

Specification for

Still video floppy disk magnetic recording system

The European Standard EN 61122:1993 has the status of a
British Standard

UDC 621.397.43

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This British Standard, having been prepared under the direction of the Electronic Equipment Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 February 1994

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The following BSI references relate to the work on this standard:
Committee reference EEL/22
Draft for comment 90/20934 DC

ISBN 0 580 22699 9

Amendments issued since publication

Amd. No.	Date	Comments

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National foreword

This British Standard has been prepared under the direction of the Electronic Equipment Standards Policy Committee and is the English language version of EN 61122:1993 *Still video floppy disk magnetic recording system*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 1122:1992, published by the International Electrotechnical Commission (IEC).

For ease of production Figure 43 and Annex A include the French text.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 72, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

UDC 621.397.43

Descriptors: Magnetic recording, video recording, audio recording, data recording, magnetic disk, floppy disk, still video, recording track, physical characteristics, recording format

English version

Still video floppy disk magnetic recording system

(IEC 1122:1992)

Système d'enregistrement magnétique à
image fixe sur disque flexible
(CEI 1122:1992)

Standbild-Video-Floppydisk-System für
magnetische Aufzeichnung
(IEC 1122:1992)

This European Standard was approved by CENELEC on 1993-09-22. 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, 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

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Foreword

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 1122:1992 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as a European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 61122 on 22 September 1993.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1994-09-01
- latest date of withdrawal of conflicting national standards (dow) 1994-09-01

For products which have complied with the relevant national standard before 1994-09-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-09-01.

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1 General

1.1 Scope

This International Standard provides technical requirements for still video floppy disk systems which use a magnetic disk in a jacket, known as a still video floppy disk.

In these systems analogue picture, time-compressed analogue audio sounds and/or digital data information are recorded separately or together on a magnetic disk.

There are two formats of analogue recording. One is for 525 line – 60 field systems and the other for 625 line – 50 field systems. There are 50 main tracks and one cue track on the disk. Analogue picture, time-compressed sounds, and/or digital data information are recorded on the main tracks.

The information recorded on the cue track can be used primarily for control purposes relating to the information on the main tracks.

As far as control functions are concerned, the control functions specified on the cue track shall dominate over other control functions recorded on the main tracks.

This standard specifies physical requirements for the jacket and the magnetic disk, and magnetic requirements for the magnetic disk.

This standard also specifies the signal recording formats of analogue picture, time-compressed audio signals, digital data and control information recorded on the magnetic disk to ensure interchangeability of the recorded disk.

1.2 Normative references

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

ISO/R 527:1966, *Plastics — Determination of tensile properties*.

ASTM (American Society for Testing and Materials) Designation D 257: *Standard test methods for d.c. resistance or conductance of insulating materials*.

1.3 Environment

Tests and measurements made on the system to check the requirements of this standard shall be carried out under the following conditions, unless otherwise specified.

Temperature:	23 °C ± 2 °C
Relative humidity:	45 % to 55 %
Barometric pressure:	86 kPa to 106 kPa

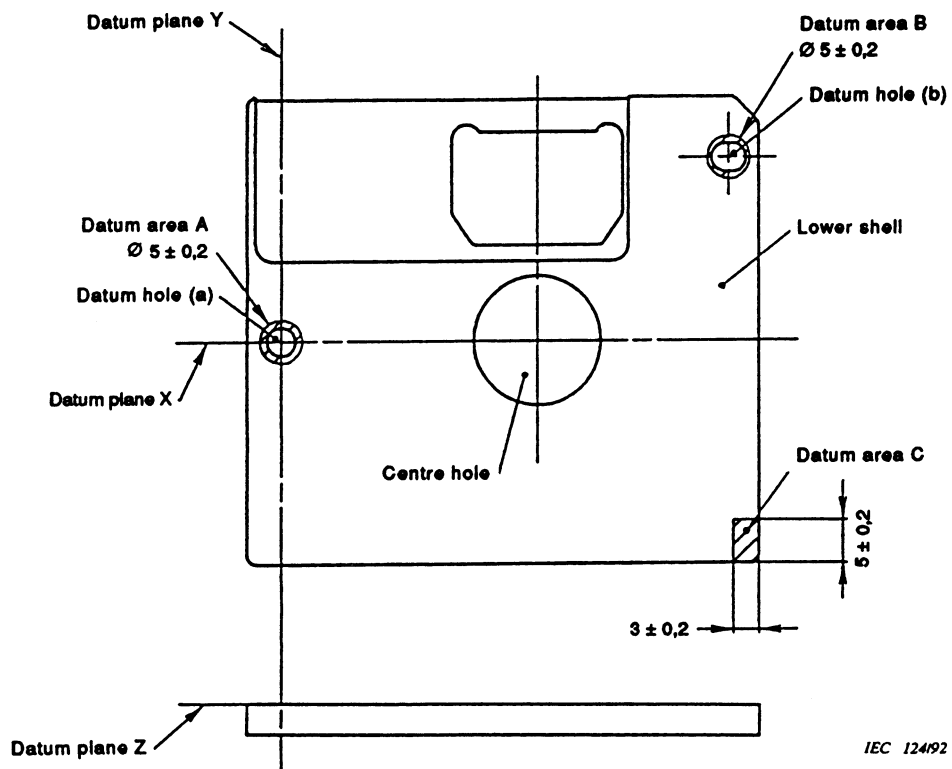
When some discrepancy occurs in the measurement of dimensions, 20 °C ± 1 °C may be adopted.

2 Jacket

The jacket shall comply with the dimensions and tolerances shown in Figure 1 to Figure 8.

2.1 Datum areas, datum holes and datum planes

Datum plane Z shall be determined by datum areas A, B and C in Figure 1. Datum plane X shall be orthogonal to datum plane Z and shall run through the centre of datum hole (a) and the centre of the centre hole of the lower shell, as shown in Figure 1. 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 shown in Figure 1.

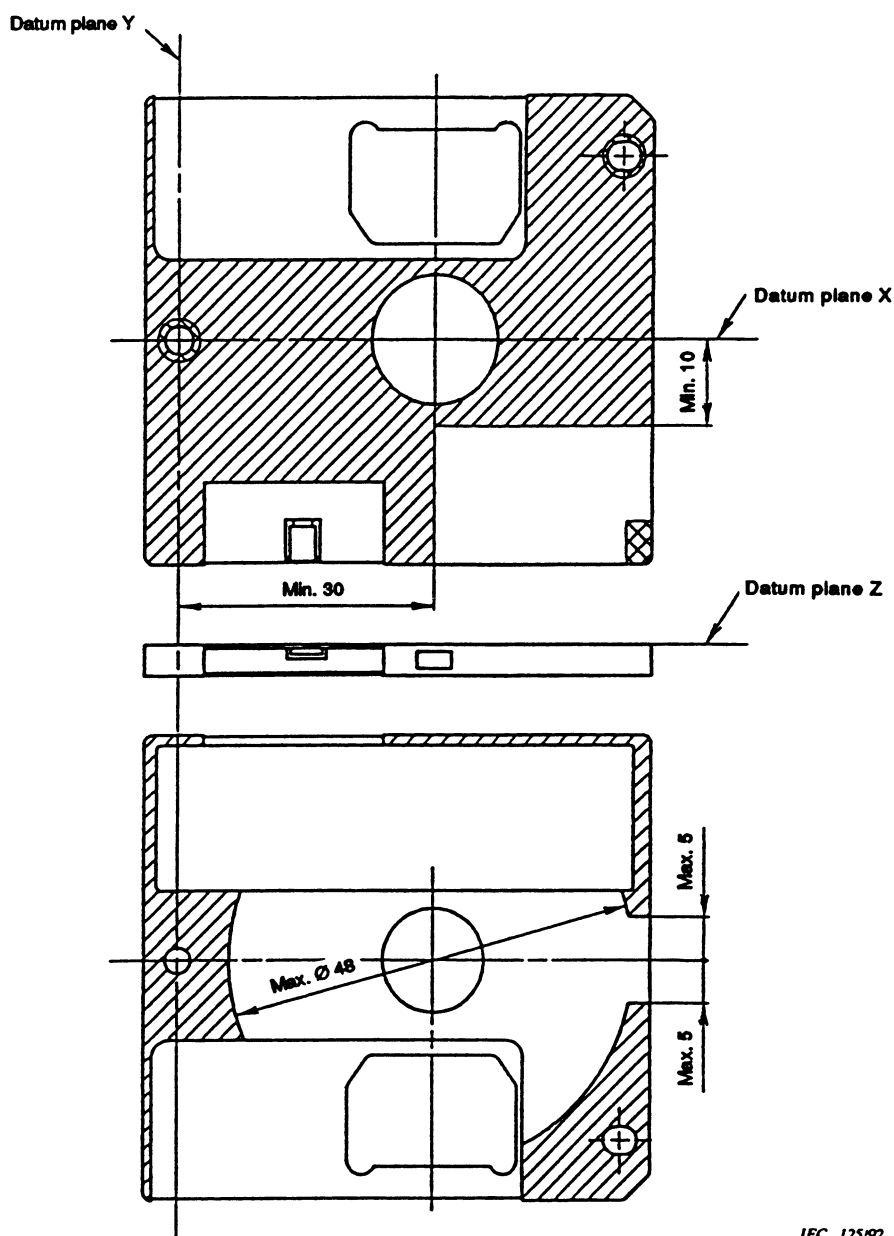


Dimensions in millimetres

Figure 1 — Datum areas, datum holes and datum planes

2.2 Flatness of jacket

The shaded areas in Figure 2 shall be coplanar to datum plane within $\pm 0,2$ mm, except for the bevelled edges.



IEC 125/92

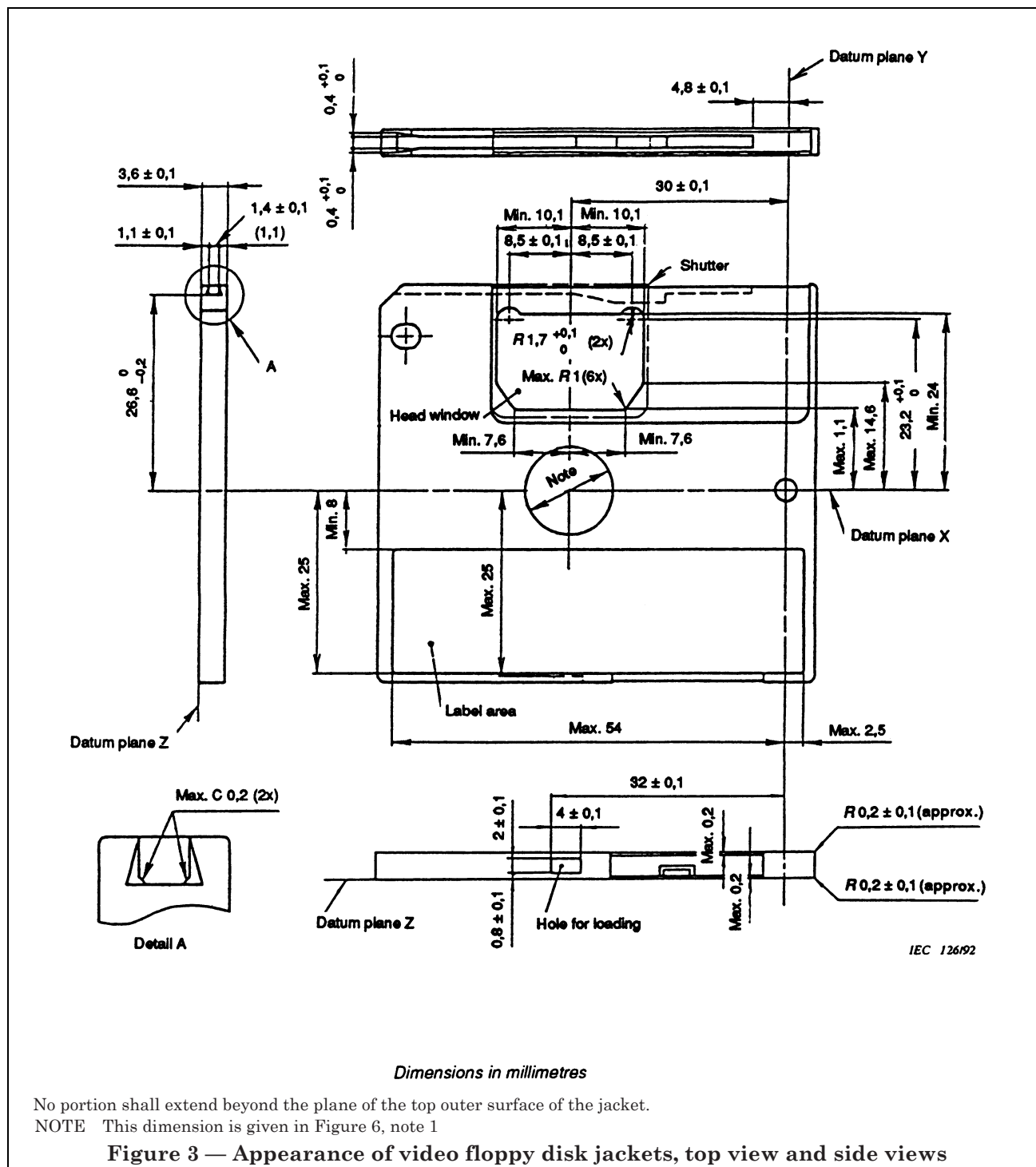
Dimensions in millimetres

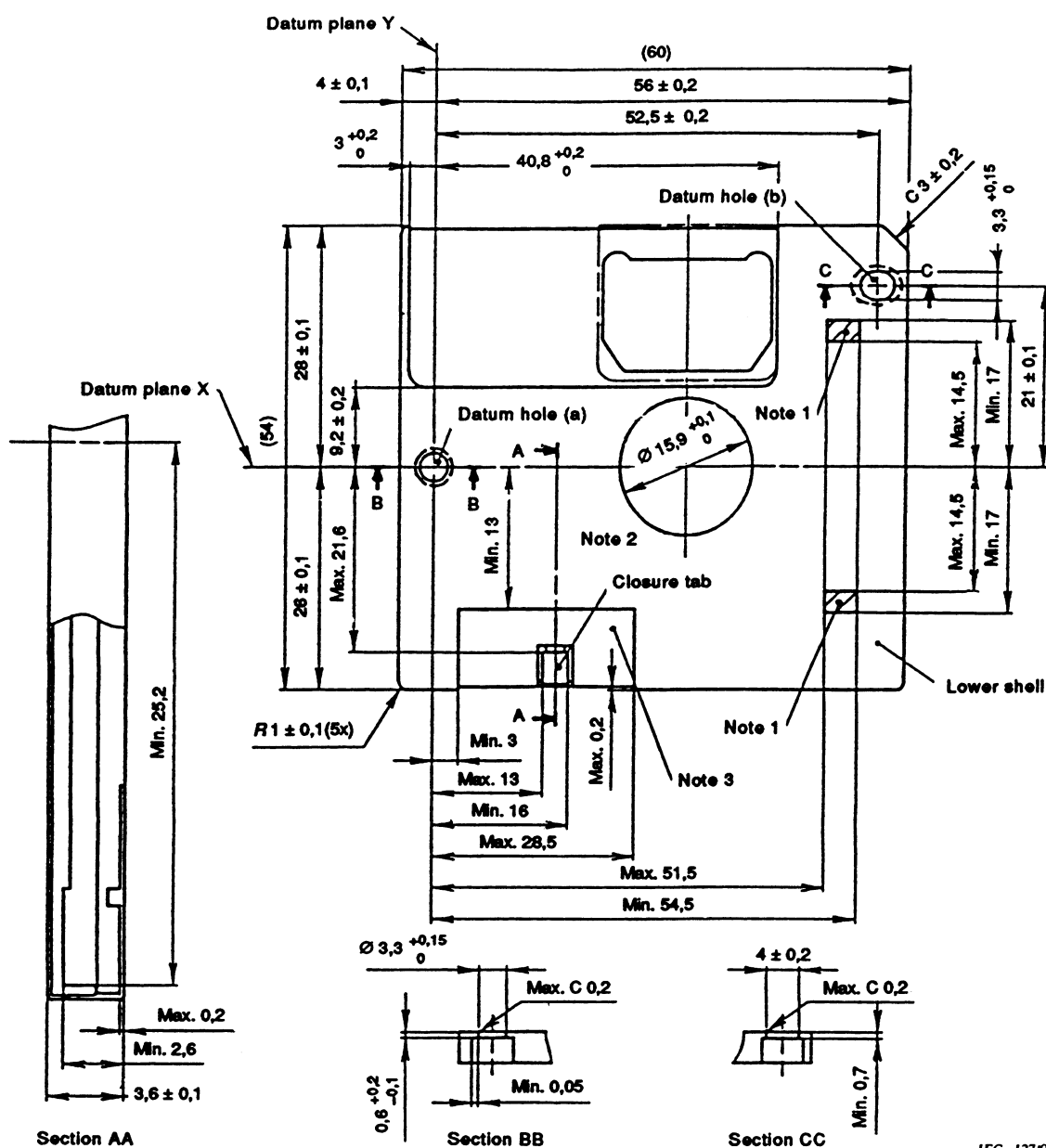
The shaded area in this figure shall be coplanar to datum plane Z within $\pm 0,2$ mm, except for the bevelled edges. There shall be no moulding gate and no moulded indication such as country of origin in the shaded areas

Figure 2 — Flatness of jacket

2.3 Appearance of jacket

Figure 3 and Figure 4 show the top, bottom and side views of the jacket.





IEC 127/92

Dimensions in millimetres

No portion shall extend beyond the plane of the bottom outer surface of the jacket.

NOTE 1 The shaded areas are reserved for recognition holes for recording media. The minimum depth of these holes shall be 2,6 mm.

NOTE 2 Mis-erasure protection. This hole is to be used in conjunction with a mechanical switch. When the hole is covered, recording shall be possible. When the hole is uncovered, recording shall not be possible. The closure tab shall not extend above the plane of the bottom outer surface of the jacket nor shall it deflect more than 0,6 mm below this plane under a weight of 0,6 N. When the closure tab is broken off, the distance from datum plane X to the near side of the resulted opening shall be 21,6 mm or shorter, and to the far side of that shall be 25,2 mm or longer. The distance from datum plane Y to the near side of the opening shall be 13,0 mm or shorter, and to the far side of that shall be 16,0 mm or longer.

NOTE 3 This area is used to cover the hole of note 2 by means of adhesive tapes.

Figure 4 — Appearance of video floppy disk jacket, bottom view

2.4 Hub

The hub shall comply with the dimensions shown in Figure 5 and Figure 6. The hub shall be provided with a spring to centre the hub, and with a PG (Pulse Generator) yoke which generates magnetic flux. The yoke shall be secured in place on the spindle by a magnet. The material of the yoke and the PG yoke shall meet the following requirements:

$$B_{800} \geq 0,45 \text{ (Wb/m}^2\text{)}$$

$$H_c \leq 480 \text{ (A/m)}$$

$$5 \times 10^{-4} \leq \mu_{\max} \text{ (H/m)} \leq 0,13$$

The area of the section of the yoke to be used for generating the flux shall be at least 0,5 mm².

The rotational torque required to remove the magnetic sheet from the hub shall be a minimum of 0,006 Nm in the temperature range from – 5 °C to + 40 °C.

2.5 Spindle

The spindle shall comply with the dimensions shown in Figure 7.

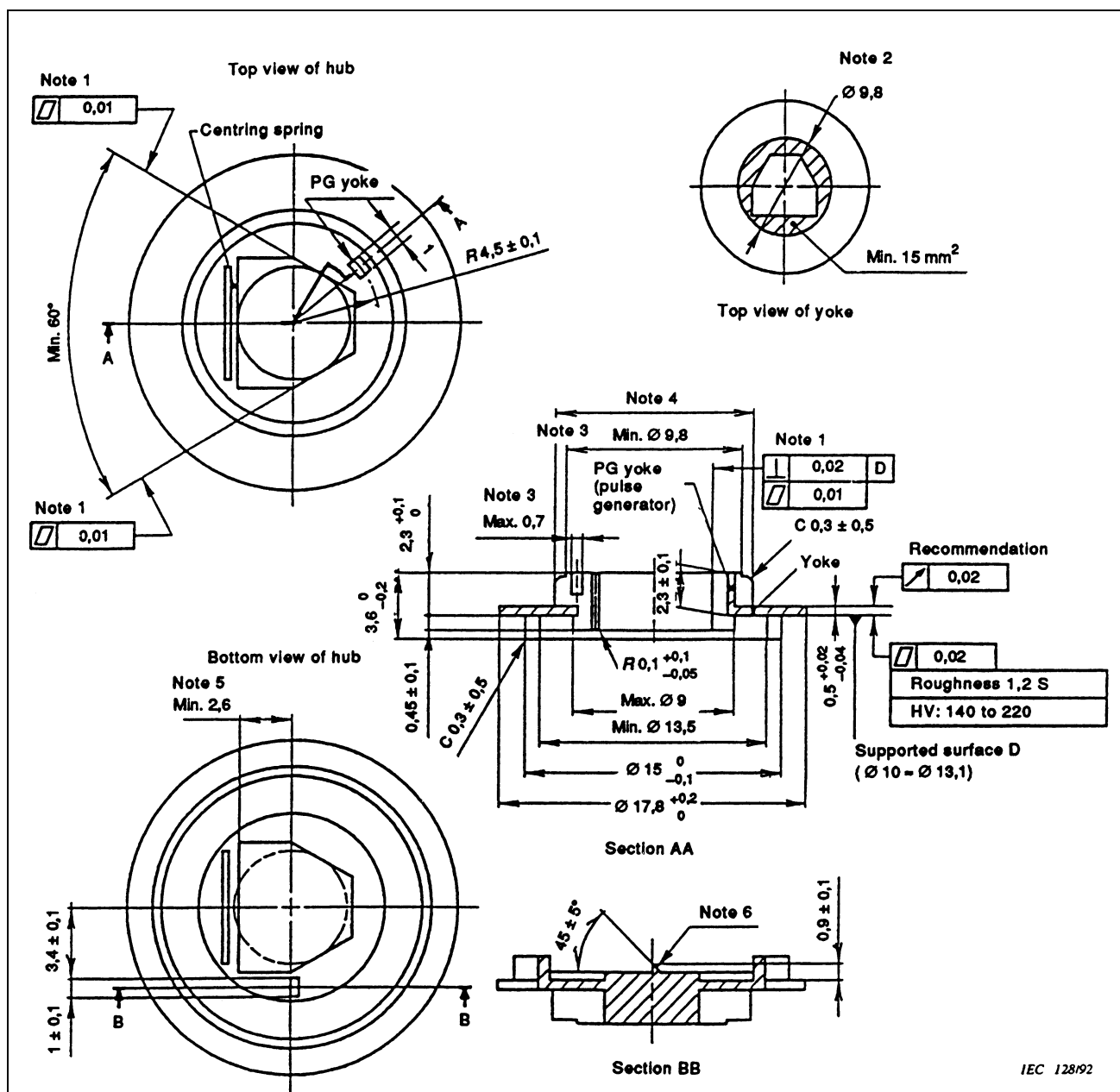
2.6 Shutter mechanism

The shutter mechanism shall comply with the dimensions shown in Figure 8.

The shutter automatically unlocks and opens when the jacket is inserted into the drive, and automatically closes and locks when the jacket is removed.

2.7 Contact between disk and jacket

When the jacket is outside the drive, the disk shall not contact the jacket in the range between Ø 17 mm and Ø 20 mm.



IEC 128/92

Dimensions in millimetres

NOTE 1 The flatness of the two plane surfaces which contact the spindle shall vary by no more than 0,01 mm. The two planes shall be orthogonal within $\pm 0,02$ mm to the supported surface D of the hub. The hardness (Hv) of the two surfaces and the centring spring shall be a maximum of 300.

NOTE 2 The area of the yoke within the $\varnothing 9,8$ mm circle shall be at least 15 mm².

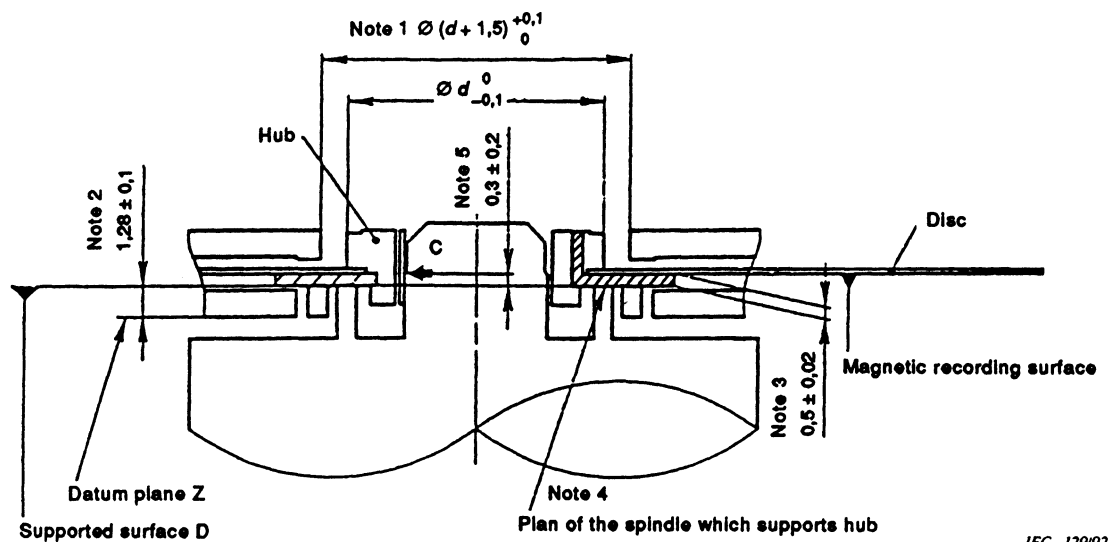
NOTE 3 The drive shall press down on the upper surface of the hub (the surface within the $\varnothing 9,8$ mm circle) to secure it on the spindle. The groove within the $\varnothing 9,8$ mm circle shall be no wider than 0,7 mm.

NOTE 4 This dimension is given in Figure 6.

NOTE 5 This dimension shall be measured from the centre of the spindle when the spindle is not inserted.

NOTE 6 This protrusion is provided to prevent slippage of the hub against the spindle.

Figure 5 — Hub



Dimensions in millimetres

The hub shall be inserted on the spindle by a maximum force of 1,3 N in the temperature range from $-5\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$.

The force securing the hub measured without the centring spring shall be 0,8 N to 1,7 N.

NOTE 1 This dimension is based on diameter of the hub.

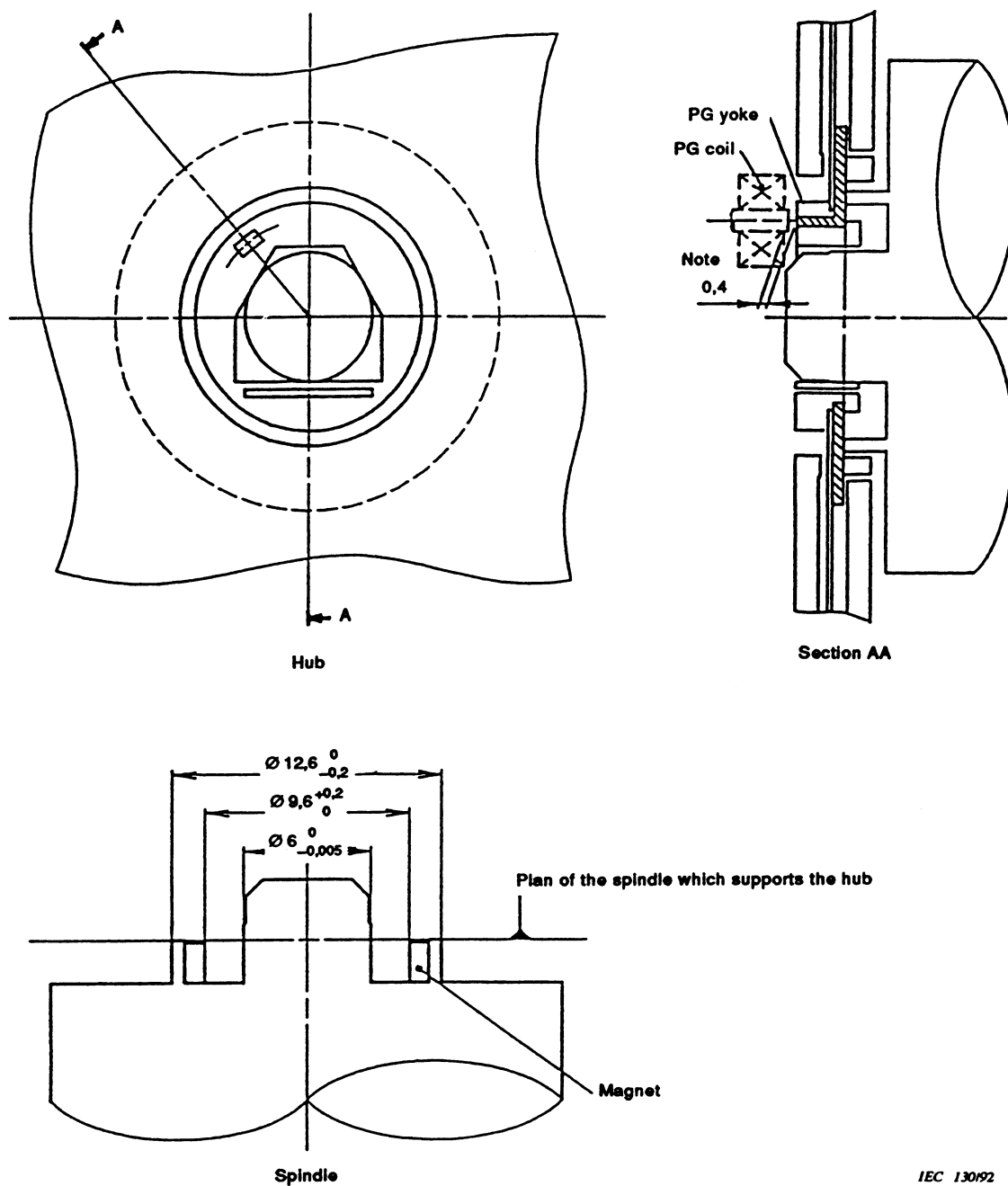
NOTE 2 Distance between datum plane Z and supported surface D of the hub.

NOTE 3 Distance between supported surface D of the hub and the lower surface of disk.

NOTE 4 Plane of the spindle which contacts the supported surface D of the hub shall be in the range from $\varnothing 10\text{ mm}$ to $\varnothing 13,1\text{ mm}$.

NOTE 5 Spindle insertion depth. The spring force at point C shall be 0,5 N to 1,8 N in the temperature range from $-5\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$.

Figure 6 — Relationship between datum plane and hub

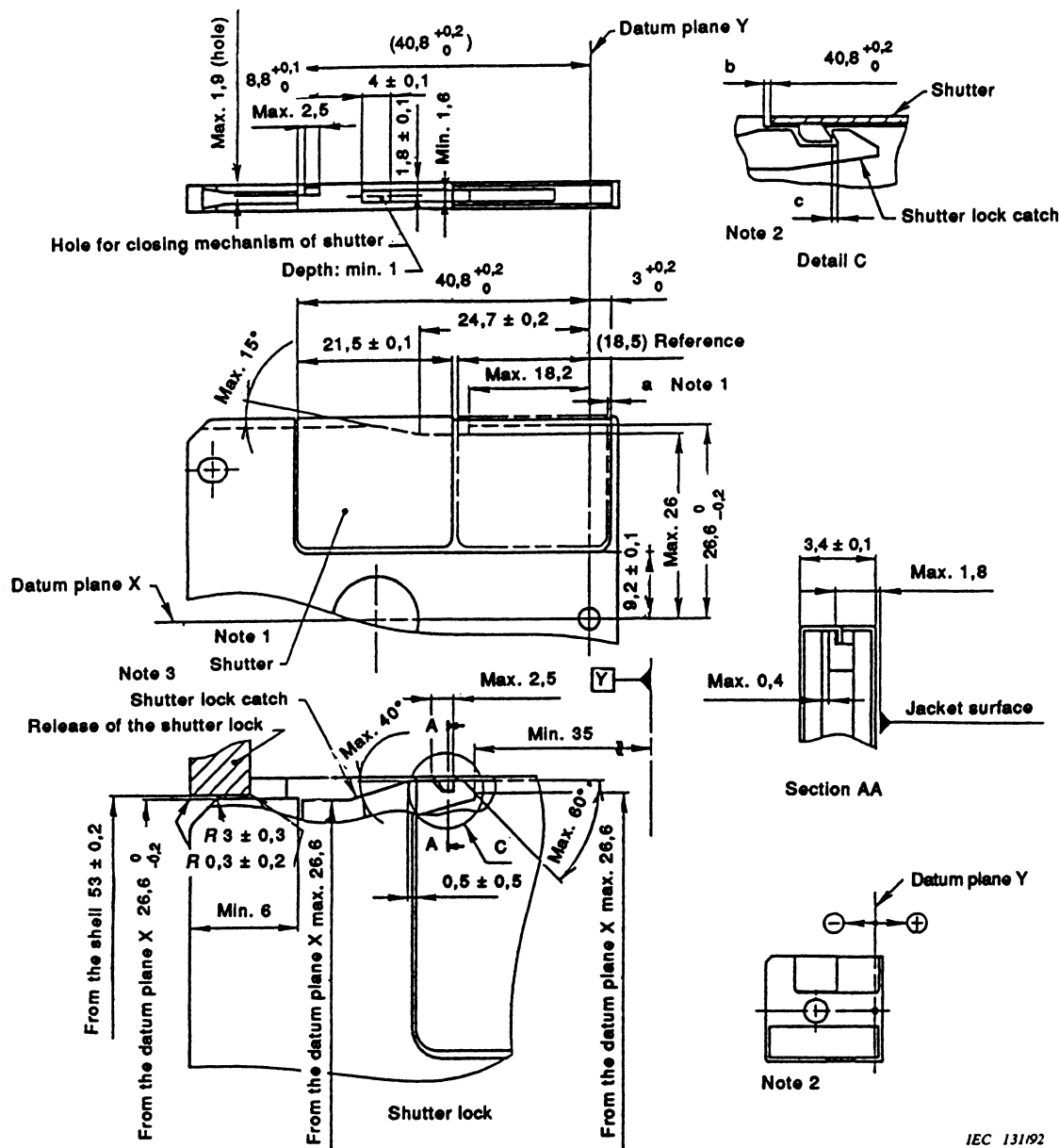


IEC 130/92

Dimensions in millimetres

NOTE This value is the nominal value.

Figure 7 — Spindle



Dimensions in millimetres

The shutter shall not extend beyond the outer surfaces of the jacket. The shutter shall be released by a 0,15 N to 0,8 N force at a point 41,0 mm from datum plane Y applied parallel to datum plane Y to the shutter-lock catch to release the shutter lock.

The force required to slide the shutter open and closed shall be maximum 0,7 N in the temperature range from -5°C to $+40^\circ\text{C}$.

NOTE 1 There shall be a clearance between the shutter and the shell when the shutter is open.

NOTE 2 The figure illustrates distance b, the distance the shutter can be moved in the — direction, and distance c, the distance the shutter can be moved in the + direction after the shutter has been moved in the — direction just far enough for the shutter lock catch to be engaged. These two distances shall meet the following specifications:

— $b \leq 0,2$

— $c \leq 0,3$

NOTE 3 The shutter-lock catch shall return to its original position after the shutter is locked. When a force of 7 N is applied to the locked shutter parallel to datum plane X, the shutter shall remain locked.

Figure 8 — Shutter mechanism

IEC 131/92

3 Disk

The disk shall comply with the following specifications. This clause also gives various recommended values.

3.1 Dimensions

3.1.1 Diameter

The diameter of the disk shall be $47^{+0,1}_{-0,2}$ mm.

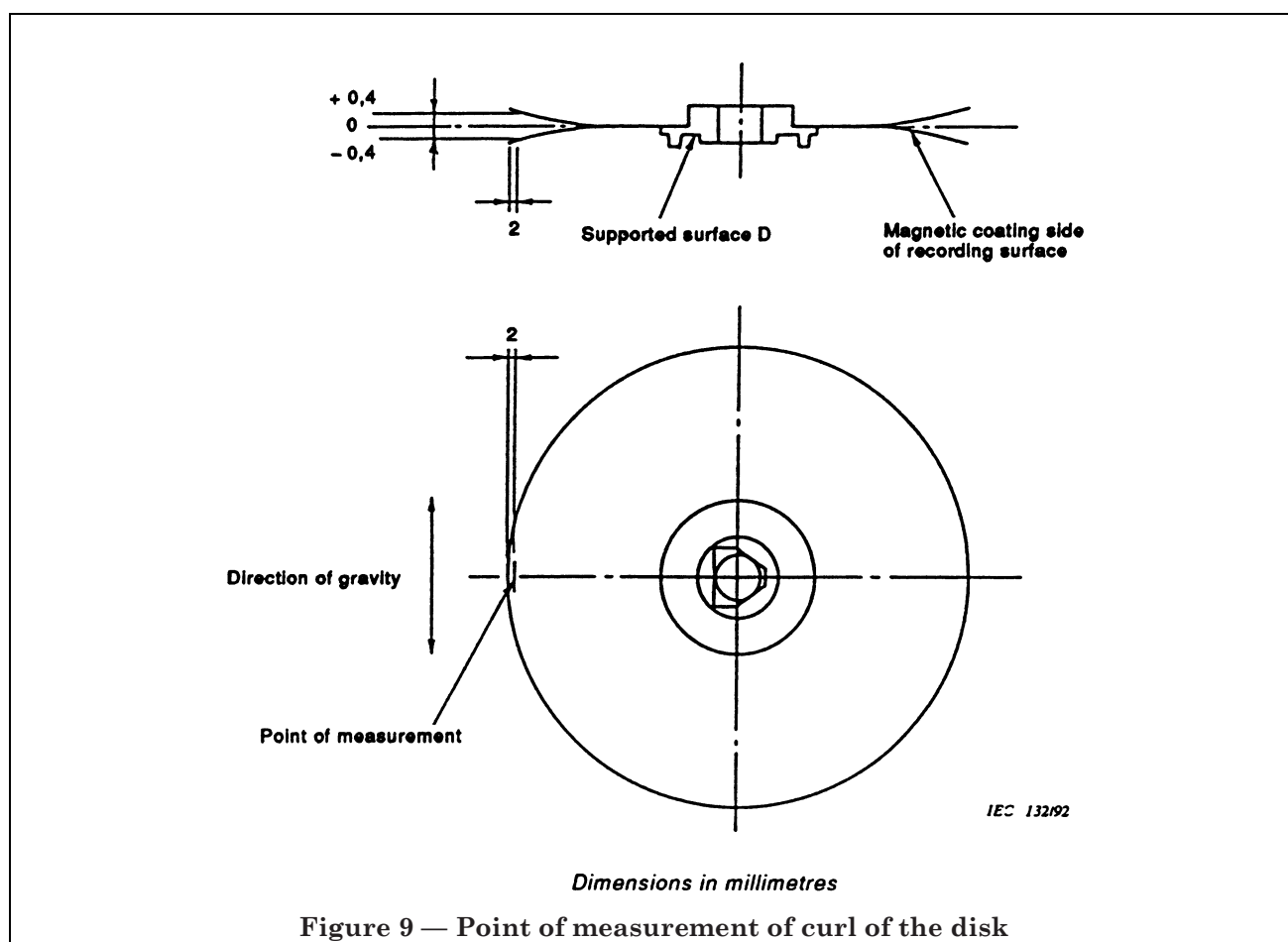
3.1.2 Thickness

The thickness of the disk shall be 40 ± 2 μ m.

3.1.3 Curl of disk

The curl of the disk shall be less than $\pm 0,4$ mm relative to the 0 mm plane. The 0 mm plane is defined as the plane of the magnetic coating side of recording surface of the uncurled disk.

The curl of the disk should be measured as shown in Figure 9.



3.2 Physical properties of disk

3.2.1 Young's modulus

It is recommended that the Young's modulus of the disk sheet is within a range from 40×10^3 N/mm² to 60×10^3 N/mm².

This measurement shall be made in accordance with ISO/R 527. The sample size is 6,25 mm $\times$ 100 mm. The test speed is 100 mm/min.

3.2.2 Coefficient of thermal expansion

It is recommended that the coefficient of linear thermal expansion of the disk sheet is within a range from $9 \times 10^{-6} \text{ K}^{-1}$ to $25 \times 10^{-6} \text{ K}^{-1}$.

3.2.3 Coefficient of hygroscopic expansion

It is recommended that the coefficient of linear hydroscopic expansion of the disk sheet is less than $15 \times 10^{-6} \% \text{ RH}^{-1}$.

3.2.4 Magnetic coating resistivity

The surface resistivity of the magnetic disk coating shall be less than $9 \times 10^{11} \Omega$. This measurement shall be made in accordance with the ASTM, Designation D257.

3.3 Recording characteristics

All measurements are to be made in comparison to the reference disk (refer to 3.4) at the 25th track (refer to Table 1), at which point the reference values are to be taken as 0 dB.

3.3.1 RF optimum recording current

The RF optimum recording current shall be $0 \pm 2 \text{ dB}$ at 7 MHz.

NOTE The RF optimum recording current is the RF recording current necessary to obtain the maximum output signal level during playback. It shall be expressed in decibels as the ratio of the RF optimum recording current of the disk under test to the RF reference recording current, which is the RF optimum recording current of the reference disk.

3.3.2 RF output level

The RF output level shall be:

- greater than -2 dB at 7 MHz;
- greater than -2 dB at 1,25 MHz.

The 4,5 MHz spurious component level of the RF output shall be less than -33 dB relative to the 7 MHz output.

NOTE 1 7 MHz output

The 7 MHz output is the playback level of a 7 MHz signal recorded at the RF reference recording current, the RF optimum recording current of the reference disk. It shall be expressed in decibels as the ratio of the 7 MHz output of the disk to be tested to that of the reference disk.

NOTE 2 1,25 MHz output

The output level of the 1,25 MHz signal played back from the disk on which 7 MHz and 1,25 MHz signal-shave been recorded in a superposed manner shall be measured under the following conditions:

- 7 MHz recording current:
 - the RF reference recording current at 7 MHz signal;
- 1,25 MHz recording current:
 - the current of the reference disk at which 4,5 MHz spurious level ois -35 dB relative to the playback level of the 7 MHz signal.

The 1,25 MHz output is then defined as the ratio, expressed in decibels, of the output level of the 1,25 MHz signal played back from the disk to be tested to that from the reference disk.

3.3.3 RF frequency response

The RF frequency response U of the video signal shall be between -2 dB and $+2 \text{ dB}$. The RF frequency response U is defined as:

$$U = u - u_0$$

where u is the relative value in decibels of the playback output level of the 10 MHz signal to that of the 7 MHz signal for the disk to be tested, and u_0 is the same for the reference disk.

The 7 MHz signal and the 10 MHz signal are recorded at the RF reference recording current of the respective frequencies.

3.3.4 Modulation

The modulation of the disk shall be:

$$\frac{(A - B)}{(A + B)} \times 100 \leq 10 (\%)$$

where:

A is the maximum output level in one revolution

B is the minimum output level in one revolution, as shown in Figure 10.

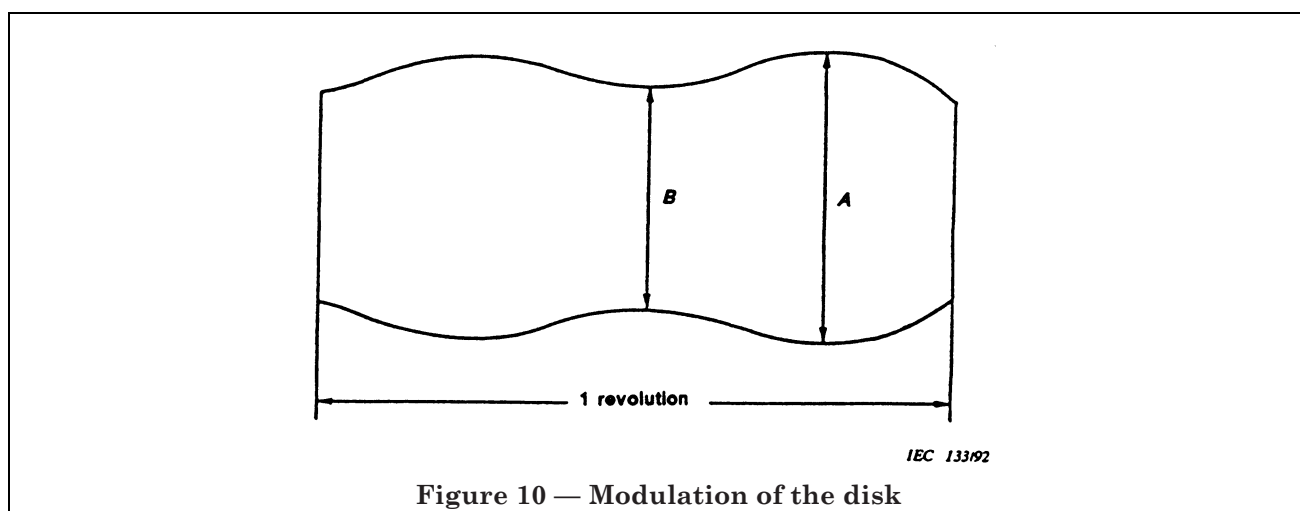


Figure 10 — Modulation of the disk

The modulation shall be measured at the playback output level of the 7 MHz at the 25th track.

3.4 Reference disk and sub-reference disk

The reference disk is defined as a typical metal powder disk¹⁾. Each company designated in Annex A keeps one reference disk.

The sub-reference disk is defined as a disk which has been calibrated to the reference disk for the recording characteristics specified in 3.3.1, 3.3.2 and 3.3.3. The calibrated data shall be attached to the sub-reference disk.

4 Track pattern

This clause specifies the tracks and the dimensions of the track patterns of the magnetic recording surface of the still video floppy disk systems.

4.1 Recording surface

The mains tracks and cue track shall be provided on one side only.

4.2 Main track

4.2.1 Main tracks consist of the 1st through the 50th track.

4.2.2 Video signals can be recorded on the main tracks. For frame recording, the two fields of a frame shall be recorded on adjacent tracks.

4.2.3 Time-compressed analogue audio signals can be recorded on the main tracks.

4.2.4 Digital data signals can be recorded on the main tracks.

4.3 Cue track

4.3.1 A cue track shall be provided at the 52nd track.

¹⁾ The characteristics of the typical metal powder disk have been approved by the Electronic Still Camera Conference.

4.4 Track configuration

Figure 11 — Track pattern of recorded disk surface

NOTE 1 The reference spindle shall be used for measuring the dimensions of the track patterns.

NOTE 2 The reference plane shall coincide with the supported surface D (see note 2 of Figure 6) when measuring the dimensions of the track patterns.

NOTE 3 Spindle insertion depth.

4.4.2 Dimensions of the track patterns of the recorded side are given in Table 1.

Table 1 — Dimensions of track patterns

Item	525 line – 60 field system	625 line – 50 field system
Disk outer diameter (D)	$47^{+0,1}_{-0,2}$ mm	$47^{+0,1}_{-0,2}$ mm
Rotating speed	3 600 rpm	3 000 rpm
Rotating direction (note 1)	Counter clockwise	Counter clockwise
Radius of n th track (R _n) (note 2)	$20 - (n - 1) \times 0,1$ mm	$20 - (n - 1) \times 0,1$ mm
Radius tolerance of track	$\pm 0,014$ mm	$\pm 0,014$ mm
Radius of 1st track (R ₁)	20 mm	20 mm
Radius of 52nd track (R ₅₂)	14,9 mm	14,9 mm
Track pitch (P)	0,1 mm	0,1 mm
Track width (T)	$0,06^{+0}_{-0,006}$ mm	$0,06^{+0}_{-0,006}$ mm
Data starting position (DSP) (note 3)	$0^\circ \pm 1^\circ 22'$	$0^\circ \pm 1^\circ 9'$
Azimuth angle (note 4)	0°	0°
Azimuth tolerance	$\pm 6'$	$\pm 6'$

NOTE 1 Observed from the recorded disk surface.

NOTE 2 n indicates track number n shall be 1st to 50th or 52nd.

NOTE 3 From the standard radial line (SRL) which does through the centre of the PG yoke.

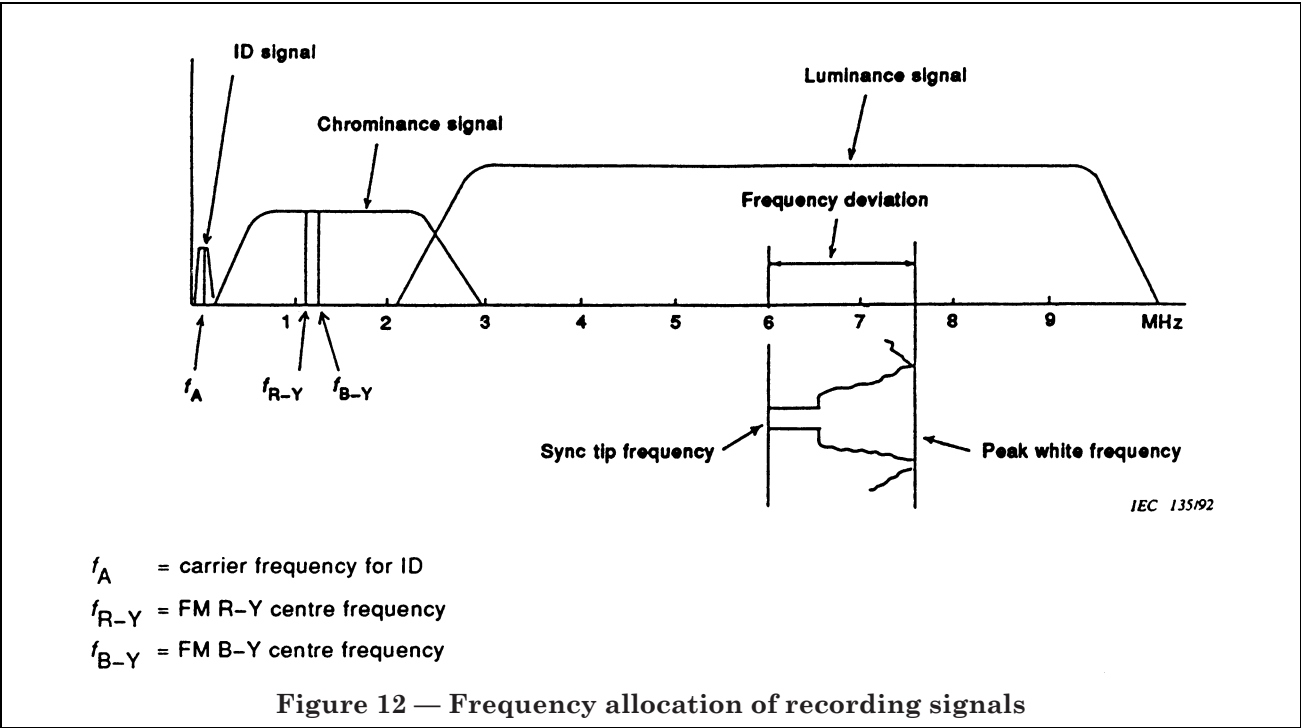
NOTE 4 From the radial line which goes through the centre of the disk, which shall coincide with the centre of the reference spindle when the spindle is inserted into the disk.

5 Video recording format

The luminance signal is recorded using the FM recording format, and the chrominance signal is recorded by first processing it to produce a line-sequential R-Y, B-Y differential colour signal, which is then recorded using the FM recording format.

5.1 Frequency spectrum allocation of recording signals

The frequency spectrum allocation of recording signals is shown in Figure 12.



In the black-and-white mode, chrominance signal carriers shall not be recorded.

5.2 Recording of luminance component

5.2.1 Emphasis

The luminance signal shall be emphasized prior to frequency modulation. Emphasis characteristics in each TV system shall be as given in Table 2.

The input signal is a sine wave. The values in the table are the ratios of the fundamental component of the output signal to the input signal.