main circuit connection point to the light source, including losses in the control gear (ballast or driver).
- The product shall perform at the minimum required efficacy at each drive current for which the product is designed to operate, when tested after 100 hours of continuous operation. If the product incorporates dimming control it shall be tested at its highest light output level.
- For amenity, accent and display lighting units, general interior lighting, and exterior floodlighting units, light output is defined as the total light output in all directions (TLO), which is the sum of:
  a) Light output in a downward direction (DLO) i.e. below the horizontal as installed, and
  b) Light output in an upward direction (ULO) i.e. above the horizontal as installed.

Note: In luminaires containing replaceable lamps the TLO may also be expressed as the result of the following calculation:

\[
\text{Initial (100 hour) lamp lumen output} \times \text{LOR}
\]

- For exterior area lighting units only, light output is defined as total light output in a downward direction (DLO) only i.e. below the horizontal as installed (i.e. light output in an upward direction is not included in the calculation of product light output or luminaire efficacy). Note: As above the DLO may also be expressed by the calculation:

\[
\text{Initial (100 hour) lamp lumen output} \times \text{DLOR}
\]

**Required test procedures**

All products shall be tested in accordance with the procedures laid down in one of the following:

- IESNA LM-79-08, “Electrical and Photometric Measurements of Solid-State Lighting Products”.

If a white LED based product is sold **solely**[^1] for use in refrigerators or freezers with a declared application temperature of 5°C or below, its efficacy and luminous flux may be measured at a temperature of between 0°C and 5°C on its external casing.

[^1]: If luminaires are used in other applications, this is not required.
For the avoidance of doubt, test data should be presented to zero decimal places by rounding down. As an example, an efficacy of 94.9 luminaire lumens per circuit Watt for a display lighting unit would be expressed as 94 llm/W and deemed to be a fail.

4. Scope of Claim

Expenditure on the provision of plant and machinery can include not only the actual costs of buying the equipment, but other direct costs such as the transport of the equipment to site, and some of the direct costs of installation. Clarity on the eligibility of direct costs is available from HMRC.