IEC 62977-2-2

Edition 1.0 2020-09

INTERNATIONAL STANDARD

colour inside

Electronic displays –
Part 2-2: Measurements of optical characteristics – Ambient performance

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.120; 31.260

ISBN 978-2-8322-8816-0

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CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 9
2 Normative references 9
3 Terms, definitions, abbreviated terms and symbols 9
3.1 Terms and definitions 9
3.2 Abbreviated terms 10
3.3 Symbols 10
4 Standard measuring conditions 11
4.1 Standard measuring environmental conditions 11
4.2 Viewing direction and light source coordinate system 12
4.3 Standard lighting conditions 12
4.3.1 General 12
4.3.2 Standard measuring darkroom conditions 13
4.3.3 Standard ambient illumination 13
4.3.4 Standard illumination geometries 14
4.4 Standard setup conditions 20
4.4.1 General 20
4.4.2 Adjustment of display 20
4.4.3 Starting conditions of measurements 21
4.4.4 General conditions of measuring equipment 21
4.5 Reflection standards 22
4.5.1 General 22
4.5.2 Diffuse reflectance standard 22
4.6 Locations of measurement field 23
5 Darkroom luminance and spectra 23
5.1 General 23
5.2 Test pattern 23
5.2.1 General 23
5.2.2 Simple box test patterns 23
5.2.3 Multi-colour test pattern 24
5.2.4 Measuring conditions 25
5.2.5 Measuring method 25
6 Reflection measurements 26
6.1 General 26
6.2 Measuring conditions 26
6.3 Measuring the hemispherical diffuse reflectance 27
6.4 Measuring the reflectance factor for a directed light source 28
7 Ambient optical performance 30
7.1 General 30
7.2 Ambient contrast ratio 30
7.2.1 General 30
7.2.2 Measuring conditions 30
7.2.3 Measuring method 30
7.3 Ambient display colour 31

7.3.1 General 31
7.3.2 Measuring conditions 31
7.3.3 Measuring method 31
7.4 Ambient colour gamut volume 33
7.4.1 General 33
7.4.2 Measuring conditions 34
7.4.3 Measuring method 34
Annex A (normative) RGB boundary colours for CIELAB gamut volume measurements 37
A.1 General 37
A.2 Equally-spaced 98 boundary colours on the RGB cube 37
A.3 Recommended 602 boundary colours on the RGB cube 40
Annex B (informative) Calculation method for CIELAB gamut volume 54
B.1 Purpose 54
B.2 Procedure for calculating the colour gamut volume 54
B.3 Number of sampled colours 55
B.4 RGB cube surface subdivision method for CIELAB gamut volume calculation 55
B.4.1 General 55
B.4.2 Assumption 55
B.4.3 Uniform RGB grid algorithm 55
B.4.4 Software example execution 57
Bibliography 67

Figure 1 – Representation of the viewing direction (direction of measurement) and coordinate system used for light source configuration 12
Figure 2 – Illustrated examples for directional illumination 15
Figure 3 – Example of the measuring setup using directional illumination where θ_S = 40° and θ_R = 30° 16
Figure 4 – Example of ring light illumination measuring setup where $\theta_S \pm \Delta$ = 35 ± 5 and θ_R = 20° 17
Figure 5 – Detailed schematic of ring light characteristics 18
Figure 6 – Example of measurement geometries for hemispherical illumination using an integrating sphere (left) or sampling sphere (right) 19
Figure 7 – Layout diagram of measurement setup 22
Figure 8 – Example of centre box test patterns using the standard 4 % and 10 % area boxes 24
Figure 9 – Standard medium APL RGBCMYWx test pattern used for centre luminance and spectra measurements with 25 % APL 25
Figure 10 – Example of the range in colours produced by a display 36
Figure B.1 – Analysis flow chart for calculating the CIELAB gamut volume 54
Figure B.2 – Example of tessellation using 5 × 5 grid of surface colours on the RGB cube 57
Figure B.3 – Example of tessellation for the RGB cube using a 3 × 3 grid 59
Figure B.4 – Example of tessellation for the CIELAB gamut volume using a 3 × 3 grid 59

Table 1 – Measurement structure from optical quantities to evaluation and to results (top down) 8
Table 2 – Summary of symbols 11
Table 3 – Eigenvalues M_1 and M_2 for CIE daylight Illuminants D50, D65, and D75 28

Table A.1 – Equally-spaced 98 RGB boundary colours used for CIELAB gamut volume measurements 38
Table A.2 – Recommended RGB boundary colours used for CIELAB colour gamut volume measurements 41
Table B.1 – Example RGB boundary colours used to demonstrate how the CIELAB colour gamut volume can be calculated 58

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ELECTRONIC DISPLAYS –

Part 2-2: Measurements of optical characteristics – Ambient performance

FOREWORD

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International Standard IEC 62977-2-2 has been prepared by IEC technical committee 110: Electronic displays.

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

FDIS	Report on voting
110/1213/FDIS	110/1232/RVD

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

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

A list of all parts in the IEC 62977 series, published under the general title *Electronic displays*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

This document describes the common optical measurement methods applicable in the field of electronic display devices, which overlap with some of the parts of existing documents developed inside TC 110 (IEC 61747-6-2 [17][1], IEC 62341-6-2 [18], IEC 61988-2-2 [19], IEC 62715-5-1 [20], IEC 62679-3-1 [21]), that describe the optical measurement methods of the individual technologies, such as LCD, OLED, PDP and others. This document on common optical measurement methods is intended to be used as the reference document in future documents and in revisions of existing documents (e.g. IEC 61747-6-2 [17], IEC 62341-6-2 [18], IEC 61988-2-2 [19], IEC 62715-5-1 [20], IEC 62679-3-1 [21]). The existing standards documents will be revised in their maintenance time and they will refer to this document to the largest extent.

All documents in IEC TC 110 that are concerned with the measurement of optical properties of electronic display devices under ambient illumination refer to a set of methods and procedures that are similar to each other, or sometimes even identical. This document is intended to identify these methods and to describe them, together with suitable precautions and diagnostics, as a reference for forthcoming documents to make the work of the involved experts more efficient and to avoid duplication of efforts.

Introduction of the common optical measurement methods (COMMs) is also related to a structure where each kind of optical measurement finds its unambiguous position for identification of similarities to other methods or for clarification of distinctions. This structural classification together with a general taxonomy is supposed to make the process of documents production easier, faster and thus more effective.

The above characteristics are summarized in Table 1. The display characteristics that are addressed in this part of IEC 62977 are indicated by a check mark √ in the table.

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1 Numbers in square brackets refer to the Bibliography.

Table 1 – Measurement structure from optical quantities to evaluation and to results (top down)

Variables	**Time**		**Location** (x, y)	**Direction** (θ, ϕ)	**Test pattern, electrical driving, input signal**	**Illumination conditions**	**Temperature, humidity**
Data sampling condition	**Fast**	**Slow**	**Slow**	**Slow**	**Slow** √		
Evaluation							
Results	Transitions from one optical state to another state (for example from test-pattern-1 to test-pattern-2)	Temporal stability (uniformity)	Lateral uniformity	Directional uniformity	Static pattern, √ Characteristic function (electro-optic transfer function, EOTF) Characteristic values (e.g. threshold, saturation)	Darkroom, √ Indoor, Outdoor	Standard environment √
Evaluation 1st order	Turn-on, turn-off, delay (latency) time periods, temporal modulations				Luminance, √ Contrast, √ chromaticity, √ Threshold, saturation values, steepness of transitions, etc.		
Evaluation 2nd order	Flicker prediction, moving picture response time, etc.				EOTF from which the exponent γ is evaluated Chromaticity/ colour gamut area, Colour gamut volume, √		

ELECTRONIC DISPLAYS –

Part 2-2: Measurements of optical characteristics – Ambient performance

1 Scope

This part of IEC 62977 specifies standard measurement conditions and measuring methods for determining the optical characteristics of electronic displays under indoor and outdoor illumination conditions. Standard illumination geometries are specified and the reflection properties of flat screens are determined under those conditions. Reference illumination levels and spectra are used to estimate the photometric and colorimetric characteristics of electronic displays under the same conditions. These methods apply to emissive, transmissive, and reflective displays, or combinations thereof, that render real 2D images on a flat screen.

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 (IEV) – Part 845: Lighting*

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

ISO/CIE 11664-1, *Colorimetry – Part 1: CIE standard colorimetric observers*

ISO/CIE 11664-4, *Colorimetry – Part 4: CIE 1976 L*a*b* colour space*

ISO 15076-1:2010, *Image technology colour management – Architecture, profile format and data structure – Part 1: Based on ICC.1:2010*

CIE 15, *Colorimetry*

CIE 168, *Criteria for the evaluation of extended-gamut colour encoding*