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INTERNATIONAL STANDARD

colour inside

3D display devices –
Part 62-11: Measurement methods for virtual-image type – Optical



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3D DISPLAY DEVICES –

Part 62-11: Measurement methods for virtual-image type – Optical

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The text of this International Standard is based on the following documents:

Draft	Report on voting
110/1459/FDIS	110/1473/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62629 series, published under the general title: *3D display devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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3D DISPLAY DEVICES –

Part 62-11: Measurement methods for virtual-image type – Optical

1 Scope

This part of IEC 62629 specifies the standard measuring conditions and measurement methods for determining the optical properties of the image created by 3D display devices and virtual-image optics such as head-up displays. The virtual image refers to an image in which the 3D visual information is superimposed with the outside world. Eye-wear type displays are however beyond the scope of this document.

NOTE The meaning of a virtual image in optics is in general an image formed when the outgoing rays from a point on an object always diverge. With regard to display application, a virtual image can be interpreted according to a real viewing case. When an image is viewed, even though there is no physical display (monitor, TV, screen), in front of a person's eyes, it is called virtual image.

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 amendment-s) applies.

IEC 62629-1-2, *3D display devices – Part 1-2: Generic – Terminology and letter symbols*

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62629-1-2 and 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

3.1.1
virtual image distance
distance from the centre between both eyes to the centre of a virtual image

Note 1 to entry: The eye-centre corresponds to the point where the half of the binocular spacing is located.

3.1.2
field of view
angle subtending the area of the virtual image as observed from the centre between both eyes

3.1.3
eye-box
<3D display devices – virtual-image type> three-dimensional space within which the users place both their eyes and properly see the entire virtual image

3.1.4
look down angle
angle in a downward direction between the normal line and viewing direction from which the virtual image is viewed at the centre between both eyes

Note 1 to entry: The normal line represents a line forming a vertical angle of 90° from the centre of the eye to the virtual image plane.

3.1.5
look over angle
angle in a sideway direction between the normal line and viewing direction from which the virtual image is viewed at the centre between both eyes

3.2 Abbreviated terms

CCD charge-coupled device
CMOS complementary metal-oxide semiconductor
FOV field of view
HUD head-up display
IPD inter pupil distance
LMD light measuring device

4 Measurement systems

4.1 Measuring device

A spot LMD or an imaging LMD such as a 2D imaging colorimeter should be applied for measuring light and colour properties, for example luminance value, chromaticity coordinates, etc. The specification of the LMD applied should be described in the report as in the example given in Table 1.

NOTE If a 3D display has the characteristics of multi-view, which is explained in IEC 62629-22-1 [1][1], the aperture size of 2 mm to 5 mm is suggested and is not larger than 6 mm.

Table 1 – Example of reported specification of an imaging LMD

Image sensor type	CCD, CMOS
Resolution	1 380 × 1 030, 2 448 × 2 050,
Luminance range	0,05 cd/m^2 to 100 000 cd/m^2
Repeatability	ΔL (luminance) < 0,1 % $\Delta x, y$ (chromaticity coordinate) < 0,001
Measuring accuracy	ΔL < 3 % (for Standard Illuminant A) $\Delta x, y$ < 0,002 (for Standard Illuminant A)

The geometric property of the 3D virtual image can be estimated using the imaging LMD (multiple imaging LMDs or one imaging LMD with movement). Annex A shows a comparison of measurement items between the conventional 3D display and the virtual-image type 3D display.

[1] Numbers in square brackets refer to the Bibliography.