

# SPECIFYING EXTERNAL LIGHTING UNITS



## Introduction

ARTSM is the trade body for companies that manufacture and supply traffic signs in the UK. Its members are committed to following all the relevant national and European standards, and have prepared this guidance for those purchasing external lighting units for traffic signs to help you through the complexity and to ensure you get the product you need that will perform well for its intended life.

The main standard for permanent traffic signs (including luminaires) is BS EN 12899-1:2007. This contains many different performance classes, so it is not sufficient to simply ask for a sign to be made to this standard, as you may receive one that meets only the lowest class. For example, there are performance classes for relevant characteristics such as mean illuminance and uniformity of luminance, as well as requirements for corrosion protection and IP ratings (resistance to ingress by dust and water). You will need to specify which class you require. Fortunately, the UK National Annex at the end of BS EN 12899-1:2007 recommends values for many of these classes, so most sign specifiers choose to adopt these. But there remain some characteristics for which the National Annex cannot recommend a single class or value, which must therefore be specified for your situation.

For installations on trunk roads (maintained by Highways Agency, Transport Scotland or Welsh Government), the manufacturer must be certified to the relevant National Highways Sector Scheme (NHSS). Some local authorities also have this requirement for their own roads. Installation of lighting units is covered by NHSSD 8.

## Future CE marking requirements

From 1 July 2013 all permanent traffic signs will require a declaration of performance and a CE mark. If the sign assembly includes external illumination, the performance of the luminaire with that sign will need to be included. After that date it will be unlawful to supply a product to BS EN 12899-1 without this. Traffic signs are covered by the Construction Product Regulations (CPR), being implemented in over 30 European countries.

All ARTSM members are working towards this goal and their products will be fully compliant by this date.

## General Requirements

External lighting units are specified in BS EN 12899-1:2007, with some general requirements set out in clause 7.1.12. Luminaires for the external illumination of traffic signs are required to be of the enclosed type; the structural design includes the entire structure consisting of the housing, support and fixings. The luminaire incorporates the light source, control equipment, reflector and cover or lens. Luminaires have to be mounted so that they don't obscure any part of the sign face from the view of drivers, or cause surface reflections in the sign face material that would be seen in normal viewing directions. Surface reflections are normally avoided when the direction of illumination forms an angle greater than 30° to the normal to the sign face. An extension of the sign plate might sometimes be necessary to prevent light shining into the eyes of drivers travelling in the opposite direction.

The manufacturer will provide a luminance intensity distribution to prove conformity to the relevant requirements of the Standard.

If you have any other specific requirements, such as the need for documentation, calculations or test certificates, this should be requested at the time of purchase, as these cannot easily be provided at a later date.

## Performance Specification

Performance classes giving a choice of performance levels for relevant characteristics are provided in the tables from BS EN 12899-1 referred to below. These include mean illuminance and uniformity of illuminance, as well as requirements for corrosion protection and IP ratings (resistance to ingress by dust and water). The National Annex to this Standard, published by BSI, recommends for some characteristics classes of performance considered most suitable for use in the UK.

### Mean illuminance

The Standard classifies the brightness of illumination from luminaires in five performance levels for mean illuminance set out in Table 22:

Mean illuminance E (unit lux)

Class E1	$40 \leq E < 100$
Class E2	$100 \leq E < 400$
Class E3	$400 \leq E < 1500$
Class E4	$1500 \leq E < 3000$
Class E5	$3000 \leq E < 9000$

The National Annex (Table NA.1) recommends that luminaires providing Class E2 brightness be specified for general use. In areas of high background luminance, e.g. a major shopping area with well-lit windows and facias, luminaires providing Class E3 brightness are recommended, although at present products meeting this or higher levels are not readily available. Transilluminated signs can provide the E3 level of brightness, and may be an option in such situations.

## Uniformity of illuminance

The ratio of the lowest to the highest illuminance level measured at any part of the sign must conform to one of the classes in Table 23:

Uniformity of illuminance

Class UE1	UE $\geq$ 1/10
Class UE2	UE $\geq$ 1/6
Class UE3	UE $\geq$ 1/3

The National Annex (Table NA.1) recommends different performance classes for different sizes of sign, recognising that it is difficult to achieve high uniformity of luminance on very tall signs using external illumination. These recommendations are shown below:

For signs with an area not exceeding 1.5 m <sup>2</sup>	Class UE3
For signs with an area exceeding 1.5 m <sup>2</sup> and with a height to width ratio less than 2.5	Class UE2
For signs with an area exceeding 1.5 m <sup>2</sup> and with a height to width ratio greater than 2.5	Class UE1

## Corrosion resistance

Table 15 sets the levels of protection that may be specified:

Class	Requirement
SP0	Surface protection not provided
SP1	Protective coatings provided
SP2	Inherent surface protection provided

Specifiers need to indicate what form of surface protection they require, unless they are content to leave this to the manufacturer by stating that surface protection shall conform to Class SP1 unless Class SP2 is provided inherently. The use of Class SP0 is not appropriate.

## Fixings

The sign lighting unit shall be attached to the sign post or posts in such a way that it prevents rotation and sliding and conforms to clause 7.1.14.

## IP ratings

Using the system specified in BS EN 60529, these ratings specify the required resistance of the luminaire and its housing to penetration by dust and water. The minimum levels permitted by the Standard (clause 7.1.8) are set out below, but purchasers may specify a higher level of protection if they wish:

### IP2X Solid Particles

Protection of fingers against access to hazardous parts, and protection of equipment against objects larger than 12.5 mm.

### IPX3 Water Ingress

Protection against spraying water at an angle of up to 60° from the vertical.

## Light Sources

Light trays may have either a single or multiple light sources. If multiple light sources are used the light tray will operate on individual circuits, leaving the sign evenly illuminated in the event of one circuit failing. The manufacturer will indicate the nominal life expectancy of all light sources in the declaration of performance.

Clause 7.1.10 requires light sources to have a minimum colour rendering index (as defined in EN12665) of RA60. However, the note to that clause indicates that improved performance can be obtained with an index of 80, and ARTSM recommends that 80 be specified.

Mounting devices shall have cable entries to accommodate cable connection equipment. The Low Voltage and EMC Directives apply to electrical components.

## Installation and Maintenance

The manufacturer will supply information concerning the installation and maintenance of the sign luminaire. This will include:

Assembly details

Location limitations

Operation instructions

Maintenance advice

Cleaning procedures

Lamp replacement procedures

Recyclability

## Recyclability

The Waste Electrical and Electronic Equipment Directive (WEEE Directive) was introduced into UK law in January 2007 by the Waste Electronic and Electrical Equipment Regulations 2006.

The WEEE Directive aims to encourage the reuse, recycling and recovery of electrical and electronic equipment. It also aims to improve the environmental performance of businesses that manufacture, supply, use, recycle and recover electrical and electronic equipment.

Light trays and bodies, including polycarbonate lenses, can be recycled.

It is the responsibility of the manufacturer to organise facilities to take back its electrical products for disposal or for a facilitator to recycle.

The following facilitators are recommended for recycling:

Luminaires

[www.lumicom.co.uk](http://www.lumicom.co.uk)

[www.sweep.co.uk](http://www.sweep.co.uk)

Lamps

[www.recolight.co.uk](http://www.recolight.co.uk)

## Checklist

### Checklist for specifying external lighting units

This list below gives the minimum information needed and helps you to avoid missing anything essential. More detail should always be given when available and will help the supplier to deliver exactly what you want and expect. References to tables or clauses are to tables or clauses in the Standard, BS EN12899-1:2007.

#### Checklist

Have you included all the following in your order or specification?

1. Mean illuminance required (Table 22).
2. Uniformity of illuminance (Table 23).
3. Corrosion resistance (Table 15).
4. IP ratings for resistance to penetration by dust and water (clause 7.1.8).
5. Colour rendering index required (clause 7.1.10).

Guidance on any of the above is available from any ARTSM member, and more detail is given in the sections above.

### Guidance documents available from [www.artsm.org.uk](http://www.artsm.org.uk)

- **Specifying Permanent Traffic Signs**
- **Specifying External Lighting Units**

For further information, please contact [enquiries@artsm.org.uk](mailto:enquiries@artsm.org.uk)

### Guidance from other organisations

#### Department for Transport guidance

- Traffic Signs Manual Chapter 1:  
[assets.dft.gov.uk/publications/traffic-signs-manual/traffic-signs-manual-chapter-01.pdf](http://assets.dft.gov.uk/publications/traffic-signs-manual/traffic-signs-manual-chapter-01.pdf)

#### Sign Supports and Passive Safety

- Institute of Highway Engineers Sign Structures Guide:  
[theihe.org/knowledge-network/uploads/StructuresGuide2010.pdf](http://theihe.org/knowledge-network/uploads/StructuresGuide2010.pdf)
- Passive Safety UK Guidelines: [www.ukroads.org/webfiles/Guidelines Print ready.pdf](http://www.ukroads.org/webfiles/Guidelines%20Print%20ready.pdf)

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