

---

---

**Video snemanje – Format vrste D-11 z magnetnim trakom s širino 12,65 mm –  
1. del: Snemanje na trak (IEC 62356-1:2003)**

**(istoveten EN 62356-1:2004)**

Video recording – 12,65 mm type D-11 format – Part 1: Tape recording (IEC 62356-1:2003)

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 62356-1:2006](https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cdbd9f9f6fad/sist-en-62356-1-2006)

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cdbd9f9f6fad/sist-en-62356-1-2006>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 62356-1:2006

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cbd9f9f6fad/sist-en-62356-1-2006>

EUROPEAN STANDARD

**EN 62356-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2004

ICS 33.160.40

English version

**Video recording –  
12,65 mm TYPE D-11 format  
Part 1: Tape recording  
(IEC 62356-1:2003)**

Enregistrement Vidéo –  
Format 12,65 mm de type D11  
Partie 1: Enregistrement sur bande  
(CEI 62356-1:2003)

Videoaufzeichnung –  
D-11-Format mit 12,65 mm  
Teil 1: Bandaufzeichnung  
(IEC 62356-1:2003)

**iTeh STANDARD PREVIEW**

This European Standard was approved by CENELEC on 2004-09-01. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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**

## Foreword

The text of the International Standard IEC 62356-1:2003, prepared by IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the formal vote and was approved by CENELEC as EN 62356-1 on 2004-09-01 without any modification.

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) 2005-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-09-01

Annex ZA has been added by CENELEC.

---

## Endorsement notice

The text of the International Standard IEC 62356-1:2003 was approved by CENELEC as a European Standard without any modification.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 62356-1:2006

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cdbd9f9f6fad/sist-en-62356-1-2006>

## 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 Where 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 61213	1993	Analogue audio recording on video tape - Polarity of magnetization	EN 61213	1994
IEC 61237-1	1994	Broadcast video tape recorders - Methods of measurement Part 1: Mechanical measurements	EN 61237-1	1994
IEC 62356-2	2003	Video recording - 12,65 mm type D-11 format Part 2: Picture compression and data stream	EN 62356-2	2004
IEC 62356-3	2003	Part 3: Data mapping over SDTI	EN 62356-3	2004
ITU-R Recommendation BT.709	2004	Parameter values for the HDTV* standard for production and international program exchange	-	-
SMPTE 12M	1999	Television, audio and film - Time and control code	-	-
SMPTE 292M	1998	Bit-Serial digital interface for high-definition television systems	-	-
SMPTE 276M	1995	Transmission of AES-EBU digital audio signals over coaxial cable	-	-
AES3	1992	Serial transmission format for two-channel linearly represented digital audio data	-	-

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 62356-1:2006

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cbd9f9f6fad/sist-en-62356-1-2006>

# INTERNATIONAL STANDARD

# IEC 62356-1

First edition  
2003-12

---

---

## Video recording – 12,65 mm TYPE D-11 format –

### Part 1: Tape recording

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 62356-1:2006

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cbd9f9f6fad/sist-en-62356-1-2006>

© IEC 2003 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE **XB**

*For price, see current catalogue*

## CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references .....	7
3 Abbreviations and acronyms.....	8
4 Environment and test conditions .....	8
4.1 Environmental conditions .....	8
4.2 Calibration tape.....	8
4.3 Record locations and dimensions .....	8
5 Tape and cassette physical specifications .....	8
5.1 Magnetic tape specifications .....	8
5.2 Cassette specifications.....	9
6 Tape record physical parameters.....	31
6.1 Tape speed .....	31
6.2 Helical record physical parameters.....	31
6.3 Longitudinal record physical parameters .....	31
7 Longitudinal track signal and magnetic parameters.....	35
7.1 Longitudinal track-record parameters .....	35
7.2 Control track record parameters .....	35
7.3 Time- and control-code track-record parameters .....	35
7.4 Cue recording.....	36
8 Helical track signal parameters and magnetization.....	37
8.1 Overview .....	37
8.2 Introduction .....	37
8.3 Helical track data parameters.....	38
8.4 Channel coding .....	50
8.5 Magnetization.....	50
8.6 Video data outer correction .....	51
8.7 Data arrangement in audio data sectors .....	52
Annex A (normative) Digital interfaces .....	62
Annex B (informative) Tape transport and scanner.....	64
Annex C (informative) Compatibility with the other digital formats using Type-L derivative cassettes .....	67
Annex D (informative) Compatibility with analog Type-L.....	68
Bibliography.....	69
Figure 1 – Top- and side-view dimensions (S-Cassette).....	11
Figure 2 – Bottom-view dimensions (S-Cassette) .....	12
Figure 3 – Datum areas, supporting areas, tape guides and associated dimensions (S- Cassette).....	14
Figure 4 – Reel location in the unlocked position (S-Cassette).....	15
Figure 5 – Protecting lid dimensions (S-Cassette).....	16
Figure 6 – Reel dimensions (S-Cassette).....	17



Figure 7 – Reel height in the unlocked position (S-Cassette) .....	17
Figure 8 – Unlocking lever insertion area (S-Cassette).....	18
Figure 9 – Lid unlocking force (S-Cassette) .....	19
Figure 10 – Lid opening force (S-Cassette).....	19
Figure 11 – Reel spring force (S-Cassette) .....	19
Figure 12 – Safety plug strength (S-Cassette).....	20
Figure 13 – Extraction force (F1, F2) and friction torque (S-Cassette).....	20
Figure 14 – Top and side views (L-Cassette) .....	21
Figure 15 – Bottom view (L-Cassette) .....	22
Figure 16 – Datum areas, supporting areas and tape guides (L-Cassette).....	24
Figure 17 – Reel location in unlocked position (L-Cassette) .....	25
Figure 18 – Protecting lid (L-Cassette).....	26
Figure 19 – Reel dimensions (L-Cassette) .....	27
Figure 20 – Reel height in unlocked operation (L-Cassette) .....	27
Figure 21 – Unlocking lever insertion area (L-Cassette).....	28
Figure 22 – Lid unlocking force (L-Cassette).....	29
Figure 23 – Lid opening force (L-Cassette) .....	29
Figure 24 – Reel spring force (L-Cassette).....	29
Figure 25 – Safety plug strength (L-Cassette).....	30
Figure 26 – Extraction force (F1, F2) and friction torque (L-Cassette) .....	30
Figure 27 – Locations and dimensions of recorded tracks .....	33
Figure 28 – Locations and dimensions of tolerance zones of helical track records .....	34
Figure 29 – Recorded control code waveform .....	36
Figure 30 – Helical recording block diagram .....	37
Figure 31 – Helical playback block diagram .....	38
Figure 32 – Sector arrangement on helical track .....	39
Figure 33 – Sector and segment arrangement on helical track .....	40
Figure 34 – Video sync block format .....	41
Figure 35 – Audio sync block format .....	42
Figure 36 – Sync block identification bytes .....	43
Figure 37 – ID <sub>0</sub> : Sync block number.....	45
Figure 38 – Segment, channel and track counts.....	47
Figure 39 – Video outer ECC .....	52
Figure 40 – 20/24 bit packing sequence.....	53
Figure 41 – Audio sample conversion block diagram.....	53
Figure 42 – Start and end sample number of burst data mode .....	54
Figure 43 – Continuous mode data mapping .....	55
Figure 44 – Audio auxiliary data words .....	56
Figure 45 – Audio data block layout.....	57
Figure 46 – Sync block shuffling (Audio sector 0).....	58
Figure 47 – Sync block shuffling (Audio sector 1).....	58
Figure 48 – Sync block shuffling (Audio sector 2).....	59
Figure 49 – Sync block shuffling (Audio sector 3).....	59

Figure 50 – AES3 channel sector shuffling..... 60

Figure A1 – System overview..... 62

Figure B1 – Possible scanner configuration (29,97 Hz, 25 Hz, 24 Hz and 23,98 Hz  
Frame rates)..... 65

Figure B2 – Possible longitudinal head location and tape wrap (29,97 Hz, 25 Hz, 24 Hz  
and 23,98 Hz Frame rates) ..... 66

Table 1 – Record location and dimensions (29,97PsF/59,94I, 25PsF/50I, 24 PsF and  
23,98PsF systems) ..... 32

Table 2 – ID<sub>0</sub>: Sync block number..... 46

Table B1 – Parameters for a possible scanner design..... 64

Table B2 – Data rate and recorded wavelength..... 64

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 62356-1:2006

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cdbd9f9f6fad/sist-en-62356-1-2006>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**VIDEO RECORDING –  
12,65 mm TYPE D-11 FORMAT –**

**Part 1: Tape recording**

**FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62356-1 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment

The text of this standard was submitted to the national committees for voting under the Fast Track Procedure as the following documents:

CDV	Report on voting
100/629/CDV	100/699/RVC

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

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

The committee has decided that the contents of this publication will remain unchanged until 2008-11. At this date, the publication will be

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

## **iTeh STANDARD PREVIEW (standards.iteh.ai)**

SIST EN 62356-1:2006

<https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cbd9f9f6fad/sist-en-62356-1-2006>

# VIDEO RECORDING – 12,65 mm TYPE D-11 FORMAT –

## Part 1: Tape recording

### 1 Scope

This International Standard specifies the format for the recording of Type D-11 compressed pictures, four channels of AES3 data and associated data which form helical records on 12,65 mm tape in cassettes. This standard also defines the helical track record parameters, the content and format of the longitudinal records and the cassette physical specifications.

The recording format supports frame frequencies of 30/1,001 Hz, 25 Hz, 24 Hz and 24/1,001 Hz.

### 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 61213:1993, *Analogue audio recording on video tape – Polarity of magnetization*

IEC 61237-1:1994, *Broadcast video tape recorders – Methods of measurement – Part 1: Mechanical measurements*

IEC 62356-2, *Video recording – 12,65 mm type D-11 format – Part 2: Picture compression and data stream*<sup>1</sup>

IEC 62356-3, *Video recording – 12,65 mm type D-11 format – Part 3: Data mapping over SDTI*<sup>1</sup>

ITU-R Recommendation BT.709:2004, *Parameter values for the HDTV\* standard for production and international program exchange*

SMPTE 12M:1999, *Television – Audio and Film – Time and Control Code*

SMPTE 292M:1998, *Bit-Serial Digital Interface for High-Definition Television Systems*

SMPTE 276M:1995, *Transmission of AES-EBU Digital Audio Signals Over Coaxial Cable*

AES3-1992, *Serial transmission format for two-channel linearly represented digital audio data*

---

<sup>1</sup> To be published.

### 3 Abbreviations and acronyms

For the purposes of this document, the following abbreviations and acronyms apply.

AUX	Auxiliary
DCT	Discrete cosine transform
ECC	Error correcting code
EOB	End of block
I-NRZI	Interleaved non-return to zero inverted
MUX	Multiplex
VLC	Variable length coding

### 4 Environment and test conditions

#### 4.1 Environmental conditions

Tests and measurements made on the system to check the requirements of this standard shall be carried out under the following conditions:

- temperature: 20 °C ± 1 °C
  - relative humidity: 50 % ± 2 %
  - barometric pressure: from 86 kPa to 106 kPa
  - tape tension: 0,3 N ± 0,05 N
  - tape conditioning: not less than 24 h
- <https://standards.iteh.ai/catalog/standards/sist/2d88ef5e-e3af-4a55-815a-cdbd99f6fad/sist-en-62356-1-2006>

#### 4.2 Calibration tape

Calibration tapes meeting the tolerances specified below should be made available by manufacturers of digital television tape recorders and players in accordance with this standard.

#### 4.3 Record locations and dimensions

Geometrical location and dimensions of the recordings on the tape and their relative positions in regard to timing relations of the recorded signals shall be as specified in Figure 27 and Table 1 . Tolerances shown in Table 1 should, however, be reduced by 50 % for calibration tapes.

### 5 Tape and cassette physical specifications

#### 5.1 Magnetic tape specifications

##### 5.1.1 Base

The base material shall be polyester or equivalent.

##### 5.1.2 Tape width and width fluctuation

The tape width shall be 12,650 mm ± 0,005 mm. Tape width fluctuation shall not exceed 6 µm peak to peak. The value of tape width fluctuation shall be evaluated by measuring 10 points, each 20 mm apart, over a tape length of 200 mm.

### 5.1.1 Tape thickness

The tape thickness shall be from 12,5 µm to 13,8 µm.

### 5.1.2 Offset yield strength

The offset yield strength shall be greater than 15 N.

### 5.1.3 Magnetic coating

The magnetic tape used shall have a coating of metal particles or equivalent, longitudinally oriented. The coating coercivity shall be in the range of 120 000 A/m to 140 000 A/m, with an applied field of 800 000 A/m (10 000 oersted) as measured by a 50 Hz or 60 Hz BH meter or vibrating sample magnetometer (VSM).

## 5.2 Cassette specifications

### 5.2.1 Cassette dimensions

Two sizes of cassettes shall be identified as follows:

S cassette	96 × 156 × 25 mm	As shown in Figures 1 to 13
L cassette	145 × 254 × 25 mm	As shown in Figures 14 to 26

### 5.2.2 Tape length and recording time

Maximum tape length and recording time are recommended as follows:

S cassette	241 m <sup>+2</sup> <sub>0</sub> m	40 min for 29,97PsF/59,94I	48 min for 25PsF/50I	50 min for 24PsF	50 min for 23,98PsF
L cassette	732 m <sup>+2</sup> <sub>0</sub> m	124 min for 29,97PsF/59,94I	148 min for 25PsF/50I	155 min for 24PsF	155 min for 23,98PsF

### 5.2.3 Datum planes

Datum plane Z shall be determined by three datum areas, A, B and C, as shown in Figures 3a and 16a. Datum plane X shall be orthogonal to datum plane Z and shall include the centres of datum holes (a) and (b). Datum plane Y shall be orthogonal to both datum plane X and datum plane Z and shall include the centre of datum hole (a) as shown in Figures 2 and 15.

### 5.2.4 Tape winding

The magnetic coating side of the magnetic tape shall face outside on both the supply reel and the take-up reel as shown in Figures 4 and 17.

### 5.2.5 Label area and window area

The hatched areas shown in Figures 1 and 14 are for the label and window. Labels attached to the cassette shall not protrude above the outside cassette surface plane.

### 5.2.6 Guiding groove

For correct insertion into the VTR, four guiding grooves for S cassettes, as shown in Figures 1 and 2, and three guiding grooves for L cassettes, as shown in Figure 15, shall be provided.