
Prikazovalniki z organskimi svetlečimi diodami (OLED) - 6-2. del: Merilne metode za ugotavljanje vizualne kakovosti in delovanja v okolju

Organic light emitting diode (OLED) displays - Part 6-2: Measuring methods of visual quality and ambient performance

Anzeigen mit organischen Leuchtdioden (OLEDs) - Teil 6-2: Messverfahren für Bildqualität und Umgebungseigenschaften

Afficheurs à diodes électroluminescentes organiques (OLED) - Partie 6-2: Méthodes de mesure de la qualité visuelle et des caractéristiques de fonctionnement sous conditions ambiantes

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Part 6-2: Measuring methods of visual quality and ambient performance
(IEC 62341-6-2:2012)**

Afficheurs à diodes électroluminescentes organiques (OLED) -
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(CEI 62341-6-2:2012)

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Teil 6-2: Messverfahren für Bildqualität und Umgebungsbetriebseigenschaften
(IEC 62341-6-2:2012)

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Foreword

The text of document 110/338/FDIS, future edition 1 of IEC 62341-6-2, prepared by IEC TC 110, "Flat panel display devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62341-6-2:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-11-28
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-02-28

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|
| IEC 60050 | Series | International electrotechnical vocabulary | - | - |
| IEC 60081 | - | Double-capped fluorescent lamps - Performance specifications | EN 60081 | - |
| IEC 61966-2-1 | - | Multimedia systems and equipment - Colour measurement and management - Part 2-1: Colour management - Default RGB colour space - sRGB | EN 61966-2-1 | - |
| IEC 62341-1-2 | - | Organic light emitting diode displays - Part 1-2: Terminology and letter symbols | EN 62341-1-2 | - |
| CIE 15 | 2004 | Colorimetry | - | - |

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**Organic light emitting diode (OLED) displays –
Part 6-2: Measuring methods of visual quality and ambient performance**

**Afficheurs à diodes électroluminescentes organiques (OLED) –
Partie 6-2: Méthodes de mesure de la qualité visuelle et des caractéristiques de
fonctionnement sous conditions ambiantes**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAYS –**Part 6-2: Measuring methods of visual quality and ambient performance**

FOREWORD

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International Standard IEC 62341-6-2 has been prepared by IEC technical committee 110: Electronic display devices.

The text of this standard is based on the following documents:

| | |
|--------------|------------------|
| FDIS | Report on voting |
| 110/338/FDIS | 110/353/RVD |

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

A list of all parts of the IEC 62341 series, published under the general title *Organic light emitting diode (OLED) displays*, can be found on the IEC website.

The committee has decided that the contents of this publication 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,
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ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAYS –

Part 6-2: Measuring methods of visual quality and ambient performance

1 Scope

This part of IEC 62341 specifies the standard measurement conditions and measurement methods for determining the visual quality and ambient performance of organic light-emitting diode (OLED) display modules and panels. This document mainly applies to colour display modules.

2 Normative references

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

IEC 60050 (all parts), *International Electrotechnical Vocabulary*
(available at <<http://www.electropedia.org>>)

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 61966-2-1, *Multimedia systems and equipment – Colour measurement and management – Part 2-1: Colour management – Default RGB colour space – sRGB*

IEC 62341-1-2, *Organic light emitting diode displays – Part 1-2: Terminology and letter symbols*

CIE 15:2004, *Colorimetry*

3 Terms, definitions and abbreviations

For the purposes of this document, the terms, definitions and abbreviations given in IEC 62341-1-2 and IEC 60050-845:1987 as well as the following apply.

3.1 Terms and definitions

3.1.1

visual inspection

a means for checking image quality by human visual observation for classification and comparison against limit sample criteria

3.1.2

subpixel defect

for colour displays, all or part of a single subpixel, the minimum colour element, which is visibly brighter or darker than surrounding subpixels of the same colour. They are classified depending on the number and configuration of multiple subpixel defects within a region of the display

3.1.3**dot defect**

for monochromatic displays, all or part of a single subpixel, the minimum dot element, which is visibly brighter or darker than surrounding dots. They are classified depending on the number and configuration of multiple subpixel defects within a region of the display

3.1.4**bright subpixel defect**

subpixels or dots which are visibly brighter than surrounding subpixels of the same colour when addressed with a uniform dark or grey background

3.1.5**dark subpixel defect**

subpixels or dots are visibly darker than surrounding subpixels of the same colour when addressed with a uniform bright background (e.g. > 50 % full screen luminance)

3.1.6**partial subpixel defect**

subpixel or dot with part of the emission area obscured such that a visible difference in brightness is observed in comparison with neighbouring subpixels of the same colour

3.1.7**clustered subpixel defects**

subpixel or dot defects gathered in specified area or within a specified distance. Also known as "close subpixel defect"

3.1.8**unstable subpixel**

subpixel or dot that changes luminance in an uncontrollable way

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3.1.9**pixel shrinkage**

reduction in the active emissive area of one or more subpixels (or dots) over time

3.1.10**panel edge shrinkage**

reduction in the active emissive area from the edges of the display area over time

3.1.11**line defect**

vertical or horizontal bright or dark line parallel to a row or column observed against a dark or bright background, respectively

3.1.12**bright line defect**

a line appearing bright on a screen displaying a uniform dark or grey pattern

3.1.13**dark line defect**

a line appearing dark when displayed with a uniform bright or grey pattern

3.1.14**mura**

region(s) of luminance and colour non-uniformity that generally vary more gradually than subpixel level defects. For classification, the maximum dimension should be less than one fourth of the display width or height

3.1.15**line mura**

variation in luminance consisting of one or more lines extending horizontally or vertically across all or a portion of the display (such as may be caused by TFT threshold voltage variation from laser induced crystallization)

3.1.16**colour mura**

mura that appears primarily in only one colour channel and results in a local variation of the white point (or CCT)

3.1.17**spot mura**

region of luminance variation larger than a single pixel appearing as a localized slightly darker or brighter region with a smoothly varying edge

3.1.18**stain mura**

region of luminance variation larger than a single pixel appearing as clearly defined edge bordering a region of brighter or darker luminance than surrounding regions

3.1.19**mechanical defects**

image artefacts arising from defects in protective and contrast enhancement films, coatings, mechanical fixturing, or other elements within the active area of the display

3.1.20**scratch defect**

defect appearing as fine single or multiple lines or scratches, generally light in appearance on a dark background, and independent of display state

3.1.21**dent defect**

localized spot generally white or grey in appearance on dark background and independent of display state

3.1.22**foreign material**

defect caused by foreign material like dust or thread in between contrast enhancement films, protective films, or on emitting surface within the active area of the display

3.1.23**bubble**

defect caused by a cavity in or between sealing materials, adhesives, contrast enhancement films, protective films, or any other films within the visible area of the display

3.1.24**ambient contrast ratio**

contrast ratio of a display with external natural or artificial illumination incident onto its surface

NOTE Includes indoor illumination from luminaires, or outdoor daylight illumination.

3.1.25**colour gamut boundary**

surface determined by a colour gamut's extremes

3.1.26**colour gamut volume**

a single number for characterizing the colour response of a display device in a three-dimensional colour space

NOTE Typically the colour gamut volume is calculated in the CIELAB colour space.

3.1.27**ambient colour gamut volume**

number for characterizing the colour response of a display device, under a defined ambient illumination condition, in a three-dimensional colour space

NOTE Typically the colour gamut volume is calculated in the CIELAB colour space.

3.2 Abbreviations

| | |
|--------|-------------------------------------------------------------------------------------|
| CCT | correlated colour temperature |
| CIE | International Commission on Illumination (Commission internationale de l'éclairage) |
| CIELAB | CIE 1976 (L*a*b*) colour space |
| DUT | device under test |
| HD | high definition |
| ISO | International Organization for Standardization |
| LED | light emitting diode |
| LMD | light measuring device |
| LTPS | low temperature polysilicon |
| OLED | organic light emitting diode |
| PL | photoluminescence |
| QVGA | quarter video graphics array |
| RGB | red, green, blue |
| SDCM | standard deviation of colour matching |
| sRGB | a standard RGB colour space as defined in IEC 61966-2-1 |
| TFT | thin film transistor |
| TV | television |
| UV | ultraviolet |

4 Structure of measuring equipment

The system diagrams and/or operating conditions of the measuring equipment shall comply with the structure specified in each item.

5 Standard measuring conditions**5.1 Standard measuring environmental conditions**

Electro-optical measurements and visual inspection shall be carried out under the standard environmental conditions, using at a temperature of $25\text{ °C} \pm 3\text{ °C}$, a relative humidity of 25 % to 85 %, and pressure of 86 kPa to 106 kPa. When different environmental conditions are used, they shall be noted in the visual inspection or ambient performance report.