LIA LABORATORY PERFORMANCE VERIFIED SCHEME

TSD-004 Version 3.0 June 2022

Table of Contents

1. LED Luminaires requirements 4
1.1 Luminaire types covered by the scheme 4
1.1.1 Test requirements 4
1.1.2 Numbers of samples 4
1.1.3 Compliance to LIA verified 4
1.2 Performance Testing 5
1.3 Product Critical Components Assessment 7
1.4 Product families 8
1.5 Surveillance Testing 8
2 Scheme Operation 9
2.1 Certification Period 9
2.1.1 Certification duration and reassessment intervals 9
2.1.2 Changes during certification 9
2.2 Access to Facilities and Information 10
2.3 Impartiality 10
2.4 Application 10
2.5 Additional Information 10
2.6 TSD-002 and TSD-003 Members 10
Appendix A 11

Note: Where a standard is referenced the latest valid version of the standard shall be used

Directives / Regulations:

SI 2021 No. 1095 - The Ecodesign for Energy-Related Products and Energy Information (Lighting Products) Regulations 2021

Commission Regulation (EU) 2019/2020 – Ecodesign requirements for light sources and separate controlgears

Performance Standards:

***EN* 62722-1**: Luminaire performance. General requirements

EN 62722-2-1: Luminaire performance. Particular requirements for LED luminaires

EN 62717: LED modules for general lighting – Performance requirements

Measurement Standards:

CIE 127: Measurement of LEDs

CIE 13.3: Method of measuring and specifying colour rendering

CIE 1960: Uniform Colour space

EN 13032-4: Light and lighting – Measurement and presentation of photometric data of lamps and luminaires

1. LED Luminaires requirements

1.1 Luminaire types covered by the scheme

Luminaires with built-in non user-replaceable LED modules and built in non-replaceable LED modules designed to be used for domestic and commercial purposes as the primary light source of an environment.

The scheme is also applicable for maintained emergency LED luminaires (light source used in normal operation, excluding emergency light source operation). The certification service is accessible to all applicants who fall under the certification scope.

1.1.1 Test requirements

The LED luminaires will be subjected to a set of performance criteria with limits derived from the relevant ecodesign regulation and other performance standards to determine the suitability for using the scheme logo(s) on the packaging and product website.

1.1.2 Numbers of samples

A total of two luminaire samples will be required for the LIA verified scheme as part of the initial assessment.

Where different family variants of the product are available additional sample(s) may be required.

An additional sample will be required each year for ongoing surveillance purposes.

1.1.3 Compliance to LIA verified

A provisional approval (test report) will be given after completion of initial photometric assessment at 0 hours and compliance against the criteria of section 1.2.

Results of goniophotometric scan at 0 hours with 1 sample and results of integrating sphere scan with 2 samples shall be conducted to measure the beam angle, luminous intensity, CCT, CRI, etc..(as listed in Table 1).

A full approval will be issued after successful completion of the 2000 hour life test and photometric assessment at 2000 hours. The photometric data will be uploaded to the LIA Laboratory's certification website at www.lialabcert.org.uk for public access once full approval is issued, a representation of the type of data that will be shown can be found in Appendix A.

1.2 Performance Testing

All life tests will be carried out in the in a room with controlled environmental conditions for a total of 2000 hours at the rated voltage of the product.

Life test switching cycles shall be as per a standard 3 hour cycle of 165 minutes – ON, 15 minutes – OFF.

The switching cycles are to be conducted in a room with an ambient temperature 25±5°C and an average air velocity of less than 0.2m/s.

The applied voltage during the switching cycles will be stabilised within a tolerance of 2%. Light sources designed to be operated on mains voltage are to be tested at 230V, 50Hz.

If constant current light sources are provided for assessment, the light sources are to be powered at the maximum constant current, as declared by the light source manufacturer. Once the specified value of constant current is achieved, the voltage shall be stabilised within 2%.

Initial measurements shall be carried out at 0 hour for the following parameters on 2 luminaires:

- Full-load on-mode power P_{on} (W);
- Power factor (0-1);
- Luminous flux Φ (lm);
- No-load power P_{no}, Standby power, P_{sb} and Networked standby power P_{net} (W) (if applicable);
- Colour rendering index CRI (0-100);
- Flicker (P_{st} LM) and stroboscopic effect (SVM) (if applicable);
- Colour consistency (MacAdam ellips steps);
- Beam angle (°);
- Lumen maintenance factor;
- Excitation purity (%);
- Correlated colour temperature (K);
- Chromaticity coordinates (x, y);

All results from the assessment of both samples shall be within a limit values as specified in Table 1.

The measurements shall be repeated on the same 2 luminaire samples at 2000 hours for final approval. Where a product complies with LIA Verified (see 1.1.3) the photometric data taken at 0 hours of life testing will be published. Where the lumen output measurements between the 2 samples at 0 hours is ≤10%, photometric measurement data from the sample with the highest lumen output shall be used throughout. If however the lumen output measurements between the 2 samples at 0 hours is >10%, data from the sample showing the lowest lumen output shall be used throughout.

The following value is calculated at 0 and 2000 hours.

- Lumens per wattage
- Luminous flux depreciation

Performance requirements for the LED luminaire are given in Table 1.

Table 1. ***Performance requirements***

Performance Parameter	Limits
Full-load on-mode power P_{on} (W)	
$P_{on} \leq 2W$	The determined value shall not be less than the declared value by more than 0.2W.
$2W < P_{on} \leq 5W$	The determined value shall not be less than the declared value by more than 10%.
$5W < P_{on} \leq 25W$	The determined value shall not be less than the declared value by more than 5%.
$25W < P_{on} \leq 100W$	The determined value shall not be less than the declared value by more than 5%.
$100W < P_{on}$	The determined value shall not be less than the declared value by more than 5%.
Displacement factor (0-1)	The determined value shall not be less than the declared value by more than 0.1 units.
Luminous flux Φ (lm)	The determined value shall not be less than the declared value by more than 10%.
No-load power P_{no}, Standby power, P_{sb} and Networked standby power P_{net} (W)	The determined value shall not be less than the declared value by more than 0.1W.
Colour rendering index CRI (0-100)	≥ 80 or 65 for outdoor use The determined value shall not be less than the declared value by more than 2.0 units.
Flicker (P_{st} LM) and stroboscopic effect (SVM)	The determined value shall not exceed the declared value by more than 10%.
Colour consistency (MacAdam ellips steps)	The determined number of steps shall not exceed the declared number of steps. The centre of the MacAdam ellipse shall be the centre declared by the supplier with a tolerance of 0.005 units.
Beam angle (°)	The determined value shall not deviate from the declared value by more than 25 %.
Survival factor	All luminaires must be operational after completing the endurance testing.
Excitation purity (%)	The determined value shall not be less than the declared value minus 5 %.
Correlated colour temperature (K)	The determined value shall not deviate from the declared value by more than 10 %.
Chromaticity coordinates (x, y)	The determined value shall not deviate from the declared value by more than 10%.
Lumens per wattage	≥ 85 Lm/W

Lumen maintenance at 2000hrs	0.90 ≤ L ≤ 0.10 of Initial Lumen (Cat A) 0.80 ≤ L < 0.90 of Initial Lumen (Cat B)

The 0 and 2000 hour lumen value of the LED product shall be plotted in accordance with Figure 2 of EN 62717, a copy of which can be found in Figure 4. of Appendix A.

1.3 Product Critical Components Assessment

For product assessment, the client shall provide LIA Laboratory all relevant information regarding critical components used in the product (e.g. bill of materials, datasheet of critical components, etc.). Examples of critical components are specified below (the list of critical component is not definitive and each product and its components will be considered on case by case basis):

- LED module;
- Controlgear;
- Transformer;
- Etc.

1.4 Product families

Where a particular product has family variants these may be assessed as groups but will be considered by LIA Laboratory on a case by case basis.

Where family members have different photometric characteristics (i.e. colour temperature etc.) then the number of samples required for testing shall still comply with 1.1.2 above.

1.5 Surveillance Testing

As part of the ongoing surveillance for certification the Laboratory shall be provided with an additional sample each year (after the initial assessment) for use in re-evaluation. During re-evaluation an integrating sphere scan will be conducted. There shall not be a difference of more than 10% between the values measured during initial assessment, and values of those from the surveillance assessment.

In addition, verification of critical components will be conducted (to verify for possible changes, see 1.3). In the event a critical component has been changed (e.g. LED module), an additional assessment may be required. Such cases will be considered separately and additional testing and costs may apply.

The client shall inform LIA Laboratory about any constructional changes as specified in section 2.1.2.

2 Scheme Operation

2.1 Certification Period

2.1.1 Certification duration and reassessment intervals

Following a successful conformity assessment a certificate will be issued. The certification period will run for three years from the date of issue, assuming that on-going assessment confirms that the products remain in conformity with the scheme. Prior to the end of the three year period, a review shall be undertaken to determine whether it is appropriate to reissue the certificate and commence a new certification cycle of 3 years. The purpose of the review is to assess whether:

- Any of the conformity standards, supporting standards or scheme requirements have been updated since the initial assessment.
- Regulatory requirements, appropriate to the product have changed
- The product range falling under the scope of certification needs to be increased / decreased.
- The products themselves have undergone any changes in design, or composition.
- There have been significant changes to production location or facilities.
- There have been any significant changes to factory production control methods or manufacture processes.

The impact of any such changes on the validity of the initial assessment and hence certification decision shall be assessed.

Where no significant changes are identified, and on-going conformity is assured, then the certificate will be reissued for a further 3 years, subject to the ongoing scheme requirements.

Where significant changes are identified, which affect the validity and scope of the certification, actions necessary to address these changes will be communicated to the client. The certificate may be suspended, or withdrawn until the issues have been addressed satisfactorily. When actions have been completed satisfactorily to bring the certification up to date, then the certification period will recommence for a further three years.

2.1.2 Changes during certification

In addition to the recertification review, it is the responsibility of the client to inform LIA Laboratory of any changes that occur affecting certification as identified in 0 within the certification period. The impact of any such changes on the validity of the initial assessment and hence certification decision shall be assessed.

Where no significant changes are identified, and on-going conformity is assured, then the certificate will remain valid, subject to the ongoing scheme requirements.

Where significant changes are identified, which affect the validity and scope of the certification, actions necessary to address these changes will be communicated to the client. The certificate may be suspended, or withdrawn until the issues have been addressed satisfactorily.

2.2 Access to Facilities and Information

Where a complaint is received by LIA Laboratory regarding a product and/or data covered by the scheme, the manufacturer will make available to LIA Laboratory any information, data, samples, access to facilities, personnel and subcontractors in order to investigate such complaints.

On occasion, where a Scheme is covered within the LIA Laboratory' ISO/IEC 17065 schedule of accreditation with UKAS, there may be a need to allow third party access to a manufactures' facilities during the assessment process. It should be noted that the manufacturer will be notified of any such requirement, all information obtained during such visits will remain confidential at all times.

2.3 Impartiality

The latest copy of the LIA Laboratory's impartiality policy along with the Terms & Conditions of this Scheme can be found on:
https://www.thelia.org.uk/page/Impartiality_Policy
https://www.thelia.org.uk/page/Certification_Terms__Conditions

Alternatively a copy can be requested by e-mail at lab@thelia.org.uk.

2.4 Application

An application form for this Scheme can be downloaded from
https://www.thelia.org.uk/page/LIA_PV

Alternatively a copy can be requested by e-mail at lab@thelia.org.uk.

2.5 Additional Information

Details of the evaluation procedures, rules and procedures for granting, for maintaining, for extending or reducing the scope of, for suspending and for withdrawing certification can be requested by email at lab@thelia.org.uk.

2.6 TSD-002 and TSD-003 Members

Members of LIA Laboratory TSD-002 and/or TSD-003 scheme may submit goniophotometry and sphere photometry test results for use within the TSD-004 scheme. LIA Laboratory retain the right to perform comparison photometry measurements as seen fit and to refuse the submitted test results at its discretion.

Appendix A

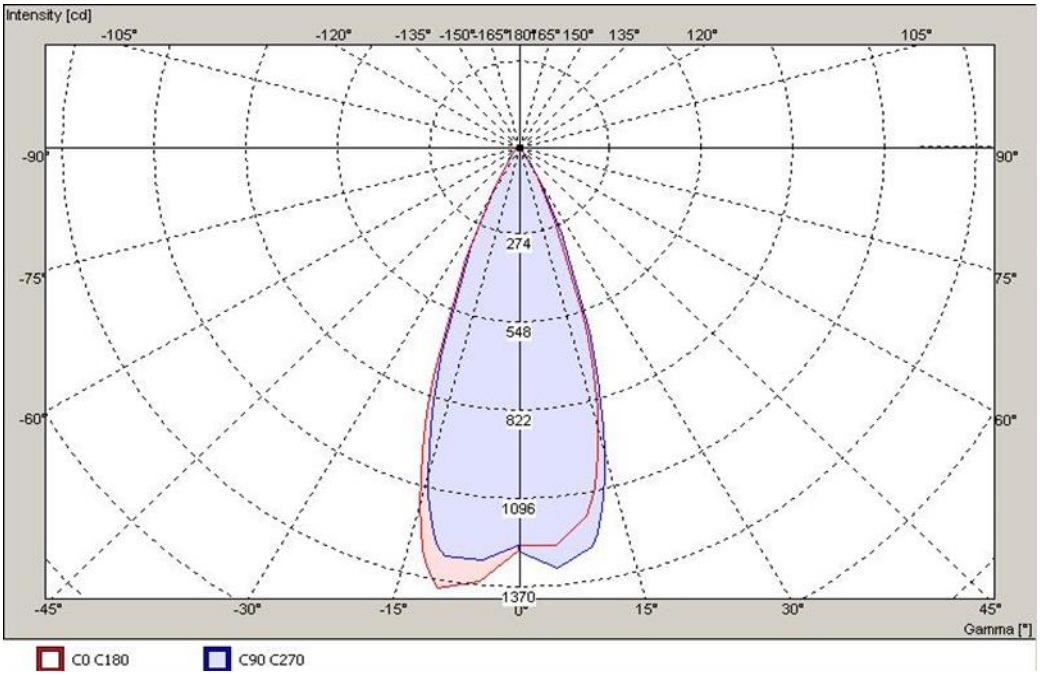


Figure 1. *Typical example of a Polar Diagram*

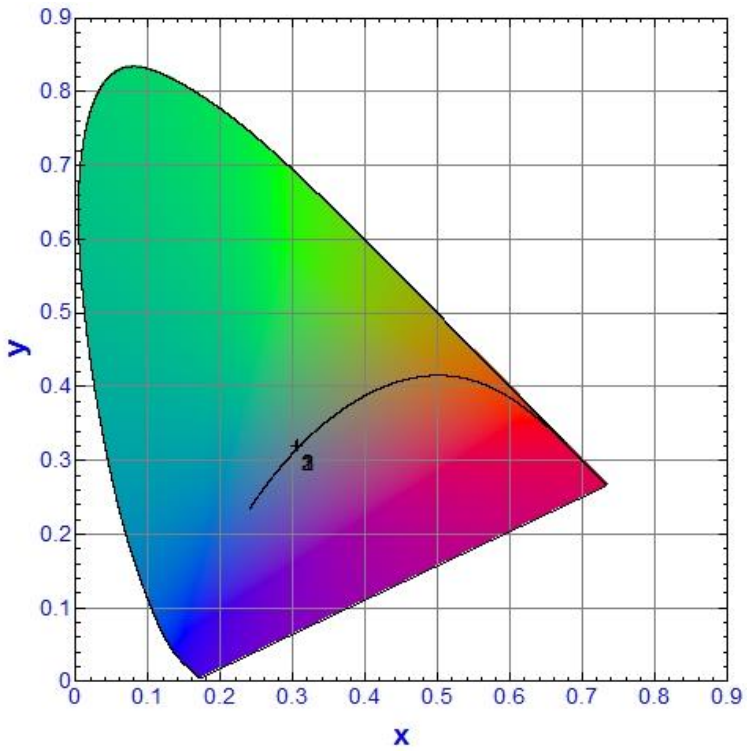


Figure 2. ***Typical example of CIE 1931 chromaticity coordinate plot***

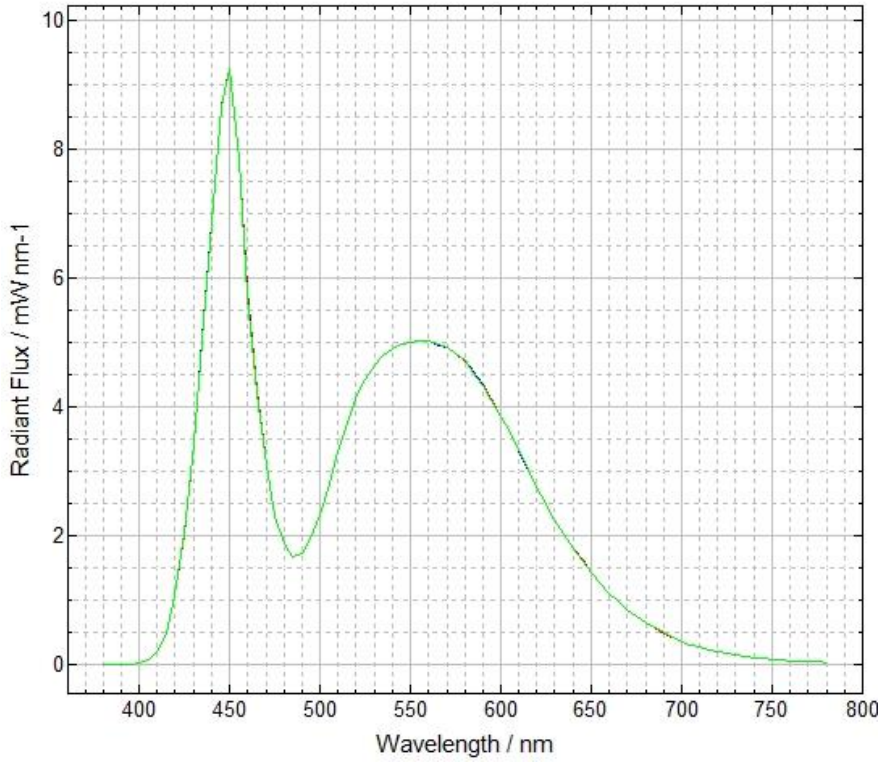
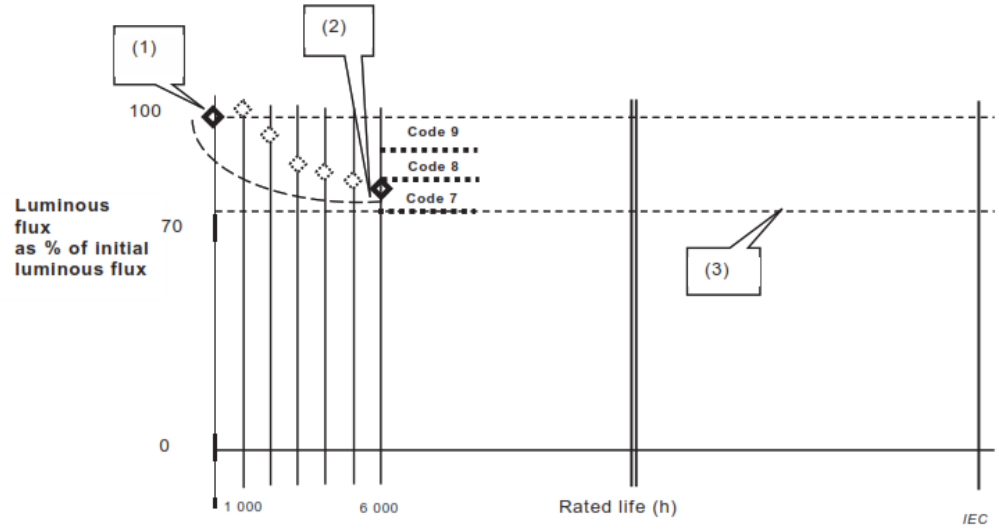


Figure 3. ***Typical example of a Spectral flux curve***



Key

(1) Initial luminous flux

(2) Measured luminous flux value at an operational time as stated in 6.1

(3) Lower limit line: claimed flux decrease over rated life L_{70}

NOTE The figure is given for illustrative purposes only.

Figure 4. ***Luminous flux depreciation over test time, taken from Figure 2 of EN 62717***