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INTERNATIONAL STANDARD

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Eyewear display –
Part 21-20: Specific measurement methods for VR image quality – Screen door effect

IEC 63145-21-20:2022-07(en)

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EYEWEAR DISPLAY –

Part 21-20: Specific measurement methods for VR image quality – Screen door effect

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

Draft	Report on voting
110/1433/FDIS	110/1444/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.

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A list of all parts in the IEC 63145 series, published under the general title *Eyewear display*, can be found on the IEC website.

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EYEWEAR DISPLAY –

Part 21-20: Specific measurement methods for VR image quality – Screen door effect

1 Scope

This part of IEC 63145 specifies the standard measurement conditions and measurement methods for determining the screen door effect (SDE), which is one of the image quality aspects of eyewear displays of virtual reality (VR) type.

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 63145-1-2, *Eyewear display – Part 1-2: Generic – Terminology*

IEC 63145-20-10:2019, *Eyewear display – Part 20-10: Fundamental measurement methods – Optical properties*

IEC 63145-20-20, *Eyewear display – Part 20-20: Fundamental measurement methods – Image quality*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63145-1-2 and the following apply.

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

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

3.1.1
screen door effect
SDE
visibility of inter-pixel areas due to a spatial display resolution lower than that of the human visual system or to an insufficient pixel fill-factor/aperture ratio

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3.2 Abbreviated terms

2D	two dimensional
CCD	charge-coupled device
DUT	device under test
LMD	light measuring device
MWA	moving window average
VR	virtual reality

4 Standard measurement conditions

Standard measurement conditions (standard environmental conditions, power supply, warm-up time, dark room conditions) shall comply with IEC 63145-20-10 and IEC 63145-20-20.

5 Measurement systems

5.1 Standard coordinate system

The standard coordinate system shall comply with IEC 63145-20-10 and IEC 63145-20-20.

5.2 Measurement equipment

5.2.1 2D imaging LMD

The 2D imaging light measuring device (LMD) shall comply with IEC 63145-20-10 and IEC 63145-20-20, if not described otherwise in the following paragraphs.

The 2D imaging LMD (using a two-dimensional sensor such as a CCD) is a kind of a filter-type LMD. The performances of the 2D imaging LMD shall comply with the LMD specified in IEC 63145-20-10 and IEC 63145-20-20. A 2D imaging LMD that can capture at least a ±2,5° measurement field shall be used. The measurement field shall be less than 18°. The valid measurement field angle of the 2D imaging LMD shall be confirmed and the peripheral image of the 2D imaging LMD shall confirm the absence of vignetting. The 2D imaging LMD should have a minimum performance of 30 cycles per degree with 50 % Michelson contrast at the entrance pupil of 2 mm to 5 mm. The optical measurement capabilities of the LMD, such as luminance and spectral radiance, should be traceable to national metrology standards under the same conditions (for example entrance pupil size, measurement field angle and focus distance in some structures).

NOTE 1 The measurement field of some 2D imaging LMDs is affected by the smaller entrance aperture. The 2D imaging LMD will have an entrance pupil between 2 mm to 5 mm. (See [1][1], [2] for the effect of aperture size.)

NOTE 2 Moiré effect might occur in the 2D imaging LMD due to factors such as pixel structure, rotational misalignment, etc. If moiré occurs, the measurement cannot be performed. (See [3] for more information about moiré.)

NOTE 3 The peripheral 2D luminance data of the 2D imaging LMD can include vignetting. The valid measurement field angle can include only 2D luminance data without such peripheral 2D luminance data.

5.2.2 Stage conditions

Stage conditions shall comply with IEC 63145-20-10 and IEC 63145-20-20.

5.2.3 Setup conditions

Setup conditions shall comply with IEC 63145-20-10 and IEC 63145-20-20.

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

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