LIA VERIFIED SCHEME

TSD-004 Version 2.0 August 2016

LED AND LUMINAIRE VERIFIED REQUIREMENT

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The following EN / IEC / CIE standards and European Directives are used as references in the LIA verified requirements.

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

Directives:

2009/125/EC Ecodesign requirements for directional lamps, light emitting diode lamps and related equipment

2006/95/EC Low Voltage Directive

Safety Standards:

60598: Luminaires. General requirements and tests (with applicable Part 2)

62031: LED Modules for general lighting-safety specifications

62560: Self-ballasted LED-lamps for general lighting services >50V-Safety specification

61347: Lamp control gear. General and safety requirements

61347-2-13: Particular requirements for DC or AC supplied electronic control gear for LED modules. Safety requirements

62471:2006. CIE S 009:2006: Photo biological safety of lamps and lamp systems

60061: Lamp caps and holders together with gauges for the control of interchangeability and safety

61195: Double-capped fluorescent lamps. Safety specifications

62776: Double-capped LED lamps designed to retrofit linear fluorescent lamps – Safety specifications

Performance Standards:

61341: Method of measurement of centre beam intensity and beam angle(s) of reflector lamps.

62612: Self-ballasted LED-lamps for general lighting services. Performance requirements

62384: DC and AC supplied electronic control gear for LED modules. Performance requirements

62722-1: Luminaire performance. General requirements

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

Measurement Standards:

CIE 127: Measurement of LEDs
CIE 13.3: Method of measuring and specifying colour rendering
CIE 1960: Uniform Colour space

Section 1: LED Lamps

1.1. LED Lamps requirements

1.1.1. Lamp types covered by the scheme

LED lamps designed to replace existing lamp types and innovative LED lamp designs are covered by this scheme. Non-standard LED lamps will be assessed for suitability of this scheme and included at the discretion of the LIA laboratories.

1.1.2. Test requirements

The LED lamps will be subjected to a set of performance criteria with limits derived from the ErP Directive and other performance standards as well as a limited safety assessment to determine the suitability for using the scheme logo(s) on the packaging and product website.

1.1.3. Number of samples

A total of 15 lamp samples will be required for the LIA verified scheme for the initial assessment where 10 will be used for evaluation of photometric performance and 5 for the limited safety assessment.

An addition 5 samples will be required each year for ongoing surveillance purposes.

1.1.4. Compliance to LIA Verified

A provisional approval will be given after successful completion of the safety screening and 100 hours of the life test.

The provisional approval will be withdrawn should the sample set fail the 2000 hour life test.

A full approval will be issued after successful completion of the 2000 hour life test and safety screening. A copy of the schedule of approval and the photometric data will be uploaded to the LIA Laboratories' certification website at www.lialabcert.org.uk for public access once 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 lamp room 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 (i.e. 8 X 15min rest cycles in a 24 hour period).

Initial measurements shall be carried out at 0 hours for the following parameters on 3 lamps:

- Initial beam angle (if applicable)[1]
- Initial integrated lumens at 25±1°C[2]
- Correlated Colour temperature CCT[3]
- Colour rendering – Ra[4]
- Colour rendering index – x, y [5]
- Colour Uniformity – u, v[6]
- Power Factor - ʎ[7]

The measurements shall be repeated on the same 3 lamp samples at 100 and 2000 hours for the provisional approval and final approval respectively. Where a product complies with LIA Verified (see 1.1.4) the photometric data taken at 0 hours of life testing will be published. Where the lumen output measurements between the 3 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 3 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, 100 and 2000 hours.

- Lumens per wattage

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

[1-8] All measurements shall be carried out in accordance with the methodology detailed in IEC/PAS 62612:2009, IEC/TR 61341:2010 CIE 127, CIE 13.3 and CIE 1960.

Table 1. ***Performance requirements***

Performance Parameter	Limits
Initial Lumen	≥ 0.90 of manufacturer declared value
Lumen maintenance at 100hrs	≥ 0.95 of Initial Lumen
Lumen maintenance at 2000hrs	0.90 ≤ L ≤ 0.10 of Initial Lumen (Cat A) 0.80 ≤ L < 0.90 of Initial Lumen (Cat B)
Initial Beam Angle	≥ 0.90 of manufacturer declared value
Lamp Life at 2000hrs	≥ 0.90 of sample size
Colour Rendering, Ra	≥ 80 or 65 for outdoor use
Lamp Power factor	P ≤ 2W – No requirement 2W ≤ P ≤ 5W; ʎ > 0.4 5W ≤ P ≤ 25W; ʎ > 0.5 P > 25W; ʎ > 0.9
Lumens per wattage	≥ 60Lm/W

The 0, 100 and 2000 hour lumen value of the LED product shall be plotted in accordance with Figure 1 of IEC / PAS 62612:2013+A1:2015, a copy of which can be found in Figure 5. of Appendix A.

1.3. Electrical Safety

A limited safety assessment shall be carried out on five of the lamp samples in combination with a documentation assessment of the following information supplied by the manufacturer / supplier. All information provided shall remain confidential at all times.

- Bill of materials
- General construction information
- Circuit diagram

The test standards to be applied depends on the product type and in the absence of a dedicated LVD standard, a set of safety tests shall be selected by the LIA laboratories for the limited safety assessment of the product.

In general, the following standards will be used for the respective lamp types. The list of critical clauses being reviewed can be found in Tables 2-4 of Appendix B.

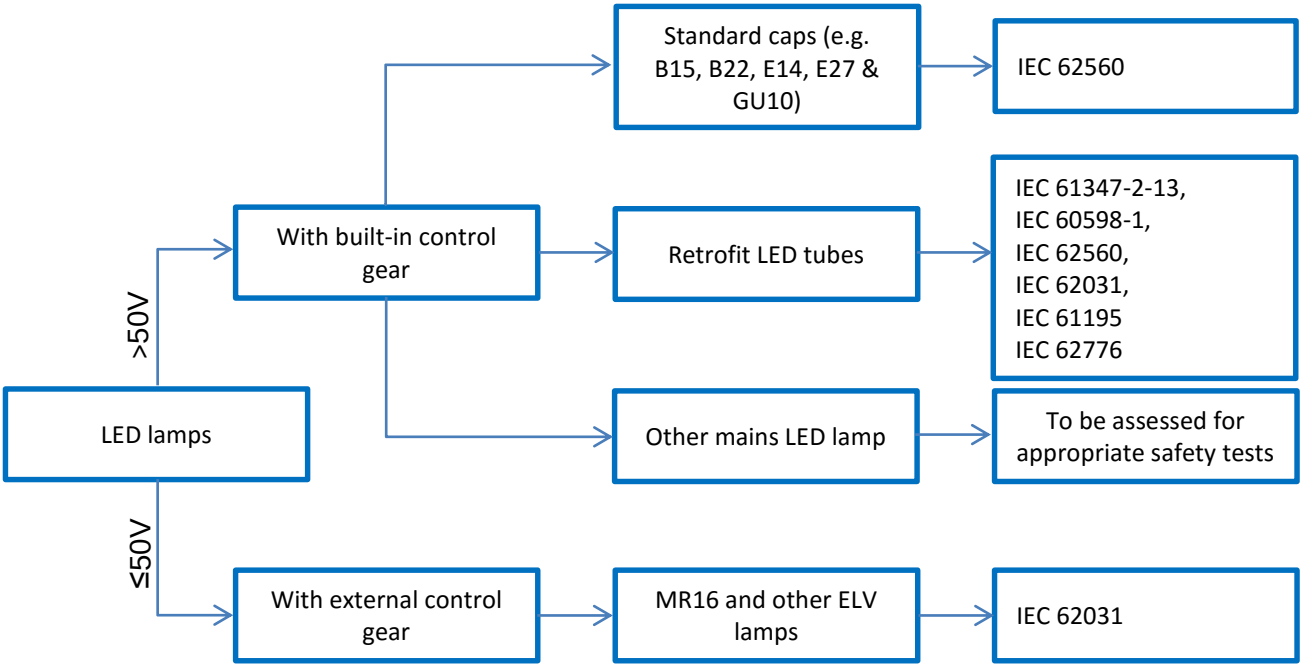

Figure 1. Safety Standards

Note: Where third party accreditation of the product can be provided LIA Laboratories may waive the limited safety assessment. LIA Laboratories retain the right to perform comparison safety testing as seen fit and to refuse the submitted test results at our discretion.

1.4. Product families

Where a particular product has family variants these may be assessed as groups but will be considered by LIA Laboratories 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 1.1.3 above.

1.5. Surveillance Testing

As part of the ongoing surveillance for certification conformity the Laboratory shall be provided with 5 additional samples each year (after the initial assessment) for use in limited electrical safety re-evaluation.

Section 2: LED Luminaires

2.1. LED Luminaires requirements

2.1.1. 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 household and commercial purposes as the primary light source of an environment.

2.1.2. Test requirements

The LED luminaires will be subjected to a set of performance criteria with limits derived from the ErP Directive and other performance standards as well as a limited safety assessment to determine the suitability for using the scheme logo(s) on the packaging and product website.

2.1.3. Numbers of samples

A total of three luminaire samples will be required for the LIA verified scheme as part of the initial assessment where two will be used for evaluation of photometric performance and one for the limited safety assessment.

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

2.1.4. Compliance to LIA verified

A provisional approval will be given after successful completion of the safety screening and 100 hours of the life test.

The provisional approval will be withdrawn should the sample set fail the 2000 hour life test.

A full approval will be issued after successful completion of the 2000 hour life test and safety screening. The photometric data will be uploaded to the LIA Laboratories' 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.

2.2. Performance Testing

All life tests will be carried out in the lamp room 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 (i.e. 8 X 15min rest cycles in a 24 hour period).

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

- Initial beam angle (if applicable)[8]
- Initial integrated lumens at 25±1°C[9]
- Correlated Colour temperature CCT[10]
- Colour rendering – Ra[11]
- Colour rendering index – x, y[12]
- Colour Uniformity – u, v[13]
- Power Factor - ʎ[14]

The measurements shall be repeated on the same 2 luminaire samples at 100 and 2000 hours for the provisional approval and final approval respectively. Where a product complies with LIA Verified (see 2.1.4) the photometric data taken at 0 hours of life testing will be published. Where the lumen output measurements between the 3 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 3 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, 100 and 2000 hours.

- Lumens per wattage

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

[8-16] All measurements shall be carried out in accordance with the methodology detailed in , IEC/PAS 62722-1:2014, IEC/PAS 62722-2-1:2014,, IEC/TR 61341:2010, CIE 127, CIE 13.3 and CIE 1960.

2.3. Electrical Safety

A limited safety assessment shall be carried out on one of the luminaire samples in combination with a documentation assessment of the following information supplied by the manufacturer / supplier. All information provided shall remain confidential at all times.

- Bill of materials
- General construction information
- Circuit diagram
- Component certificates
- Third party approved for UV blue light of luminaire in accordance with IEC 62778 (if this cannot be provided LIA Laboratories can perform required testing)

The test standards to be applied depend on the product type and in the absence of a dedicated LVD standard, a set of safety test shall be selected by the LIA Laboratories for the limited safety assessment of the product.

It is expected that the LED module(s) fitted in the luminaires comply(ies) with IEC 62031 or complies with Section 1 of this document. Proof of third party approval will be required on all critical components used.

In general, the following standards will be used for the respective luminaire types.

IEC 60598-1 – Luminaires – General requirements and tests

List of IEC 60598-2 standards:

Part 2-1 Fixed general purpose luminaires

Part 2-2 Recessed luminaires

Part 2-3 Luminaires for road and street lighting

Part 2-4 Portable general purpose luminaires

Part 2-5 Floodlights

Part 2-7 Portable luminaires for garden use

Part 2-10 Portable luminaires for children

Part 2-12 Mains socket-outlet mounted nightlights

Part 2-20 Lighting chains

Part 2-22 Luminaires for emergency lighting

The list of critical clauses being reviewed can be found in Table 5 of Appendix B.

Note: Where third party accreditation of the product can be provided LIA Laboratories may waive the limited safety assessment. LIA Laboratories retain the right to perform comparison safety testing as seen fit and to refuse the submitted test results at our discretion.

2.4. Product families

Where a particular product has family variants these may be assessed as groups but will be considered by LIA Laboratories 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 2.1.3 above.

2.5. 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 limited electrical safety re-evaluation.

Section 3: Scheme Operation

3.1. Certification Period

3.1.1. 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 significant 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, and then 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.

3.1.2. Changes during certification

In addition to the recertification review, it is the responsibility of the client to inform LIA Laboratories of any changes that occur affecting certification as identified in 3.1.1 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, and then 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.

3.2. Access to Facilities and Information

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

On occasion, where a Scheme is covered within the LIA Laboratories' ISO 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.

3.3. Impartiality

The latest copy of the LIA Laboratories' impartiality policy along with the Terms & Conditions of this scheme can be found on www.lialabcert.org.uk alternatively a copy can be requested by e-mail at lab@thelia.org.uk.

3.4. Application

An application form for this scheme can be downloaded from www.lialabcert.org.uk alternatively a copy can be requested by e-mail at lab@thelia.org.uk.

3.5. 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.

3.6. TSD-002 and TSD-003 Members

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

APPENDICES

APPENDIX A

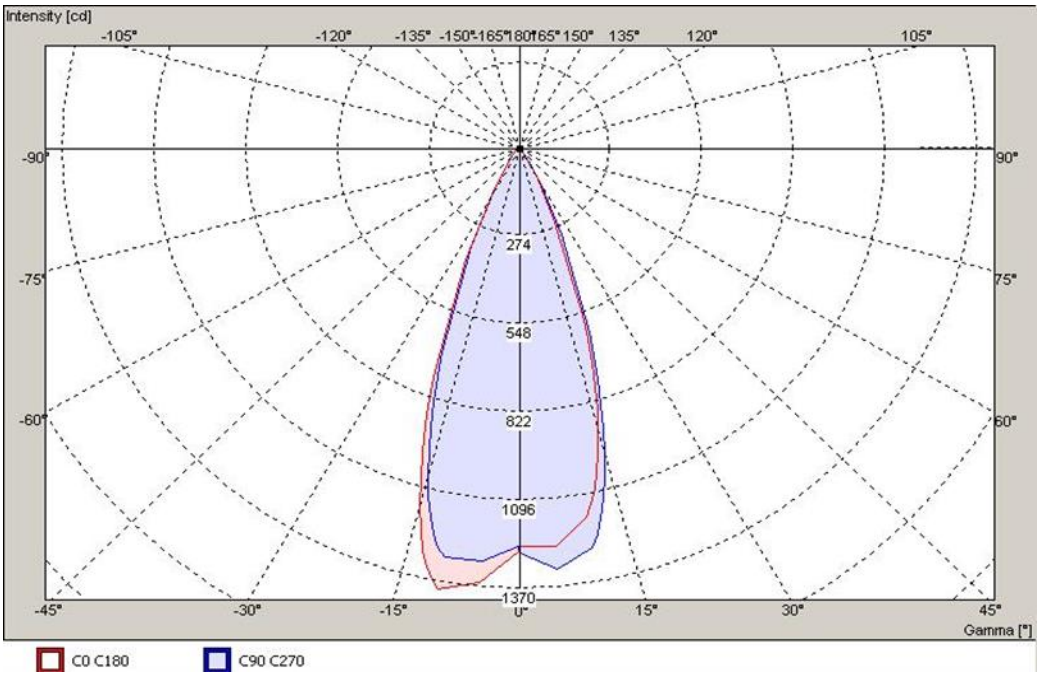

Figure 2. ***Typical example of a Polar Diagram***

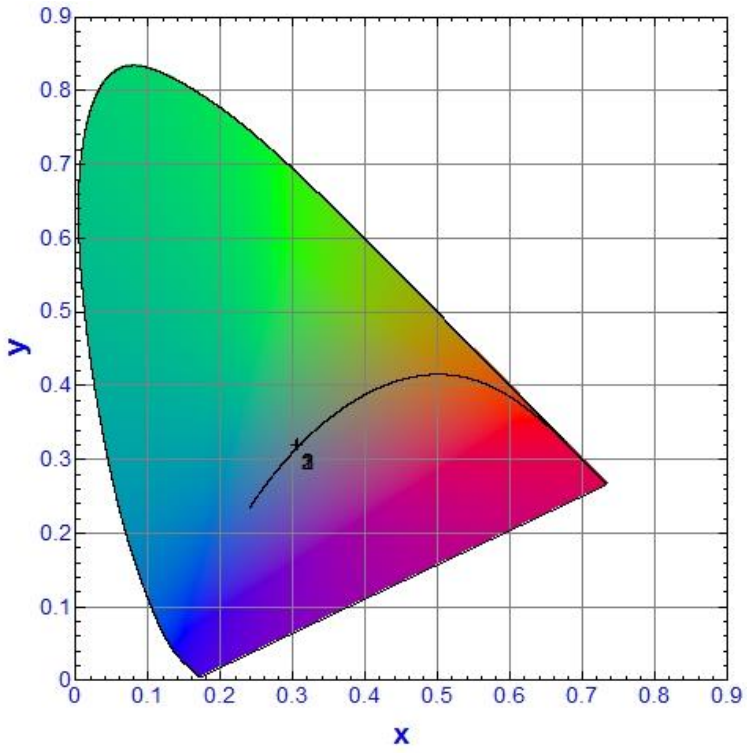

Figure 3. ***Typical example of CIE 1931 chromaticity coordinate plot***

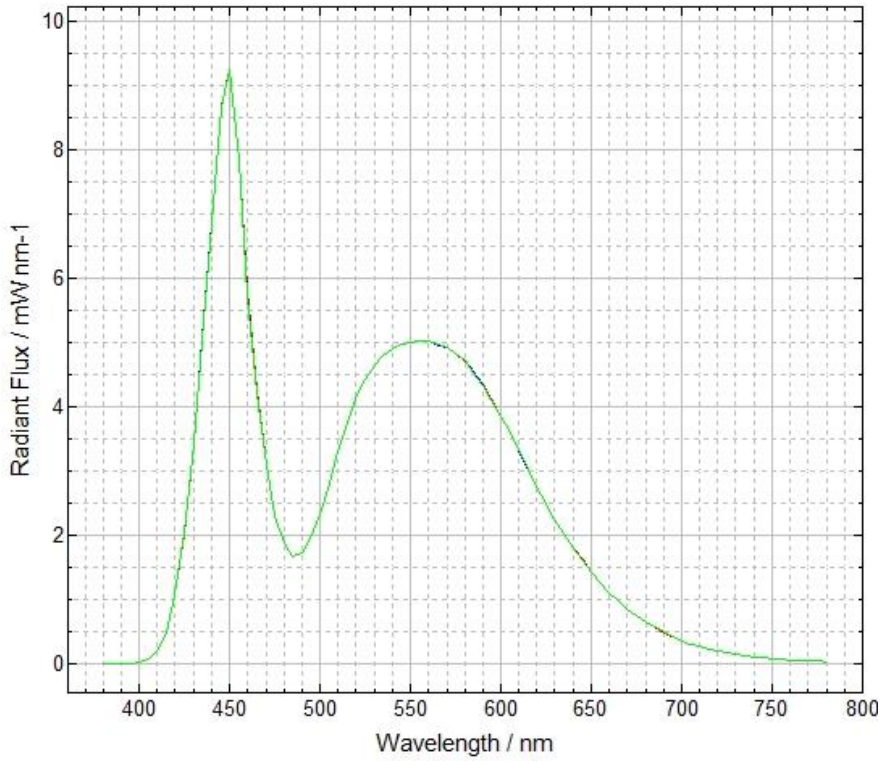

Figure 4. ***Typical example of a Spectral flux curve***

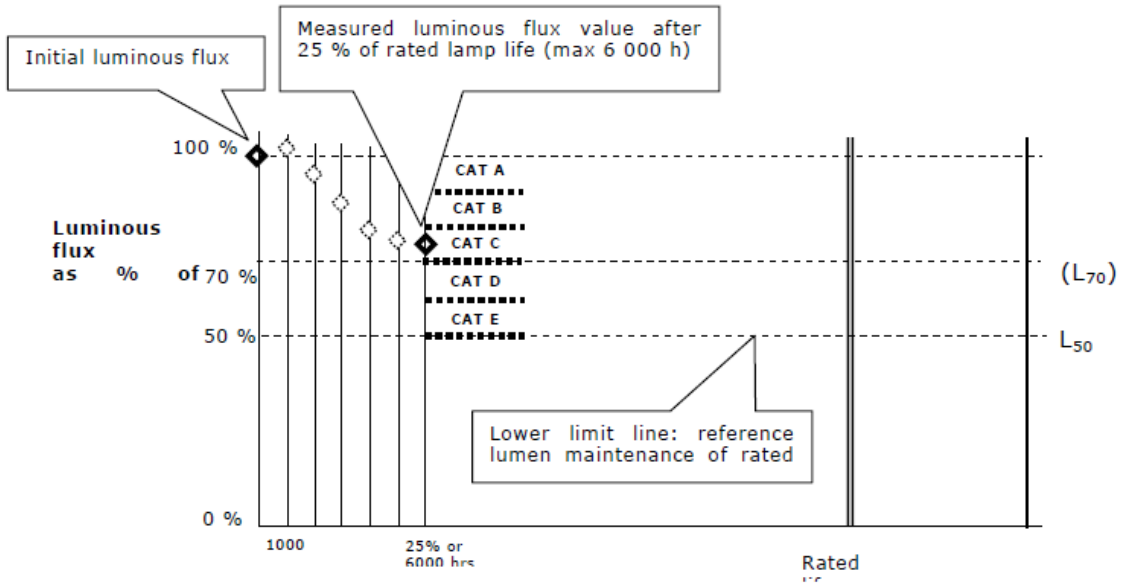

Figure 5. ***Expected luminous flux depreciation over time, taken from Figure 1 of IEC / PAS 62612:2013+A1:2015***

APPENDIX B

Clauses selected for safety screening according to lamp type:

Table 2. ***Safety Tests - IEC 62560***

Clause No.	Clause Title
5	Marking
6	Interchangeability
8	Insulation resistance and electric strength after humidity treatment
9	Mechanical Strength
10	Cap temperature rise
11	Resistance to heat
12	Resistance to Flame and Ignition
13	Fault condition (limited test)
14	Creepage distances and Clearances

Table 3. ***Safety Tests - IEC 62776***

Clause No.	Clause Title
5	Marking
6	Interchangeability (Clause 6.1 and 6.2 only)
7	Pin-safety during insertion
8	Insulation resistance and electric strength after humidity treatment
9	Mechanical requirements for caps (Clause 9.1 and 9.2 only)
10	Cap temperature rise
11	Resistance to heat
12	Resistance to Flame and Ignition
13	Fault condition (limited test)
14	Creepage distances and Clearances

Table 4. ***Safety Tests - Limited testing to IEC 62031***

Clause No.	Clause Title
7	Marking
8	Terminals
11	Moisture resistance and insulation
12	Electric Strength
13	Fault condition (limited test)
15	Construction
17	Screws, current carrying parts and connections
18	Resistance to heat, fire and tracking

Table 5. ***Safety Tests - Limited testing to IEC 61347, IEC 60598, IEC 62560, IEC 62031 and IEC 61195***

Clause No.	Clause Title
7	Marking (62560)
	Interchangeability according to IEC 60061-1
10	Protection against accidental contact with live parts (61347)
11	Moisture resistance and insulation (61347)
12	Electric Strength (61347)
14	Fault condition (limited test) (62031 and 61347)
15	Construction (61347)
11	Creepage distances and Clearances (60598)
17	Screws, current carrying parts and connections (61347)
18	Resistance to heat, fire and tracking (61347)
2.9	Lamp cap temperature rise (Annex B 61195)

Clauses selected for safety screening of luminaires:

Table 6q. ***Safety Tests - Limited testing to IEC 60598-1 with relevant part 2's***

Clause No.	Clause Title
3	Marking
4	Construction
8	Protection against electric shock
10	Insulation resistance and electric strength, Touch Current and Protective conductor current
11	Creepage distances and clearances
12.4	Thermal test only