

BS EN 61966-5:2009



BSI British Standards

Multimedia systems and equipment — Colour measurement and management —

Part 5: Equipment using plasma display panels

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The UK participation in its preparation was entrusted to Technical Committee EPL/100, Audio, video and multimedia systems and equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Multimedia systems and equipment -
Colour measurement and management -
Part 5: Equipment using plasma display panels
(IEC 61966-5:2008)**

Systèmes et appareils multimédia -
Mesure et gestion de la couleur -
Partie 5: Appareils utilisant
des afficheurs à plasma
(CEI 61966-5:2008)

Multimediasysteme und -geräte -
Farbmessung und Farbmanagement -
Teil 5: Geräte mit Plasma-Anzeigen
(IEC 61966-5:2008)

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European Committee for Electrotechnical Standardization
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Foreword

The text of document 100/1295/CDV, future edition 2 of IEC 61966-5, prepared by technical area 2, Colour measurement and management, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61966-5 on 2009-07-01.

This European Standard supersedes EN 61966-5:2001.

EN 61966-5:2009 includes the following significant technical change with respect to EN 61966-5:2001:

Annex A has been deleted as it is no longer relevant.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2010-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2012-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61966-5:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61966-2-1 NOTE Harmonized as EN 61966-2-1:2000 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

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 60050-845	1987	International Electrotechnical Vocabulary (IEV) - Chapter 845: Lighting/CIE 17.4:1987, International Lighting Vocabulary (joint IEC/CIE publication)	-	-
IEC 61966-3	2000	Multimedia systems and equipment - Colour measurement and management - Part 3: Equipment using cathode ray tubes	EN 61966-3	2000
ISO 5-4	1995	Photography - Density measurements - Part 4: Geometric conditions for reflection density	-	-
ISO 9241-8	1997	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 8: Requirements for displayed colours	-	-
ISO/CIE 10526	1999	CIE standard illuminants for colorimetry	-	-
ISO/CIE 10527	1991	CIE standard colorimetric observers	-	-
CIE 15	2004	Colorimetry	-	-

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INTRODUCTION

A series of methods and parameters for colour measurements and management for use in multimedia systems and equipment is applicable to the assessment of colour production and reproduction. This part of IEC 61966 deals with equipment using plasma display panels (PDP) to display colour images for use in multimedia applications.

The methods of measurement standardized in this part of IEC 61966 are designed to make possible the objective performance assessment and characterization of colour reproduction of PDP displays which accept red – green – blue analogue or digital signals from electrical input terminals and output colour images on PDP display screens. For PDP displays to which analogue signals are applicable, the corresponding digital signals are taken into account. The measured results are intended to be used for the purpose of equipment specific colour control in order to enable colour management in open multimedia systems.

MULTIMEDIA SYSTEMS AND EQUIPMENT – COLOUR MEASUREMENT AND MANAGEMENT –

Part 5: Equipment using plasma display panels

1 Scope

This part of IEC 61966 defines input test signals, measurement conditions, methods of measurement and reporting of the measured data, to be used for colour characterization and colour management of plasma display panels in multimedia systems.

Colour control within equipment is outside the scope of this International Standard. It does not specify limiting values for various parameters.

2 Normative references

The following referenced documents are indispensable for the application 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 60050-845:1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting/ CIE 17.4:1987, International Lighting Vocabulary (joint IEC/CIE publication)*

IEC 61966-3:2000, *Multimedia systems and equipment – Colour measurement and management – Part 3: Equipment using cathode ray tubes*

ISO 5-4:1995, *Photography – Density measurements – Part 4: Geometric conditions for reflection density*

ISO 9241-8:1997, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 8: Requirements for displayed colours*

ISO/CIE 10526:1999, *CIE standard illuminants for colorimetry*

ISO/CIE 10527:1991, *CIE standard colorimetric observers*

CIE 15:2004, *Colorimetry*

3 Terms and definitions

For the purpose of this part of IEC 61966, the definitions of IEC 60050-845/CIE 17.4, as well as the following definitions, apply.

3.1

background

image on a screen of the PDP display other than the interested area of a colour patch

3.2

colour control

effort to convert equipment dependent colour image data to equipment independent data for a specific colour space including tone characteristics

3.3**colour patch, test area**

square colour image on a screen of the PDP display subject to be measured for colour reproduction, in which input data for the red, green and blue channels are kept constant within the image area

3.4**CRT**

colorimetrically well-controlled equipment using cathode ray tubes to present colour images with digital inputs for reference

3.5**PDP display**

any multimedia equipment using plasma display panels to present colour images

3.6**effective screen height**

vertical dimension of the effective screen area

3.7**effective screen area**

area where a picture can be produced

3.8**normalized (image) signal**

input signal normalized by its full scale value, whose level is of interest in calculation and evaluation of colour control function within PDP display, see also equation (1)

3.9**uncertainty (of measurement)**

parameter, associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the particular quantity subject to measurement

NOTE See also [16] ¹.

¹ Figures in square brackets refer to the bibliography

4 Letters and symbols

The notations consistently adopted in this part of IEC 61966 are summarized below.

A	display area ratio
N	number of bits in digital data for each channel
M	maximum integer for non-negative N -bit system; $M = 2^{N-1}$
D_R	digital data applied to red channel
D_G	digital data applied to green channel
D_B	digital data applied to blue channel
R	normalized input level to red channel
G	normalized input level to green channel
B	normalized input level to blue channel
X	one of measured raw data using spectroradiometers and colorimeters corresponding to tristimulus values
Y	one of measured raw data using spectroradiometers and colorimeters corresponding to tristimulus values in candela per square metre
Z	one of measured raw data using spectroradiometers and colorimeters corresponding to tristimulus values
R'	linearized data for red channel taking into account the tone characteristics of the channel
G'	linearized data for green channel taking into account the tone characteristics of the channel
B'	linearized data for blue channel taking into account the tone characteristics of the channel
X'	one of the tristimulus values normalized by Y_n (candela per square metre) for peak white
Y'	one of the tristimulus values normalized by Y_n (candela per square metre) for peak white
Z'	one of the tristimulus values normalized by Y_n (candela per square metre) for peak white

5 Conditions

5.1 Environmental conditions

All measurements specified in this standard shall be carried out in a dark room. Particular attention should be paid to reflected illumination caused by the ambient objects (desktop, wall, etc.) and to direct illumination from light-emitting indicators of measuring instruments.

A 1 h warm-up time should precede the measurements in 7.2, 9.2, 10.2, 11.2 and 14.2, if not specified by the manufacturer of the equipment.

The mains voltage and frequency shall be at the rated values specified by the manufacturer of a PDP display. When the mains voltage fluctuates, a regulated power supply should be used to maintain the supply voltage within $\pm 5\%$ of the rated value.

Other environmental conditions such as room temperature and relative humidity shall be reported together with the results of the measurements.

If additional environmental conditions are described in the manufacturer's specifications, these should also be taken into account.

5.2 Conditions of measurements

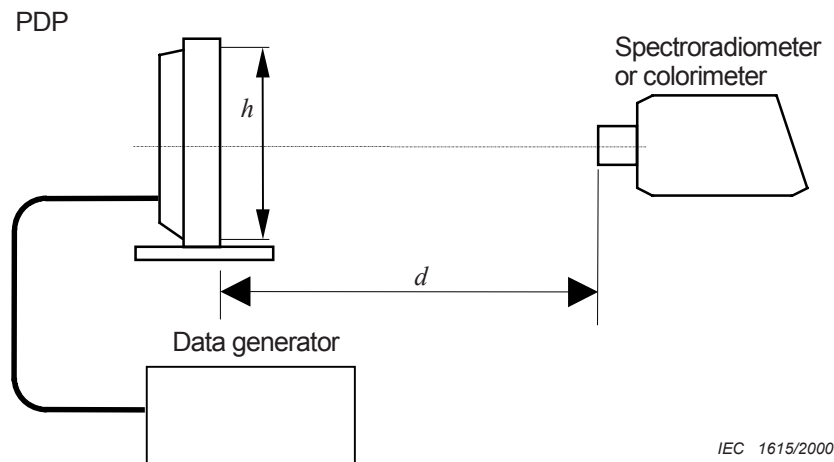
Contrast, brightness and additional adjustments shall be set to the preset positions specified by the manufacturer of the PDP display under measurement. When the adjustment is set to a position other than the preset, the position or corresponding value should be reported with the results of the measurements.

The equipment arrangement for non-contact measurements should be as shown in figure 1. It incorporates a spectroradiometer or a non-contact colorimeter, depending on the characteristics to be measured. The instrument optical axis should be normal to the centre of the surface of the PDP display.

The distance d between the faceplate of the PDP display and the measuring instrument shall be $4h$ or larger, where h is the effective screen height of the display, see Figure 1.

NOTE 1 It is recommended to take precautions so that the measurement is not influenced by vibration and that there are no missing picture elements within the field of view of the measuring instrument.

NOTE 2 The measurement area in the colour patch should include more than 500 picture elements.



h the effective screen height

Figure 1 – Equipment arrangement for non-contact measurements

The equipment arrangement for contact measurements should be as shown in Figure 2, where a measurement probe is placed on the faceplate of the PDP display.