



# SLOVENSKI STANDARD

## SIST EN 61016:2003

01-december-2003

---

### Helical-scan digital component video cassette recording system using 19 mm magnetic tape (format D-1) IEC 61016:1998 + A1:1999

Helical-scan digital component video cassette recording system using 19 mm magnetic tape (format D-1)

Videokassettenystem mit Schrägspuraufzeichnung digitaler Komponenten auf Magnetband 19 mm (D1-Format)

Système de magnétoscope numérique à composantes à cassette à balayage hélicoïdal utilisant la bande magnétique de 19 mm (format D-1)

[https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-](https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003)

Ta slovenski standard je istoveten z: EN 61016:2001

---

#### **ICS:**

33.160.40      Video sistemi                      Video systems

**SIST EN 61016:2003**                      en

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

[SIST EN 61016:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003>

EUROPEAN STANDARD

**EN 61016**

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2001

ICS 33.160.40

English version

**Helical-scan digital component video cassette recording system  
using 19 mm magnetic tape (format D-1)  
(IEC 61016:1989 + A1:1999)**

Système de magnétoscope numérique  
à composantes à cassette à balayage  
hélicoïdal utilisant la bande magnétique  
de 19 mm (format D-1)  
(CEI 61016:1989 + A1:1999)

Videokassettensystem mit  
Schrägspuraufzeichnung digitaler  
Komponenten auf Magnetband 19 mm  
(D-1-Format)  
(IEC 61016:1989 + A1:1999)

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

This European Standard was approved by CENELEC on 2000-08-01. 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

### Foreword

The text of the International Standard IEC 61016:1989 and its amendment 1:1999, prepared by the former SC 60B and SC 100B, Recording, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 61016 on 2000-08-01 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) 2002-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-08-01

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

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

The text of the International Standard IEC 61016:1989 and its amendment 1:1999 was approved by CENELEC as a European Standard without any modification.

<https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003>

## 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 60461	1986	Time and control code for video tape recorders	HD 507 S1 <sup>1)</sup>	1988
IEC 60735	1982	Measuring methods for video tape properties	HD 454 S1 <sup>2)</sup>	1984
IEC 60958	1989	Digital audio interface	EN 60958 <sup>3)</sup>	1990
CCIR Recommendation 601		Encoding parameters of digital television for studios	-	-
CCIR Recommendation 656		Interfaces for digital component video signals in 525-line and 625-line television systems	-	-
CCIR Report 624		Characteristics of television systems	-	-
CCITT Recommendation J.17		Pre-emphasis used on sound-programme circuits	-	-

1) HD 507 S1 is superseded by EN 60461:2001, which is based on IEC 60461:2001.

2) HD 454 S1 is superseded by EN 60735:1991, which is based on IEC 60735:1991.

3) EN 60958:1999 is superseded by EN 60958-1:2000, which is based on IEC 60958-1:1999.

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

SIST EN 61016:2003

<https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003>

NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

**CEI  
IEC  
1016**

Première édition  
First edition  
1989-12

---



---

**Système de magnétoscope numérique  
à composantes à cassette à balayage  
hélicoïdal sur bande magnétique  
de 19 mm (format D-1)**

**iTeh STANDARD PREVIEW**

**Helical-scan digital component video  
cassette recording system using  
19 mm magnetic tape (format D-1)**

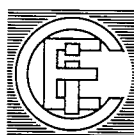
<https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003>

© CEI 1989 Droits de reproduction réservés — Copyright — all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

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.

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembe Genève, Suisse



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

**XC**

Pour prix, voir catalogue en vigueur  
For price, see current catalogue

## CONTENTS

	Page
FOREWORD . . . . .	9
PREFACE . . . . .	9
<b>SECTION ONE – GENERAL</b>	
Clause	
1. Scope . . . . .	11
2. Object . . . . .	11
3. Environment and test conditions . . . . .	11
<b>SECTION TWO – VIDEOTAPE CASSETTE</b>	
4. Mechanical parameters . . . . .	11
4.1 Cassette dimensions . . . . .	11
4.2 Identification of cassettes . . . . .	13
4.3 Tape lengths, thickness and play times . . . . .	13
4.4 Face of magnetic coating . . . . .	13
4.5 Datum planes . . . . .	13
4.6 Window and labels . . . . .	31
4.7 Identification holes . . . . .	39
4.8 Leader/trailer tape . . . . .	47
4.9 Reels . . . . .	47
4.10 Lid . . . . .	59
5. Video tape specification . . . . .	67
5.1 Base . . . . .	67
5.2 Width . . . . .	67
5.3 Width fluctuation . . . . .	67
5.4 Reference edge deviation . . . . .	67
5.5 Tape thickness . . . . .	67
5.6 Transmissivity . . . . .	67
5.7 Offset yield strength . . . . .	67
5.8 Magnetic coating . . . . .	67
5.9 Coating coercivity . . . . .	67
5.10 Oxide orientation . . . . .	69
<b>SECTION THREE – HELICAL RECORDINGS</b>	
6. Tape speed . . . . .	69
7. Record location and dimensions . . . . .	69
8. Helical track record curvature . . . . .	73
8.1 Tolerance zones, centrelines . . . . .	73
9. Relative positions of recorded signals . . . . .	75
10. Gap azimuth . . . . .	75
10.1 Cue track, control track, time code track . . . . .	75
10.2 Helical track . . . . .	75



Clause	Page
SECTION FOUR – PROGRAM TRACK DATA ARRANGEMENT	
11. Introduction . . . . .	79
12. Labelling convention . . . . .	79
13. Sector details . . . . .	79
13.1 Sync block . . . . .	79
13.2 Sync pattern . . . . .	79
13.3 Identification pattern . . . . .	81
13.4 Data field . . . . .	83
13.5 Sector preamble . . . . .	87
13.6 Sector postamble . . . . .	87
14. Edit gaps . . . . .	87
15. Channel code . . . . .	87
16. Magnetization . . . . .	87

## SECTION FIVE – VIDEO PROCESSING

17. Recorded data . . . . .	101
17.1 Recorded lines . . . . .	101
17.2 Digital active lines . . . . .	101
18. Source precoding . . . . .	101
19. Sample labelling . . . . .	103
20. Intersector distribution . . . . .	103
21. Intrasector shuffling . . . . .	105
21.1 Intraline shuffle . . . . .	105
21.2 Sector array shuffling . . . . .	107
22. Outer code error protection . . . . .	135

## SECTION SIX – AUDIO PROCESSING

23. Introduction . . . . .	137
24. Source coding . . . . .	137
25. Source processing . . . . .	137
25.1 Introduction . . . . .	137
25.2 Segment . . . . .	137
25.3 Audio data word processing . . . . .	139
26. Interface control words . . . . .	145
26.1 Channel use (CHAN) – 4 bits . . . . .	147
26.2 Pre-emphasis (PREF) – 4 bits . . . . .	149
26.3 Audio data word mode (LNHG) – 4 bits . . . . .	151
26.4 Block sync location S MARK 0, S MARK 1–8 bits . . . . .	151
27. Processing control words . . . . .	153
27.1 Word count (B.CNT) – 4 bits . . . . .	153
27.2 Overlap edit (E LAP) – 4 bits . . . . .	153
27.3 Sequence (SEQN) – 4 bits . . . . .	155
28. User control words (UCW) . . . . .	155
29. Outer error protection . . . . .	155
30. Inner protection and channel coding . . . . .	157
31. Order of transmission to inner coding . . . . .	157
32. Sector usage . . . . .	159

Clause	Page
SECTION SEVEN – CONTROL, CUE AND TIME CODE TRACK RECORDING	
33. Control track . . . . .	161
33.1 CT signal structure . . . . .	161
33.2 CT magnetic orientation . . . . .	161
33.3 CT flux level . . . . .	161
33.4 Relation CT/helical tracks . . . . .	161
34. Cue track . . . . .	163
34.1 Method of recording . . . . .	163
34.2 Flux level . . . . .	163
34.3 Recorded flux characteristic . . . . .	163
34.4 Reproducer flux/frequency response . . . . .	163
34.5 Relative timing . . . . .	163
35. Time code track . . . . .	167
35.1 Method of recording . . . . .	167
35.2 Flux level . . . . .	167
36. Longitudinal time code recording . . . . .	167
36.1 Structure of the time code signal . . . . .	167
36.2 Recording characteristics . . . . .	167
36.3 Time relationship of time code and digital video . . . . .	167
36.4 Longitudinal position of the time code record . . . . .	167

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

SIST EN 61016:2003

<https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## HELICAL-SCAN DIGITAL COMPONENT VIDEO CASSETTE RECORDING SYSTEM USING 19 mm MAGNETIC TAPE (FORMAT D-1)

## FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

## PREFACE

This standard has been prepared by IEC Sub-Committee 60B: Video Recording, of IEC Technical Committee No. 60: Recording.

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

Six Months' Rule	Report on Voting	Two Months' Procedure	Reports on Voting
60B(CO)88	60B(CO)92	60B(CO)93 60B(CO)97	60B(CO)96 60B(CO)108

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

*The following IEC publications are quoted in this standard:*

- Publications Nos. 461 (1986): Time and control code for video tape recorders.
- 735 (1982): Measuring methods for video tape properties.
- 958 (1989): Digital audio interface.

*Other publications quoted:*

CCIR publications:

- Recommendation 601: Encoding parameters of digital television for studios.
- Recommendation 656: Interfaces for digital component video signals in 525-line and 625-line television systems.

Report 624: Characteristics of television systems.

CCITT publication:

- Recommendation J. 17: Pre-emphasis used on sound-programme circuits.

# HELICAL-SCAN DIGITAL COMPONENT VIDEO CASSETTE RECORDING SYSTEM USING 19 mm MAGNETIC TAPE (FORMAT D-1)

## SECTION ONE – GENERAL

### 1. Scope

This standard is applicable to magnetic recording of one digital video and four digital audio signals using 19 mm tape cassettes. It is valid for TV signals in digital component form, generated according to the rules of the CCIR Recommendations 601 and 656 and for digital audio signals according to IEC Publication 958.

This standard also describes the digital recording of ancillary data and the analog recording of one cue track and the control track.

### 2. Object

The object of this standard is to define the electrical and mechanical characteristics of equipment which will provide for the interchangeability of recorded cassettes.

The requirements given relate to 525/60 and 625/50 TV systems.

### 3. Environment and test conditions

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

temperature:  $20 \pm 1$  °C  
relative humidity:  $50 \pm 2\%$   
barometric pressure: 86 kPa to 106 kPa  
tape tension:  $0.8 \pm 0.05$  N  
tape conditioning: not less than 24 h

## SECTION TWO – VIDEOTAPE CASSETTE

### 4. Mechanical parameters

#### 4.1 *Cassette dimensions*

The dimensions of the three different cassettes used for recording shall be in accordance with Figures 1 to 15, pages 15 to 45.

##### 4.1.1 *Mechanical tolerances*

General tolerances for dimensions, except those for which tolerances are otherwise specified, shall be as follows:

Table 1 – Mechanical tolerances

Over	to	mm
0	4	±0.2
4	16	±0.3
16	63	±0.4
63	250	±0.5
250		±0.7

#### 4.2 Identification of cassettes

The three sizes of cassettes shall be identified as:

Small: D-1S  
 Medium: D-1M  
 Large: D-1L

#### 4.3 Tape lengths, thickness and play times

Table 2 – Tape lengths of S, M, L cassettes

Tape Cassette	16 µm		13 µm	
	S	190 m	11 min	225 m
M	587 m	34 min	708 m	41 min
L	1 311 m	76 min	1 622 m	94 min

SIST EN 61016:2003

<https://standards.iteh.ai/catalog/standards/sist/be5e40e0-aa0c-4670-84b7-bf837daa71af/sist-en-61016-2003>

#### 4.4 Face of magnetic coating

The magnetic coating on the tape shall face out of the cassette as specified in Figures 1 to 3, pages 15 to 19.

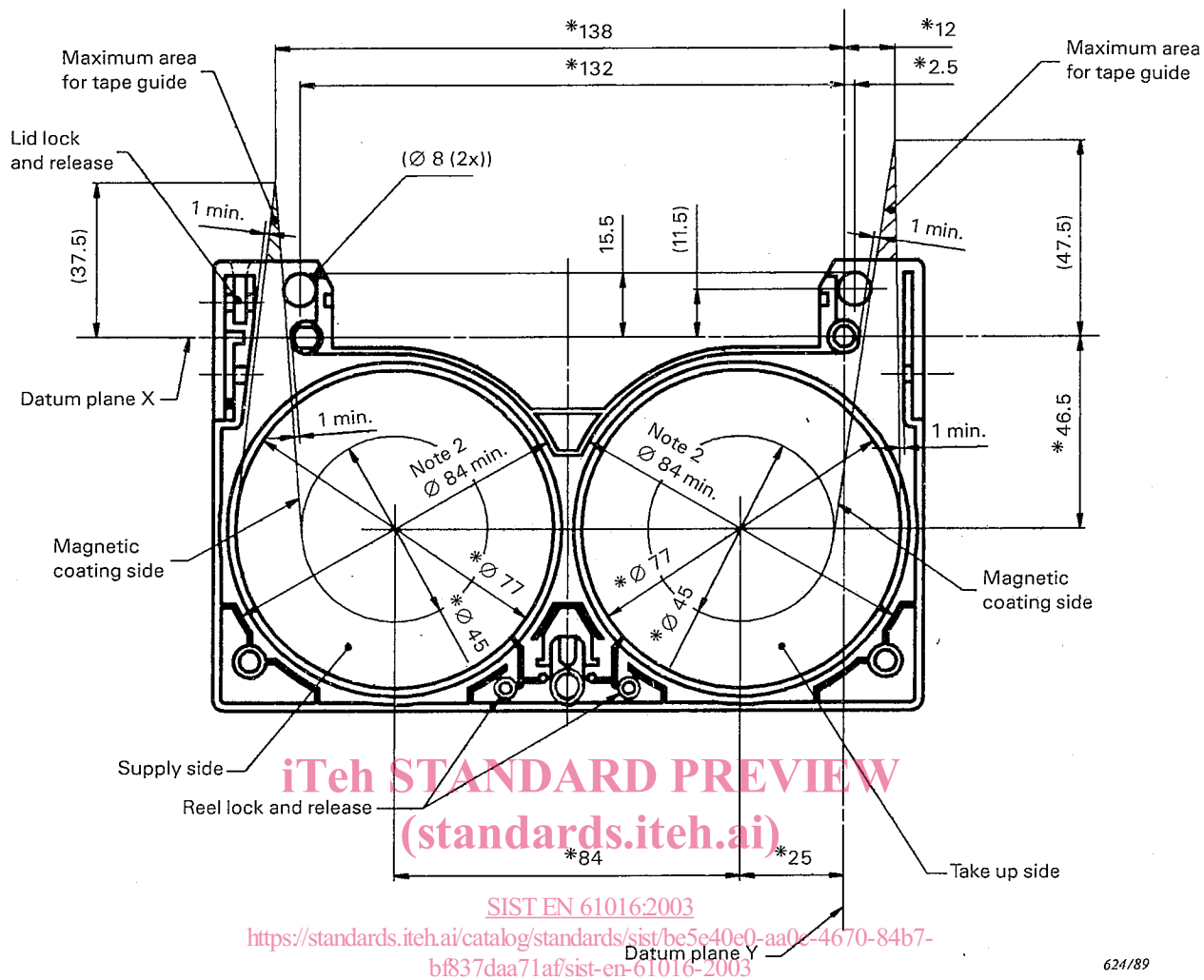
#### 4.5 Datum planes

4.5.1 Datum plane Z is determined by datum areas A, B and C as specified in Figures 4 to 6, pages 21 to 25.

4.5.2 Datum C does not need to correspond to a fastener.

4.5.3 Datum plane X shall be orthogonal to datum plane Z and shall run through the centre of datum hole (a) and datum hole (b) as specified in Figures 7 to 9, pages 27 to 31.

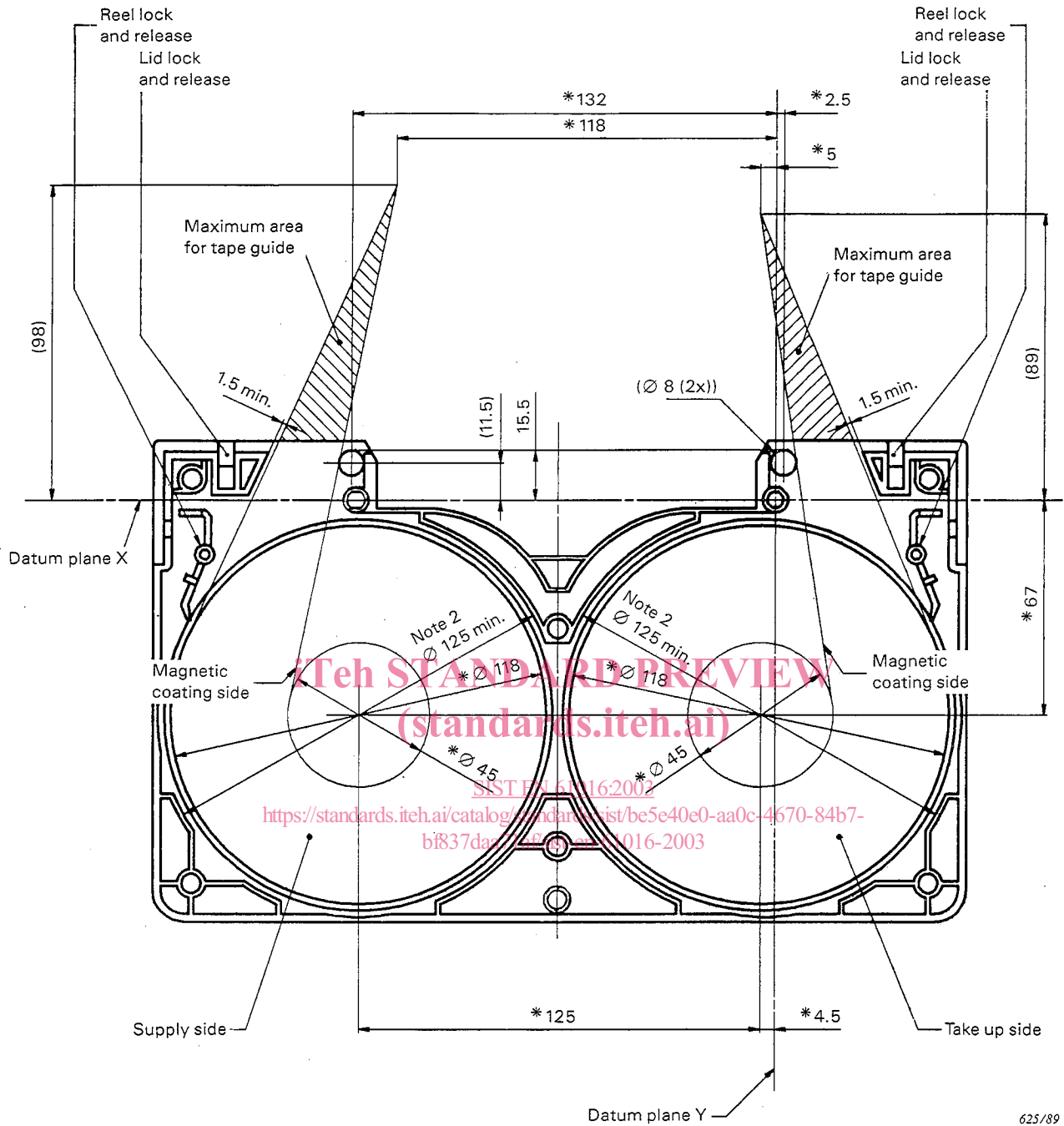
4.5.4 Datum plane Y shall be orthogonal to both datum plane X and datum plane Z and shall run through the centre of datum hole (a) as specified in Figures 7 to 9.



Dimensions in millimetres

FIGURE 1 – Top view, inner structure and tape path of the D-1S cassette  
(for reference only)

Notes 1. – Dimensions with an asterisk are nominal values specifying the tape path.  
2. – Area for the reel.



Dimensions in millimetres

FIGURE 2 – Top view, inner structure and tape path of the D-1M cassette

- Notes 1. – Dimensions with an asterisk are nominal values specifying the tape path.  
2. – Area for the reel.