IEC/PAS 62722-2-1

Edition 1.0 2011-06

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

Luminaire performance –
Part 2-1: Particular requirements for LED luminaires

IEC/PAS 62722-2-1:2011(E)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE P

ICS 29.140.40

ISBN 978-2-88912-000-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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IEC-PAS 62722-2-1 has been processed by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document
Draft PAS	**Report on voting**
34D/995/PAS	34D/1013/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

The contents of the corrigendum of December 2011 have been included in this copy.

INTRODUCTION

The first edition for a performance PAS for LED luminaires for general lighting applications acknowledges the need for relevant tests for luminaires using this new source of electrical light, sometimes called “solid state lighting”. The publication is seen in close context with simultaneously developed and edited publication of performance standards (or PAS) for luminaires in general and for LED modules. Changes in the LED luminaires PAS will have impact on the module standards and vice versa, due to the behaviour of LED. Therefore, in the development of the present PAS, mutual consultancy of experts of both products has taken place.

The provisions in the standard represent the technical knowledge of experts from the fields of the semiconductor (LED chip) industry and of those of the traditional electrical light sources and luminaires.

LUMINAIRE PERFORMANCE –

Part 2-1: Particular requirements for LED luminaires

1 Scope

This PAS specifies the performance requirements for LED luminaires, together with the test methods and conditions, required to show compliance with this PAS. It applies to LED luminaires for general lighting purposes, where claims of operational performance are made.

The following types of LED luminaires are distinguished:

– Type A – Luminaires using LED modules that have not been shown to comply with IEC/PAS 62717;

– Type B – Luminaires using LED modules that have been shown to comply with IEC/PAS 62717;

– Type C – Luminaires using a LED lamp and covered in IEC/PAS 62722-1.

NOTE The definition of the LED module is given in IEC/TS 62504.

The requirements of this PAS only relate to type testing.

This PAS does not cover LED luminaires that intentionally produce coloured light; neither does it cover luminaires using OLEDs (organic LEDs).

These performance requirements are additional to the requirements in IEC/PAS 62722-1.

As this PAS has been simultaneously developed and edited with the PAS for LED modules, where appropriate the compliance of the modules to the provisions of IEC/PAS 62717 may be transferred to the whole luminaire.

Life time of LED luminaires is in most cases much longer than the practical test times. Consequently, verification of manufacturer's life time claims cannot be made in a sufficiently confident way. For that reason the acceptance or rejection of a manufacturer's life time claim, past 25 % of rated life (with a maximum of 6 000 h), is out of the scope of this PAS.

Instead of life time validation this PAS has opted for lumen maintenance categories at a defined finite test time. Therefore, the category number does not imply a prediction of achievable life time. The categories are lumen-depreciation character categories showing behaviour in agreement with manufacturer's information which is provided before the test is started.

In order to validate a life time claim, an extrapolation of test data is needed. A general method of projecting measurement data beyond limited test time is under consideration.

The pass/fail criterion of the life time test as defined in this PAS is different from the life time metrics claimed by manufacturers. For explanation of recommended life time metrics see IEC/PAS 62717, Annex C.

It may be expected that LED luminaires which comply with this PAS will start and operate satisfactorily at voltages between 92 % and 106 % of rated supply voltage and at an ambient air temperature within the declared range of the manufacturer.

The requirements of this PAS apply in addition to the IEC/PAS 62722-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC/PAS 62722-1, *Luminaire performance – Part 1: General requirements*

IEC/PAS 62717, *LED modules for general lighting – Performance requirements*

IEC/TS 62504, *General lighting – LEDs and LED modules – Terms and definitions*

3 Terms and definitions

For the purposes of this PAS, the provisions of Clause 3 of IEC/PAS 62717 apply. In addition, the following definitions are given:

3.1
LED luminaire
luminaire incorporating LED light sources

3.2
family of LED luminaires
group of LED luminaires that have

– LED modules with the same method of control and operation (self-ballasted, semi-ballasted, non-ballasted);
– LED modules with the same classification according to the method of installation (reference is made to IEC 62031, Clause 6);
– the same class of protection against electrical shock;
– the same design characteristics, distinguished by common features of materials, components, and/or method of processing and heat management.

3.3
temperature
t_q
ambient temperature around the luminaire related to the performance of the luminaire

NOTE 1 $t_q \leq t_a$. For t_a, see 1.2.25 of IEC 60598-1.

NOTE 2 For a given life time, the t_q temperature is a fixed value, not a variable.

NOTE 3 There can be more than one t_q temperature, depending on the life time claim.

3.4
LED light source
unit supplied as being a LED lamp or LED module

4 Product information

Information on the parameters shown in Table 1 shall be provided by the manufacturer or responsible vendor on the product datasheets, leaflets or website.

NOTE This information is in addition to the mandatory marking required by IEC 60598-1.

Compliance is checked by inspection.

Table 1 – Product information[1)]

a)	Rated input power (in W)
b)	Photometric code [2)]
c)	Rated luminous flux (in lm)
d)	Rated life (in h) of the LED module in the luminaire and the associated rated lumen maintenance (L_x)
e)	Failure fraction (F_y), corresponding to the rated life of the LED module in the luminaire
f)	Lumen maintenance code [3)]
g)	Rated chromaticity co-ordinate values both initial and maintained [4)]
h)	Correlated Colour Temperature (CCT in K)
i)	Rated Colour Rendering Index (CRI)
j)	Ambient temperature (t_q) for a luminaire [5)]
k)	LED luminaire efficacy (in lm/W)
l)	Aging time, if different to 0 h
1)	Regional requirements may apply and overrule.
2)	See Annex D of IEC/PAS 62717.
3)	See Table 6 of IEC/PAS 62717.
4)	See Table 5 of IEC/PAS 62717.
5)	See last paragraph of Clause A.1 to understand the relation between t_p and t_q.

5 Not used

6 Test conditions

6.1 General test conditions

Test conditions for testing electrical and photometric characteristics, lumen maintenance and life are given in Annex A.

All tests are measured on "*n*" LED luminaires of the same type. The number "*n*" shall be a minimum of products as given in Table 3. LED luminaires used in the endurance tests shall not be used in other tests.

Each sample luminaire shall comply with all the relevant tests except for the tests of Clause 10 where one sample is required for each of the three separate tests. In order to reduce the time of testing, the manufacturer or responsible vendor may submit additional luminaires or parts of luminaires provided that these are of the same materials and design as the original luminaire and that the results of the test are the same as if carried out on an identical luminaire.

LED luminaires with dimming control shall be adjusted to maximum output for all tests.

LED luminaires with adjustable colour point shall be adjusted / set to one fixed value as indicated by the manufacturer of responsible vendor.

LED luminaires of linear geometry and variable length shall be tested at a length at which the parameters are given (e. g. performance per x cm).

6.2 Luminaires with LED modules not in compliance with IEC/PAS 62717

6.2.1 Testing where reliability data of components available

Test duration is 10 % of rated life time up to a maximum of 2 000 h for LED luminaires making use of components where long term test data are available.

Compliance criteria for allowance of 2 000 h test duration:

Component test data for the principle components shall cover at least 25 % of rated LED module lifetime up to a maximum of 6 000 h. The principle components, where applicable, shall be LED packages, electronics, diffusers (incl. remote phosphors), lenses, reflectors and active cooling systems.

Apart from the full set of data provided upon the 2 000 h, the manufacturer or responsible vendor shall also provide the expected data for at least 25 % of rated LED module lifetime up to a maximum of 6 000 h of

– chromaticity co-ordinates;
– lumen maintenance code.

Testing of principle components is not within the scope of this document.

NOTE The method of how to obtain reliability data of principle components and their interaction on LED module level is under consideration.

6.2.2 Testing where no reliability data of components available

If component long term test data is not available, the manufacturer shall conduct testing for 25 % of rated life up to a maximum of 6 000 h.

6.2.3 Creation of module families to reduce test effort

6.2.3.1 General

The provisions of Subclause 6.2.1 of IEC/PAS 62717 apply to the LED luminaire.

6.2.3.2 Variations within family

The provisions of Subclause 6.2.2 of IEC/PAS 62717 apply to the LED luminaire.

6.2.3.3 Compliance testing of family members

The provisions of Subclause 6.2.3 of IEC/PAS 62717 apply to the LED luminaire.

6.3 LED modules in compliance with IEC/PAS 62717

Tests are only carried out of initial performance test.

6.4 Performance requirements

The performance criteria given in Table 2 apply only to LED luminaires and the required testing for each type of luminaire is indicated by an “x”. All other data is available from the respective product standard.