

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Organic light emitting diode (OLED) panels for general lighting – Performance requirements

Panneaux à diodes électroluminescentes organiques (OLED) destinés à l'éclairage général – Exigences de performance

<https://standards.iteh.ai/catalog/standards/sist/2b247154-cddb-4862-b572-9f76e6b648d2/iec-62922-2016>



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

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

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IEC 62922

Edition 1.1 2021-08
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.140.99

ISBN 978-2-8322-5457-8

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ORGANIC LIGHT EMITTING DIODE (OLED) PANELS FOR GENERAL LIGHTING – PERFORMANCE REQUIREMENTS

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IEC 62922 edition 1.1 contains the first edition (2016-11) [documents 34A/1942/FDIS and 34A/1956/RVD] and its amendment 1 (2021-08) [documents 34A/2241/FDIS and 34A/2252/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62922 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

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

In this standard, the following print types are used:

- requirements: roman type,
- *test specifications: italic type,*
- notes: smaller roman type.

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ORGANIC LIGHT EMITTING DIODE (OLED) PANELS FOR GENERAL LIGHTING – PERFORMANCE REQUIREMENTS

1 Scope

This document specifies the performance requirements of OLED tiles and panels for use on DC supplies up to 120 V or AC supplies up to 50 V at 50 Hz or 60 Hz for indoor and similar general lighting purposes.

NOTE In this current edition, life (life time and maintained values) is not addressed. This is intended to be covered in a future amendment.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60050-845, *International Electrotechnical Vocabulary. Lighting* (available at <http://www.electropedia.org>)

IEC 62868, *Organic light emitting diode (OLED) panels for general lighting – Safety requirements*

~~IEC TR 62732, *Three digit code for designation of colour rendering and correlated colour temperature*~~

IEC TS 62972, *General lighting – Organic light emitting diode (OLED) products and related equipment – Terms and definitions*

ISO 11664-5/CIE S 014-5/E:2009/2016, *Colorimetry – Part 5: CIE 1976 L*u*v* Colour space and u', v' uniform chromaticity scale diagram*

CIE 013.3:1995, *Method of measuring and specifying colour rendering properties of light sources*

CIE TN 001:2014, *Chromaticity difference specification for light source*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-845, IEC TS 62972 and IEC 62868 as well as the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

test voltage

input voltage at which tests are carried out

3.2**test current**

input current at which tests are carried out

3.3**test power**

input power at which tests are carried out

3.4**initial value**

photometric and electrical characteristics at the end of the ageing and stabilization time

3.5**average luminance**

L_{av}

luminance averaged over the light output surface of an OLED panel in a direction

3.6**median useful life**

L_x

<of OLED tiles and panels> length of operating time during which a total of 50 % of a population of operating OLED tiles or panels of the same type have flux degraded to the luminous flux maintenance factor x

Note 1 to entry: The median useful life includes operating OLED tiles and panels only.

Note 2 to entry: By convention, the expression "life of OLED tiles" or "life of OLED panels" without any modifiers is understood to be the median useful life.

3.7**maintained operating voltage**

<of OLED tiles and panels> operating voltage measured at an operational time, the OLED tiles or panels operating under specified conditions

Note 1 to entry: Specified conditions are described either in this document or the manufacturer's document.

3.8**maintained chromaticity coordinate**

<of OLED tiles and panels> chromaticity coordinate measured at an operational time, the OLED tiles or panels operating under specified conditions

Note 1 to entry: Specified conditions are described either in this document, or the manufacturer's document.

Note 2 to entry: Details are given in 8.2.2.

4 General statement and test conditions**4.1 General statement**

The requirements of this document apply in addition to the requirements of IEC 62868.

The requirement applies for 95 % of the population (with a failure margin below 5 %, it is considered that the product passed the test).

It is understood that reference to an OLED panel also includes reference to OLED tiles in the requirements and tests of this document.

4.2 General test conditions

Unless otherwise specified, all measurements shall be made in a draught free room at a temperature of 25 °C with a tolerance of ± 5 °C, a relative humidity of 65 % maximum and steady state operation of the OLED panel. The temperature shall be maintained within ± 2 °C during the test. The temperature shall be measured in the integrating sphere or at the point within 1,5 m from the OLED panel.

The tests shall be conducted at the rated current or voltage unless otherwise specified in this document.

The test shall be made with the OLED panel in the horizontal mounting position with the surface emitting the largest fraction of luminous flux directed upwards, unless specified otherwise by the manufacturer. The mounting position shall be recorded in the documentation. If all surfaces are intended to emit the same luminous flux, the orientation is at the discretion of the test laboratory. The operating position shall be maintained during the entire test.

In the case of constant current operation: The test current, unless otherwise specified, shall be stable within $\pm 0,5$ % during the performance test of an OLED panel. The total harmonic content of the input shall not exceed 3 %.

In the case of constant voltage operation: The test voltage, unless otherwise specified, shall be stable within $\pm 0,05$ % or 5 mV whichever is greater during the performance test of an OLED panel. The total harmonic content of the input shall not exceed 3 %. The tolerance of $\pm 0,05$ % is applicable for DC supplies only. The tolerance for AC supplies is under consideration. The test voltage shall be measured at the terminals of the OLED panel.

The OLED panel shall be mounted in such a way that thermal contact between the measurement equipment, sample holder and OLED panel is minimal. During stabilization and measurement, an OLED panel shall only be in contact with the measurement equipment near its edges and contact ledges. All other parts of the panel, especially the light output surface and the opposing surface (the back of the OLED panel) shall be open to air, unless otherwise specified by the manufacturer.

NOTE The harmonic content is understood as the r. m. s. summation of the individual harmonic components using the fundamental as 100 %.

4.3 Stabilization

4.3.1 General requirements for stabilization

Stabilization is conducted in a draught free room at a temperature of 25 °C \pm 5 °C. The temperature shall be maintained within ± 2 °C during stabilization. The temperature shall be measured in the integrating sphere or the point within 1,5 m from the OLED panel.

If stabilization conditions, according to 4.3.2 or 4.3.3, are not achieved within 60 min, the measurement may be started and the observed fluctuations shall be reported.

4.3.2 Current-driven stabilization

This method of stabilization is used for OLED panels intended to be operated primarily in constant current mode and OLED panels for which the selection of the operating mode is left to the customer.

The OLED panel shall be powered with a constant input current stable within $\pm 0,5$ %.

During the stabilization period, measurements of the voltage are made at least at 1 min intervals. The OLED panel under test may be regarded as stable and suitable for test purposes if the difference of maximum and minimum readout voltage observed over the last 5 min is less than 0,5 %.

4.3.3 Voltage-driven stabilization

This method of stabilization is used for OLED panels intended to be operated primarily in constant voltage mode.

The OLED panel shall be powered with a constant input voltage stable within $\pm 0,05$ %.

During the stabilization period, measurements of the current are made at least at 1 min intervals. The OLED panel under test may be regarded as stable and suitable for test purposes if the difference of maximum and minimum readout current observed over the last 5 min is less than 1 %.

5 Marking

5.1 Contents and location

OLED panels shall be marked according to Table 1.

Table 1 – Contents and location of marking

Parameters	Location
Rated luminous flux (lm)	Mandatory on packaging or product information
Average luminance (cd/m^2)	Mandatory on packaging or product information
Photometric code (according to IEC TR 62732)	Mandatory on packaging or product information
Rated chromaticity coordinates (in u'v' coordinates) and chromaticity coordinate range (expressed by $\Delta u'v'$, a u'v' circle or a u'v' quadrangle)	Mandatory on packaging or product information
Correlated colour temperature (K)	Mandatory on packaging or product information
Rated colour rendering index	Mandatory on packaging or product information
Operating temperature range ($^{\circ}\text{C}$)	Mandatory on packaging or product information
Rated luminous efficacy (lm/W)	Mandatory on packaging or product information
Luminance uniformity (%)	Mandatory on packaging or product information
Luminous intensity distribution ^a	Mandatory on packaging or product information
Surface chromaticity uniformity and location of measurement spots (if applicable)	Mandatory on packaging or product information
Angular chromaticity uniformity	Mandatory on packaging or product information
Rated location and dimensions of the light output surface	Mandatory on packaging or product information
Rated median useful life (h)	Mandatory on packaging or product information
Luminous flux maintenance (%)	Mandatory on packaging or product information
Maintained operating voltage (V)	Mandatory on packaging or product information
Maintained chromaticity coordinate	Mandatory on packaging or product information
NOTE The operating temperature range specifies maximum and minimum temperatures of the OLED panel at which the OLED panel will function as intended. The operating temperatures are measured according to Annex F.	
^a This requirement is fulfilled if the data file is made available electronically.	

5.2 Information on reliability of electrical connection

Information shall be provided in the datasheet on how the electrical connection of an OLED panel is made, unless the connection method is obvious. This information shall include, as applicable, information on:

- requirements for connectors (e.g. wire size, material, connector specification);

- method for attaching connectors (e.g. solder time and temperature);
- reliability of connection (e.g. maximum pull force and appropriate test setup);
- additional safeguards required (e.g. external strain relief).

6 Input power

The general test conditions and stabilization according to 4.2 and 4.3 shall apply. The input power of the OLED panel is measured.

The measured input power shall not exceed the rated power by more than 10 %.

7 Initial photometric characteristics

7.1 General

The initial values of photometric characteristics shall be measured after stabilization of the OLED panel.

For operation, stabilization and test conditions of an OLED panel, 4.2 and 4.3 apply.

7.2 Luminous flux

Annex C applies.

The initial luminous flux shall not deviate by more than 10 % from the rated initial luminous flux.

NOTE A review of the methods in use for luminous flux measurement is given with CIE 084:1989 and CIE S 025:2015, 4.5 and 6.2. A more specific measurement method for OLED panels is in preparation in IEC 62922-2016.

7.3 Luminous efficacy

OLED panel efficacy shall be calculated from the measured initial luminous flux of the individual OLED panel, divided by the measured initial input power of the same individual OLED panel.

The OLED panel efficacy shall not be less than 90 % of the rated OLED panel efficacy as declared by the manufacturer of the responsible vendor.

7.4 Chromaticity coordinates

~~The chromaticity coordinates shall be derived from the spatially integrated measured spectral characteristics. The test is performed as described in 7.2. The u', v' chromaticity coordinates are calculated as described in ISO 11664-5 CIE S 014-5/E.~~

~~For the calculation of $\Delta(u', v')$, CIE TN 001:2014, Clause 4 applies.~~

~~Where only a rated chromaticity coordinate pair is given in the datasheet: the difference $\Delta(u', v')$ between the rated and measured chromaticity coordinate shall be less than 0,005.~~

~~Where a range of chromaticity coordinates is stated in the datasheet: The measured chromaticity coordinate of an OLED panel shall not fall outside the rated chromaticity coordinate range.~~

The chromaticity coordinates shall be determined from the spectral distribution obtained from the measurement specified in 7.2, in accordance with ISO 11664-5/CIE S 014-5/E:2016.