



DPC: 22 / 30446804 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Part 62-12: Measurement methods for virtual-image type - Image Quality

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



110/1431/CD

COMMITTEE DRAFT (CD)

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SECRETARIAT:

Japan

SECRETARY:

Mr Yoshi SHIBAHARA

OF INTEREST TO THE FOLLOWING COMMITTEES:

PROPOSED HORIZONTAL STANDARD:

☐

Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

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Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

3D Display Devices - Part 62-12: Measurement methods for virtual-image type - Image Quality

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

3D DISPLAY DEVICES –

Part 62-12: Measurement methods for virtual-image type – Image Quality

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IEC 62629-62-12 has been prepared by IEC technical committee 110: Electronic displays. It is an International Standard.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/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.

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

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

- 142 • reconfirmed,
 - 143 • withdrawn,
 - 144 • replaced by a revised edition, or
 - 145 • amended.
- 146

147 The National Committees are requested to note that for this document the stability date
148 is 20XX..

149 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED
150 AT THE PUBLICATION STAGE.

151

3D DISPLAY DEVICES– –

Part 62-12: Measurement methods for virtual-image type – Image Quality

1 Scope

This part of IEC 62629 specifies the standard measuring conditions and measurement methods for determining image-quality 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. Eyewear displays are however beyond the scope of this document.

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

IEC 62629-62-11, *3D display devices – Part 62-11: Measurement methods for virtual-image type – Optical*

3 Terms, definitions and abbreviations

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 between the centre of user's both eyes and the centre of a virtual-image

3.1.2

field of view

angle subtending the active area of the virtual image as observed from the centre between both eyes

3.1.3

eye box

<the virtual image created by the 3D displays such as 3D head up displays> three-dimensional space within which the users place their both eyes and properly see the entire virtual image

3.1.4

binocular misalignment

differences in vertical and horizontal position of 3D virtual objects observed in the positions of the left and right eyes

Note 1 to entry: It is generally assumed that 3D virtual images reproduced using binocular disparity information should be displayed at the same location when observed with the left and right eyes, however, the position difference of 3D virtual images occurs due to factors such as manufacturing and design errors of HUD optical system. In this aspect, the definition of the 'binocular misalignment' is given in 3.1.4.

3.1.5**dynamic crosstalk**

3D crosstalk which changes with time, occurs when the eye movement is faster than the system latency for 3D display with the eye-position tracking function

Note 1 to entry: the static crosstalk is an amount independent of time change and its definition is in accordance with the IEC 62629-1-2.

3.1.6**ghost image**

fake image that appears repeatedly adjacent to the actual image

3.2 Abbreviations

FOV	field of view
HUD	head up display
IPD	inter pupil distance
LMD	light measuring device

4 Measurement systems**4.1 Measuring device****4.1.1 Light measuring device (LMD)**

A spot LMD or an imaging LMD such as a 2D imaging colorimeter shall be applied for measuring light and colour properties, e.g., luminance value, chromaticity coordinates etc. The specification of the LMD applied shall be described in the report as 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, the aperture size of 2mm to 5mm is suggested and should not be larger than 6mm.

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	$\Delta L(\text{luminance}) < 0,1 \%$ $\Delta x, y (\text{chromaticity coordinate}) < 0,001$
Measuring accuracy	$\Delta L < 3 \%$ (for Standard Illuminant A) $\Delta x, y < 0,002$ (for Standard Illuminant A)

The measurement of geometric information is required for quantifying the levels of the binocular misalignment and the ghost image in this standard. The geometric property of the 3D virtual image can be estimated using one imaging LMD with movement. The Annex C in the IEC 62629-62-11 provides the geometric calibration process for the imaging LMD.

4.1.2 The camera for measuring dynamic crosstalk

It is recommended that a small-size digital camera is utilized for quantifying the degree of dynamic crosstalk, since the measurement of dynamic crosstalk requires a fast-moving equipment greater than 200 mm/sec. The crosstalk is evaluated by measuring the luminance leakage into the observed monocular view of an eye from the monocular image for the other eye. The output of the camera can be calibrated to be proportional to luminance using the spot or imaging LMD that has already been corrected. The specification of a small-size digital camera shall be described in the report as an example given in Table 2.

NOTE The moving speed of the measuring equipment for dynamic crosstalk is determined by considering that the maximum eye-movement speed is generally 200 mm/sec in driving case.