IEC 60838-2-2

Edition 1.1 2012-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Miscellaneous lampholders –
Part 2-2: Particular requirements – Connectors for LED-modules

Douilles diverses pour lampes –
Partie 2-2: Règles particulières – Connecteurs pour modules DEL

IEC 60838-2-2:2006+A1:2012

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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This consolidated version of IEC 60838-2-2 consists of the first edition (2006) [documents 34B/1229/FDIS and 34B/1237/RVD] and its amendment 1 (2012) [documents 34B/1621/CDV and 34B/1638/RVC]. It bears the edition number 1.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 60838-2-2 has been prepared by subcommittee 34B: Lamp caps and holders, of IEC technical committee 34: Lamps and related equipment.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This Part 2-2 is to be used in conjunction with the latest edition of IEC 60838-1 and its amendments. It was established on the basis of the fourth edition (2004) of that standard.

IEC 60838 consists of the following parts, under the general title *Miscellaneous lampholders:*

Part 1: General requirements and tests

Part 2-1: Particular requirements – Section 1: Lampholders S14

Part 2-2: Particular requirements – Connectors for LED modules

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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MISCELLANEOUS LAMPHOLDERS –

Part 2-2: Particular requirements – Connectors for LED-modules

1 General

1.1 Scope

This part of IEC 60838-2 applies to connectors for building-in (including those used for interconnection between LED modules) of miscellaneous types to be used with PCB-based LED modules.

1.2 Normative references

Subclause 1.2 of IEC 60838-1 applies, together with the following additions.

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests – Test N: Change of temperature*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 + 12-hour cycle)*

IEC 62031:2008, *LED modules for general lighting – Safety specifications*
Amendment 1:— [1]

2 Definitions

The definitions given in Clause 2 of IEC 60838-1 as well as the following definitions apply.

2.1
light emitting diode
LED
solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current.

[IEV 845-04-40]

2.2
LED module
unit supplied as a light source. In addition to one or more LEDs it may contain further components, e.g. optical, mechanical, electrical and electronic (under consideration)

3 General requirement

The requirements of Clause 3 of IEC 60838-1 apply.

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[1] To be published.

4 General conditions for tests

The requirements of Clause 4 of IEC 60838-1 apply together with the following additions.

4.1 The tests of 16.1, 16.2 and 19 are carried out on three additional specimens for each test.

5 Standard ratings

5.1 Maximum rated voltage is 50 V a.c.

NOTE An equivalent maximum d.c. voltage of 120 V is under consideration

5.2 Minimum rated current is 10 mA. Maximum rated current is 3 A.

5.3 The rated operating temperature range is -30°C to +65°C. ~~The lower value has to be complied with by all systems unless they are restricted to indoor use only~~ Systems restricted to indoor use are exempt from the lower limit. For relevant application notice and symbol see IEC 60598-1.

NOTE In the automobile industry very often -40°C is required.

6 Classification

The requirements of Clause 5 of IEC 60838-1 apply.

7 Marking

The requirements of Clause 6 of IEC 60838-1 apply.

NOTE The small size of these parts may require reduced letter and symbol height

8 Protection against electric shock

The requirements of Clause 7 of IEC 60838-1 apply.

9 Terminals

The requirements of Clause 8 of IEC 60838-1 apply.

10 Provision for earthing

The requirements of Clause 9 of IEC 60838-1 apply.

11 Construction

The requirements of Clause 10 of IEC 60838-1 apply together with the following additions.

11.1 Minimum cross-sectional area for the connecting leads is 0,22 mm^2. If flat cables (sometimes also called ribbon cables) are used, they shall have a minimum cross-sectional area of 0,09 mm^2. Attention has to be paid to the maximum allowed current load for this cross-sectional area taking into account the rated current range given in 5.2.

12 Moisture resistance, insulation resistance and electric strength

The requirements of Clause 11 of IEC 60838-1 apply.

13 Mechanical strength

The requirements of Clause 12 of IEC 60838-1 apply.

14 Screws, current carrying parts and connections

The requirements of Clause 13 of IEC 60838-1 apply.

15 Creepage distances and clearances

The requirements of Clause 14 of IEC 60838-1 apply.

16 Endurance

The requirements of Clause 15 of IEC 60838-1 apply together with the following additions.

16.1 Connectors for LED modules shall be capable of maintaining good electrical contact to the module during rapid change of temperature.

Compliance is checked by the following test.

A commercial LED module or capped printed circuit board in accordance with IEC 60061, if existing, is inserted and the resistance of the connector contacts and connections is measured as mentioned in 16.3.

The connector and module is then subjected to the temperature change test in accordance to IEC 60068-2-14, test Na, subject to the following details.

The specimen shall be subjected to 100 cycles between the minimum and the maximum value of the rated operating temperature range. The exposure time of each of the two temperatures is 30 min.

NOTE Standard transition time is between 2 min and 3 min. A transition time (t_2) of less than 30 s is allowed, if an automatic test system is used.

During the test the connector shall not undergo any change impairing its further use, especially with respect to contact-making.

After the temperature change test the connector is removed from the test chamber and allowed to recover for 12 h. The LED module remains inserted during this time. The resistance of the connector contacts and connections as mentioned in 16.3 is measured again with the above configuration.

16.2 Connectors for LED modules shall be capable to maintain good electrical contact to the module in high humidity environment.

Compliance is checked by the following test.

A commercial LED module or capped printed circuit board in accordance with IEC 60061, if existing, is inserted and the resistance of the connector contacts and connections is measured as mentioned in 16.3.

The connector and module is then subjected to the damp heat test, cyclic, in accordance to IEC 60068-2-30, subject to the following details.

The specimen shall be subjected to 6 cycles at maximum temperature 55°C, variation 2.

During the test the connector shall not undergo any change impairing its further use, especially with respect to contact-making.

After the damp heat test the connector is removed from the test chamber and allowed to recover for 12 h. The LED module remains inserted during this time. The resistance of the connector contacts and connections as mentioned in 16.3 is measured again with the above configuration.

16.3 The resistance of the connector contacts and connections is measured as follows:

– *a current equal to the rated current of the connector is allowed to flow for a time just sufficient for the resistance to be measured;*
– *on connectors equipped with leads, the resistance is measured between the leads 5 mm from where they come out of the connector;*
– *on connectors without leads, it is necessary to attach leads of the minimum size for which the connector was designed. The resistance is measured between the leads 5 mm from where they come out of the connector;*

The measurement is made in an a.c. circuit of not more than 6V.

The measured resistance shall not exceed the following value:

$0{,}045\ \Omega + (A \times n)$

with

$A = 0{,}01\ \Omega$, *if* $n = 2$;

$A = 0{,}015\ \Omega$, *if* $n > 2$;

where n is the number of separate contact points between connector and PCB, which are included in the measurement.

17 Resistance to heat and fire

The requirements of Clause 16 of IEC 60838-1 apply.

18 Resistance to excessive residual stresses (season cracking) and to rusting

The requirements of Clause 17 of IEC 60838-1 apply.

19 Vibrations

19.1 Connectors for LED modules shall be capable to satisfactorily maintain electrical contact to the module when affected to vibration in normal use.

Compliance is checked by the following test.

A commercial LED module or capped printed circuit board in accordance with IEC 60061, if existing, is inserted and fixed according to the manufacturer's instructions.

The connector and module is then subjected to the vibration test in accordance to IEC 60068-2-6, subject to the following details.

The specimen shall be subjected to 5 sweep cycles in a frequency range between 10 Hz and 500 Hz for each axis with a duration time of 2 h. The acceleration amplitude shall be 5 g.

During the test the connector shall not undergo any change impairing its further use, especially with respect to contact making.

After the vibration test the test assembly is removed and it is checked whether contact making between the connector contacts and the inserted module is still present.

20 Heat management

Information for heat management is provided in Clause 21 and Annex D of IEC 62031, and in relevant IEC 60061 data sheets (e.g. 7004-162).

Requirements and test for contact pressure for heat management purposes are under consideration.

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