

Video cameras (PAL/SECAM/NTSC) — Methods of measurement —

Part 4: Automatic functions of video cameras and camera-recorders

The European Standard EN 61146-4:1998 has the status of a
British Standard

ICS 33.160.40

National foreword

This British Standard is the official English language version of EN 61146-4:1998. It is identical with IEC 61146-4:1998.

The UK participation in its preparation was entrusted to Technical Committee EPL/100, Audio, video and multimedia systems and equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 21 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 December 2005

© BSI 30 December 2005

ICS 33.160.40

Descriptors: Video equipment, motionpicture cameras, magnetoscope, characteristics, control functions, automatic, measurements, test results, testing condition, comparison, mire, illuminance, luminance, colours

English version

Video cameras (PAL/SECAM/NTSC) - Methods of measurement
Part 4: Automatic functions of video cameras and camera-recorders
(IEC 61146-4:1998)

Caméras vidéo (PAL/SECAM/NTSC)
Méthodes de mesure
Partie 4: Fonctions automatiques des
caméras video et des caméscopes
(CEI 61146-4:1998)

Videokameras (PAL/SECAM/NTSC)
Meßverfahren
Teil 4: Automatische Funktionen von
Videokameras und Camcordern
(IEC 61146-4:1998)

This European Standard was approved by CENELEC on 1998-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

© 1998 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Foreword

The text of document 100C/221/FDIS, future edition 1 of IEC 61146-4, 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 61146-4 on 1998-08-01.

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) 1999-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2001-05-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annexes A and ZA are normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61146-4:1998 was approved by CENELEC as a European Standard without any modification.

CONTENTS

Clause	Page
1 Scope	5
2 Normative references.....	5
3 Terms and definitions.....	5
4 Conditions	6
4.1 Environmental conditions	6
4.2 Conditions of measurement.....	6
4.2.1 Illumination	6
4.2.2 Shooting conditions.....	6
4.2.3 Settings of the equipment under test	6
4.2.4 Reliability of measured results.....	7
5 Method of measurement of automatic functions	7
5.1 Automatic exposure control	7
5.1.1 Dependency on illumination level	7
5.1.2 Dependency on average brightness.....	9
5.1.3 Dynamic response	12
5.2 Automatic focusing.....	13
5.2.1 Assessment of focusing response time	13
5.2.2 Focusing accuracy	14
5.3 Automatic white balance.....	15
5.3.1 Dependency on colour temperature of illumination.....	15
5.3.2 Dynamic characteristics of automatic white balance.....	18
Annex A (normative) Specification of the tracking chart.....	20
Annex 2A (normative) Normative references to international publications with their corresponding European publications.....	21
Figure 1 – Equipment arrangement for measurement of dependency on illumination level	8
Figure 2 – Equipment arrangement for measurement of dependency on average brightness	10
Figure 3 – Waveform of a horizontal line for $\bar{B} = 27\%$	11
Figure 4 – Waveform of a horizontal line for $\bar{B} = 77\%$	11
Figure 5 – Waveform of a horizontal line for $\bar{B} = 9\%$	11
Figure 6 – Typical response (1)	12
Figure 7 – Typical response (2)	12
Figure 8 – Equipment arrangement for measurement of focusing time	13
Figure 9 – Equipment arrangement for measurement of automatic white balance.....	16
Figure 10 – Colour temperature conversion block and its specification	17
Figure A.1 – Dimensional specification of the large-sized tracking chart	20

	Page
Table 1 – Automatic exposure control – Dependency on illumination level	9
Table 2 – Automatic exposure control – Dependency on average brightness	12
Table 3 – Automatic focusing – Assessment of focusing response time	14
Table 4 – Automatic white balance – Dependency on colour temperature of illumination .	18
Table 5 – Optical filters used for conversion of colour temperature	19
Table A.1 – Positions of equi-centred small circles and triangle markers	20

METHODS OF MEASUREMENT –

Part 4: Automatic functions of video cameras and camera-recorders

1 Scope

This part of IEC 61146 applies to the assessment of characteristics of automatic functions which are implemented in colour video cameras and camera-recorders. The performance to be assessed in this standard is limited to automatic functions relating to light input from the lens and to the electronic output from video cameras and the video camera portions of camera-recorders.

This standard defines test patterns, measurement conditions, methods of measurement and the presentation of measured results so as to make possible the comparison of the measurement results.

This standard intends to provide an objective method of measurement for each characteristic of the automatic functions but the results of objective measurements may not correlate well with the subjective assessment of automatic functions.

It does not specify limiting values for the various characteristics related to automatic functions.

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 8341:1989, *Photography – Slide projectors and filmstrip projectors – Illumination test*

3 Terms and definitions

For the purpose of this part of IEC 61146, the following definitions apply.

3.1

grey scale chart

test chart which has logarithmic grey steps of $\gamma = 2,2$ specified in item 1 of annex A of IEC 61146-1

3.2**tracking chart**

test chart with a radial arrangement of black and white wedges (see annex A)

3.3**resolution chart**

test chart specified in item 4 of annex A of IEC 61146-1

3.4**uniform white chart**

test chart specified in item 2 of annex A of IEC 61146-1

3.5**equipment under test**

colour video camera and camera-recorder with electronic output(s)

4 Conditions**4.1 Environmental conditions**

All measurements shall be carried out within the environmental conditions as specified by the manufacturer.

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

4.2 Conditions of measurement**4.2.1 Illumination**

- a) The illumination of test charts should be performed by two or four spot lights depending on the characteristics to be measured.
- b) The correlated colour temperature of the spot light shall be $3\,100\text{ K} \pm 100\text{ K}$.
- c) Unless otherwise specified, the illumination level of the test chart shall be $2\,000\text{ lx} \pm 100\text{ lx}$.
- d) The non-uniformity of the illumination shall be less than 5 %.
- e) The methods used for all the measurements shall be in line with the standard methods specified in ISO 8341.

4.2.2 Shooting conditions

- a) An optical axis of the equipment under test shall coincide with a normal line of the test chart.
- b) Unless otherwise specified, the distance between the test chart and the equipment under test should be approximately 2 m.
- c) Unless otherwise specified, the zooming should be adjusted so that horizontal and vertical markers just fit the full frame of an under-scan monitor.

4.2.3 Settings of the equipment under test

Except when otherwise indicated, the following setting shall be used:

- a) focus shall be adjusted for the best condition;