



SLOVENSKI STANDARD

SIST EN 61146-2:1999

01-april-1999

Video cameras (PAL/SECAM/NTSC) - Methods of measurement -- Part 2: Two- and three-sensor professional cameras (IEC 61146-2:1997)

Video cameras (PAL/SECAM/NTSC) - Methods of measurement -- Part 2: Two- and three-sensor professional cameras

Videokameras (PAL/SECAM/NTSC) - Meßverfahren -- Teil 2: Zwei- und Drei-Sensorkameras für professionelle Anwendung

Caméras vidéo (PAL/SECAM/NTSC) - Méthodes de mesure -- Partie 2: Caméras professionnelles à deux et trois capteurs

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33.160.40 Video sistemi Video systems

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English version

**Video cameras (PAL/SECAM/NTSC) - Methods of measurement
Part 2: Two- and three-sensor professional cameras
(IEC 61146-2:1997)**

Caméras vidéo (PAL/SECAM/NTSC)
Méthodes de mesure
Partie 2: Caméras professionnelles à
deux et trois capteurs
(CEI 61146-2:1997)

Videokameras (PAL/SECAM/NTSC)
Meßverfahren
Teil 2: Zwei- und Drei-Sensorkameras
für professionelle Anwendung
(IEC 61146-2:1997)

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European Committee for Electrotechnical Standardization
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Foreword

The text of document 100C/59/FDIS, future edition 1 of IEC 61146-2, prepared by SC 100C, Audio, video and multimedia subsystems and equipment, 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 61146-2 on 1997-10-01.

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) 1998-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-07-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61146-2:1997 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

**Normative references to international publications
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 61146-1	1994	Video cameras (PAL/SECAM/NTSC) Methods of measurement Part 1: Non-broadcast single-sensor cameras	EN 61146-1	1996
ISO/CIE 10526	1991	CIE colorimetric standard illuminants	-	-
ISO/CIE 10527	1991	CIE colorimetric standard observers	-	-
EBU Techn. 3237	1983	Methods of measurement of the colorimetric fidelity of television cameras	-	-
Corrigendum	1989			
Supplement 1	1989	Measurement procedures		
CIE 15.2	1986	Colorimetry	-	-

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Caméras vidéo (PAL/SECAM/NTSC) –
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trois capteurs

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Part 2:
Two- and three-sensor professional cameras

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**VIDEO CAMERAS (PAL/SECAM/NTSC) –
METHODS OF MEASUREMENT –****Part 2: Two- and three-sensor professional cameras**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
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- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61146-2 has been prepared by subcommittee 100C: Audio, video and multimedia subsystems and equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
100C/59/FDIS	100C/128/RDV

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

Annex A is for information only.

VIDEO CAMERAS (PAL/SECAM/NTSC) – METHODS OF MEASUREMENT –

Part 2: Two- and three-sensor professional cameras

1 General

1.1 Scope

This part of IEC 61146 applies to the assessment of performance of professional colour video cameras equipped with two and three tubes or solid state imagers, used for educational or industrial purposes and in other applications.

This part of IEC 61146 defines test patterns, measurement conditions, and methods of measurement, so as to enable the comparison of the results of measurements.

The methods of measurement are designed to enable the assessment of the performance of cameras by using light input from the lens and any electrical outputs of the cameras, for example, R-G-B signals, Y-C separate signals, and composite video signals.

This standard does not specify limiting values for various parameters.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61146. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61146 are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 61146-1: 1994, *Video cameras (PAL/SECAM/NTSC) – Methods of measurement – Part 1: Non-broadcast single-sensor cameras*

ISO/CIE 10526: 1991, *CIE colorimetric standard illuminants*

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

EBU Techn. 3237: 1983, *Methods of measurement of the colorimetric fidelity of television cameras*

Corrigendum (1989)

Supplement 1: 1989, *Measurement procedures*

Publication CIE 15.2: 1986, *Colorimetry*

1.3 Conditions

1.3.1 Environmental conditions

All measurements shall be carried out within the environmental conditions specified by the manufacturer of the camera under assessment.

The environmental conditions during measurement, at least the temperature and the relative humidity, shall be reported together with the results of measurements.

An adequate warm up time shall be allowed.

1.3.2 Conditions of measurements

The measurements shall be carried out either by measuring the output signals of the device when the camera is shooting different test charts, depending on the characteristic to be measured, or by measuring the distortions on a monitor screen.

1.3.2.1 Test charts

All the test charts used for measurement shall be specified with the results, together with the lighting conditions (illumination intensity, correlated colour temperature, etc.).

The test charts shall be shot by the camera so that the frame limited by the arrows coincides exactly with the edges of the picture displayed on the video monitor in underscan mode.

The test charts may be either reflective or transparent. Where there is a choice, the reflective test chart shall be used in questionable cases.

1.3.2.2 Illumination

The illumination of reflective test charts shall be performed by two spotlights with a correlated colour temperature of $3\,200\text{ K}^{+100\text{K}}_{-200\text{K}}$ placed at 45° with respect to the perpendicular axis of the centre of the test charts, as shown in figure 1.

A uniform illumination should be obtained by adjusting the distance of the spotlights or by defocusing them. The illumination can also be adjusted by other means without changing the colour temperature. It is recommended to maintain the supply voltage constant during the measurements. The light box used for transparent test charts shall be a diffusing surface, illuminated by a light source with a stabilised power supply.

The subject illumination of the reflective chart shall be $2\,000\text{ lx} \pm 5\%$. The luminance of the diffusion surface of the light box used for a transparent test chart shall be $636\text{ cd/m}^2 \pm 5\%$.

1.3.2.3 Reference conditions

The camera shall be placed so that its optical axis coincides with the perpendicular passing through the centre of the test chart, the camera being adjusted for normal operation conditions. If switching is possible, the measurements should be made in the following setting conditions, using the standard lens specified by the manufacturer of the camera (see note below), unless otherwise stated:

- a) focal length of the lens is adjusted to the mean value corresponding to normal operation;
- b) iris is set to f/5,6;
- c) white balance is set, manually or automatically, to the position corresponding to the correlated colour temperature of the illuminant;
- d) white balance is further adjusted using a white test chart (see figure 6) with the output signals as the reference value;
- e) bias light is set ON, when applicable;
- f) black level corrector is ON, when applicable;
- g) flare corrector is ON;
- h) black balance is set for an output voltage of 35 mV with lens capped;
- i) colour matrixing corrector is OFF;
- j) contour corrector is OFF;
- k) noise reducer is OFF;
- l) aperture correction is OFF;
- m) black and white shading correctors are ON and optimized;
- n) gamma corrector is set to OFF;
- o) gain is set to 0 dB;
- p) knee and auto-knee functions are set to OFF where appropriate.

NOTE – If a zoom lens is recommended by the manufacturer, the measurement may be carried out using the narrowest and the widest angle of the lens. In this case, the type of the lens and the setting should be reported with measured results.

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1.3.2.4 Equipment arrangement

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Unless otherwise stated, the equipment arrangement shown in figures 1 or 3 should be used. The test equipment shall have the following specifications:

- a) oscilloscope
 - with external television synchronization,
 - adjustable delay relative to the field interval,
 - marker pulse output which can be used to mark on the monitor the part of the picture signal which is displayed on the oscilloscope;
- b) lightmeter
 - with a cosine corrector;
- c) video signal outputs shall be properly terminated by 75 Ω .

1.3.3 Reference output levels

Unless otherwise specified, the reference luminance Y and R , G , B output levels are assumed to be 700 mV peak-to-peak for PAL and SECAM systems, and 714 mV peak-to-peak for NTSC systems. The level shall be measured from the blanking level to the peak white level.