

**This sub-technology category has been removed as of 22nd March 2018.
Please see the new sub-technology category of Efficient White Lighting Units.**

White Light Emitting Diode Lighting Units

Date added to ETL 2008 (Revised 2016).

1. Definition of Technology

White light emitting diode lighting units are products that are specifically designed to provide white light by means of solid-state lighting devices.

2. Technology Description

White LED lighting units are products that consist of one or more white LEDs, incorporated into a light fitting (or luminaire) and includes associated electronic control gear. The luminaire generally also includes an optical system that reflects and/or focuses the product's light output onto the item(s) being illuminated. White LED lighting units may also incorporate lighting control devices such as light regulation (dimming) and 'presence' controls. Luminaires designed to incorporate or supplied with LED based 'lamps' that retrofit to traditional light sources such as LED T8 replacement tubes or MR16 Low Voltage Lamps are not included in the scope.

White LED Lighting Units have been included in the Enhanced Capital Allowance (ECA) scheme because they offer substantial energy and carbon savings. A wide variety of LED lighting units are available in a range of designs with different performance levels. The ECA scheme aims to encourage the purchase of higher efficiency products.

The ECA Scheme covers four categories of products:

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

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, signs associated with the business function, or merchandise. It includes spot or projector lighting in shops, theatres, galleries and studios; and display case lighting.

- **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 products containing white light emitting diode 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 must:

- Include one or more solid-state LED devices, luminaire and associated electronic control gear.
- 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”.
- Be CE Marked.
- **Not** be luminaires designed to incorporate or supplied with LED based ‘lamps’ that retrofit to traditional light sources such as LED T8 replacement tubes or MR16 Low Voltage Lamps.
- **Not** be emergency lighting.

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

- BS EN 61347-2-13:2014, “Lamp control gear. Particular requirements for d.c. or a.c. supplied electronic control gear for LED modules”.
- BS EN 62384:2006 (as amended), “D.C. or A.C. supplied electronic control gear for LED modules. Performance requirements”.

Performance criteria

All products must:

- Have a luminaire efficacy (i.e. lighting efficiency) that is greater than, or equal to, the thresholds set out in Table 1 below, after 100 hours of continuous operation.
- 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).

- Have a colour rendering index that meets the requirements of Section 2.2 of Commission Regulation (EU) no 1194/2012 (implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment)
- Have a power factor that is greater than, or equal to, 0.7 at all levels of product light output.

In addition:

- General lighting units installed indoors must comply with the glare and angular exclusion zone recommendations in paragraph 94 of HSG 38 (1997), “Lighting at work” (ISBN: 9780717612321).
- Individual control gear must 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 must not consume power when it is switched off.
- Amenity, accent and display lighting units to be installed indoors must have a minimum light output of at least 100 lumens after 100 hours of continuous operation. All other fittings must have a minimum light output of at least 200 lumens after 100 hours of continuous operation.

Table 1 - Minimum luminaire efficacies for white LED lighting units

Category	Minimum luminaire efficacy (in luminaire lumens per circuit watt)
Amenity, accent and display lighting units	≥ 75
General interior lighting, using downlighting units (DLOR/LOR \geq 0.9)	≥ 82
General interior lighting using uplighting units (DLOR/LOR $<$ 0.1)	≥ 100
General interior lighting using combined up and down lighting units (DLOR/LOR \geq 0.1 and $<$ 0.9)	$\geq 100 - (18 \times \text{DLOR/LOR})$
Exterior area lighting units	≥ 82
Exterior floodlighting units	≥ 82

" \geq " means "greater than or equal to".

Where:

- Luminaire efficacy is defined in terms of the 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 ‘LED module’, including losses in the power supply and constant current source, and losses due to the effects of temperature. It is not the ‘rated wattage’ of the LED chip.
- The product must 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.
- 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).

Required test procedures

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

- BS EN 13032-4:2015, “Light and lighting. Measurement and presentation of photometric data of lamps and luminaires. LED lamps, modules and luminaires”.
- IES LM-79-08, “Electrical and Photometric Measurements of Solid-State Lighting Products”.
- DD IEC/PAS 62722-2-1:2011. “Luminaire performance Part 2-1: Particular requirements for LED luminaires”.

However if a product is sold solely 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° and 5°C on its external casing. The light output measurements at 0 and 6000 hours shall both be made at the same temperature.

- The following test conditions must be observed:
 - Testing of efficacy, minimum light output, power factor and standby power must be conducted on the complete product (i.e. solid state LED device(s), luminaire and associated electronic control gear) and under normal operating conditions.
 - Measurements of the reduction in product light output with time shall be made over a period of 6000 hours according to the methods in either DD IEC/PAS 62722-2-1:2011 “Luminaire performance Part 2-1: Particular requirements for LED luminaires” or IES LM-80-08, “Measuring Lumen Maintenance of LED Light Sources”. These measurements may be carried out on the complete product.
 - Measurements of the product’s light output and electrical power consumption at different drive currents must be taken after the junction temperature has stabilised to a constant level after selecting the particular drive current.

For the avoidance of doubt test data should be presented to zero decimal places. As an example, an efficacy of 74 lumens per circuit watt for a display lighting unit would be deemed to be a fail.

Please note that performance data obtained in accordance with the procedures and conditions detailed in BS EN 13032-1:2004 (as amended) will be accepted as an alternative to testing in accordance with BS EN 13032-4:2015 until further notice.

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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](#).

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