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**Information processing - Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7958 ftprad, 1,9 tpmm (48 tpi), on both sides - Part 2: Track format A (ISO 7487-2:1985)**

Information processing - Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7958 ftprad, 1,9 tpmm (48 tpi), on both sides - Part 2: Track format A (ISO 7487-2:1985, ed. 1)

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Informationsverarbeitung - Datenaustausch auf 130 mm (5.25 in) Disketten unter Verwendung von modifizierter Wechseltaktschrift mit 7958 Flußwechsel je rad, 1,9 Spuren je mm (48 Spuren je in) auf zwei Seiten - Teil 2: Spurformat A (ISO 7487-2:1985, Ausg. 1)

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Traitement de l'information - Echange de données sur cartouches a disquette de 130 mm (5,25 in) utilisant un enregistrement a modulation de fréquence modifiée a 7958 ftprad, 1,9 tpmm (48 tpi), sur deux faces - Partie 2: Schéma de piste A (ISO 7487:1985, éd. 1)

**Ta slovenski standard je istoveten z: EN 27487-2:1989**

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**ICS:**

35.220.21      Magnetni diski      Magnetic disks

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Key words: Data processing, information interchange, flexible disk cartridges, magnetic recording, frequency modulation, track format

English version

Information processing. Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad 1,9 tpm (48 tpi) on both sides. Part 2: track format A (ISO 7487-2, 1st edition, 1985)

Traitement de l'information. Echange de données sur cartouches à disquette de 130 mm (5,25 in) utilisant un enregistrement à modulation de fréquence modifiée à 7 958 ftprad, 1,9 tpm (48 tpi), sur deux faces. Partie 2: schéma de piste A (ISO 7487-2, 1ère édition, 1985)	Informationsverarbeitung. Datenaustausch auf 130 mm (5.25 in) Disketten unter Verwendung von modifizierter Wechseltaktschrift mit 7 958 Flusswechsel je rad, 1,9 Spuren je mm (48 Spuren je in) auf zwei Seiten. Teil 2: Spurformat A (ISO 7487-2, 1. Ausgabe, 1985)
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This European Standard was accepted by CEN on 1988-12-21 and is identical to the ISO standard as referred to in EN 27487-2:1997. CEN members are bound to comply with the requirements of the CEN/CENELEC Common Rules 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 CEN Central Secretariat or to any CEN member.

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

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European Committee for Standardization  
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## BRIEF HISTORY

The Technical Board has decided to submit the International Standard

ISO 7487-1, 1st edition, 1985 "Information processing; Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides; Part 1: Track format A"

to the formal vote. The result of this vote was positive.

For the time being, this document exists only in the English and the French versions.

According to the CEN/CENELEC Common Rules, the following countries are bound to implement this standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## STATEMENT

The text of the International Standard ISO 7487-2, 1st edition, 1985, was approved by CEN as a European Standard without any modification.



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# International Standard



# 7487/2

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## Information processing — Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides — Part 2 : Track format A

STANDARD PREVIEW  
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*Traitement de l'information — Échange de données sur cartouches à disquette de 130 mm (5,25 in) utilisant un enregistrement à modulation de fréquence modifiée à 7 958 ftprad, 1,9 tpmm (48 tpi), sur deux faces — Partie 2 : Schéma de piste A*

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UDC 681.327.63

Ref. No. ISO 7487/2-1985 (E)

Descriptors : data processing, information interchange, data recording devices, magnetic disks, flexible disks, track formats, specifications.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7487/2 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

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# Information processing — Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides —

## Part 2 : Track format A

### 0 Introduction

ISO 7487 specifies the characteristics of 130 mm (5.25 in) flexible disk cartridges recorded at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides using modified frequency modulation (MFM) recording.

ISO 7487/1 specifies the dimensional, physical, and magnetic characteristics of the cartridge so as to provide physical interchangeability between data processing systems.

Together with the labelling scheme specified in ISO 7665, ISO 7487/1 and ISO 7487/2 provide for full data interchange between data processing systems.

ISO 7487/3 specifies an alternative track format for data interchange.

### 1 Scope and field of application

This part of ISO 7487 specifies the quality of recorded signals, the track layout, and a track format to be used on such a flexible disk cartridge, which is intended for data interchange between data processing systems.

NOTE — Numeric values in the SI and/or Imperial measurement system in this International Standard may have been rounded off and therefore are consistent with, but not exactly equal to, each other. Either system may be used, but the two should be neither intermixed nor re-converted. The original design of this part of ISO 7487 was made using SI units.

### 2 Conformance

A flexible disk cartridge shall be in conformance with ISO 7487 when it meets all the requirements either of parts 1 and 2 or of parts 1 and 3 of ISO 7487.

### 3 References

ISO 646, *Information processing — ISO 7-bit coded character set for information interchange.*

ISO 2022, *Information processing — ISO 7-bit and 8-bit coded character sets — Code extension techniques.*

ISO 4873, *Information processing — ISO 8-bit code for information interchange — Structure and rules for implementation.*

ISO 7487, *Information processing — Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 ftprad, 1,9 tpmm (48 tpi), on both sides —*

*Part 1: Dimensional, physical and magnetic characteristics.*  
*Part 3 : Track format B.*

ISO 7665, *Information processing — File structure and labelling of flexible disk cartridges for information interchange.*

### 4 Track format

#### 4.1 General requirements

##### 4.1.1 Mode of recording

##### 4.1.1.1 Track 00, side 0

The mode of recording shall be two-frequency where the start of every bit cell is a clock flux transition. A ONE is represented by a data flux transition between two clock flux transitions. Exceptions to this are defined in 4.1.12.

##### 4.1.1.2 All tracks other than track 00, side 0

The mode of recording shall be Modified Frequency Modulation (MFM) for which the conditions are

a) a flux transition shall be written at the centre of each bit cell containing a ONE;

b) a flux transition shall be written at each cell boundary between consecutive bit cells containing ZERO's.

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Exceptions to this are defined in 4.1.12.

#### 4.1.2 Track location tolerance of the recorded flexible disk cartridge

The centrelines of the recorded tracks shall be within  $\pm 0,085$  mm (0.003 3 in) of the nominal positions, over the range of operating environment specified in ISO 7487/1. This tolerance corresponds to twice the standard deviation.

#### 4.1.3 Recording offset angle

At the instant of writing or reading a magnetic transition, the transition may have an angle of  $0^\circ \pm 18'$  with the radius. This tolerance corresponds to twice the standard deviation.

#### 4.1.4 Density of recording

**4.1.4.1** The nominal density of recording shall be 7 958 ftrad. The nominal bit cell length for track 00, side 0 is 251  $\mu$ rad, and for all the other tracks it is 125,5  $\mu$ rad.

**4.1.4.2** The long-term average bit cell length shall be the average bit cell length measured over a sector. It shall be within  $\pm 3,5$  % of the nominal bit cell length.

**4.1.4.3** The short-term average bit cell length, referred to a particular bit cell, shall be the average of the lengths of the preceding eight bit cells. It shall be within  $\pm 8$  % of the long-term average bit cell length.

#### 4.1.5 Flux transition spacing

The instantaneous spacing between flux transitions may be influenced by the reading and writing process, the bit sequence recorded (pulse crowding effects), and other factors. The locations of the transitions are defined as the locations of the peaks in the signal when reading. Tests should be carried out using a peak-sensing amplifier.

**4.1.5.1** Flux transition spacing for track 00, side 0 (see figure 1)

**4.1.5.1.1** The spacing between two clock flux transitions surrounding a data flux transition or between two data flux tran-

sitions surrounding a clock flux transition shall be between 90 % and 140 % of the nominal bit cell length.

**4.1.5.1.2** The spacing between two clock flux transitions not surrounding a data flux transition or between two data flux transitions surrounding a missing clock flux transition shall be between 60 % and 110 % of the nominal bit cell length.

**4.1.5.1.3** The spacing between a data flux transition and the preceding clock flux transition (when not missing) or between a clock flux transition and the preceding data flux transition (when not missing) shall be between 45 % and 70 % of the nominal bit cell length.

**4.1.5.2** Flux transition spacing for all tracks other than track 00, side 0 (see figure 2).

**4.1.5.2.1** The spacing between the flux transitions in a sequence of ONE's shall be between 80 % and 120 % of the short-term average bit cell length.

**4.1.5.2.2** The spacing between the flux transition for a ONE and that between two ZERO's preceding or following it shall be between 130 % and 165 % of the short-term average bit cell length.

**4.1.5.2.3** The spacing between the two ONE flux transitions surrounding a ZERO bit cell shall lie between 185 % and 225 % of the short-term average bit cell length.

#### 4.1.6 Average signal amplitude

For each side the average signal amplitude on any non-defective track (see ISO 7487/1) of the interchanged flexible disk cartridge shall be less than 160 % of  $SRA_{1f}$  and more than 40 % of  $SRA_{2f}$ .

#### 4.1.7 Byte

A byte is a group of eight bit-positions, identified B1 to B8, with B8 the most significant and recorded first.

The bit in each position is a ZERO or a ONE.

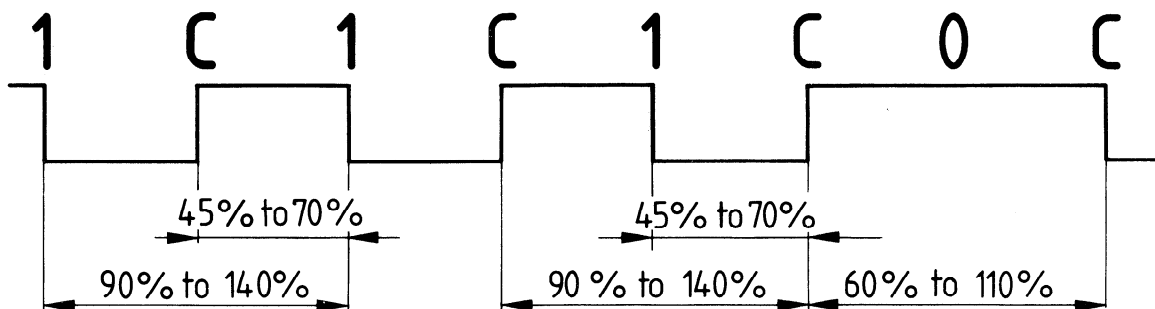


Figure 1

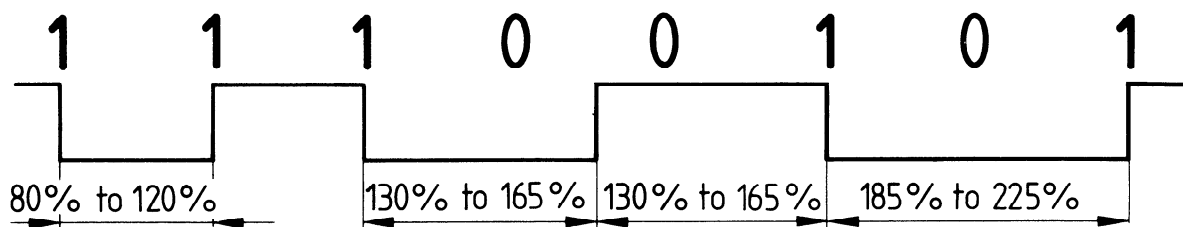


Figure 2

**4.1.8 Sector**

All tracks are divided into 16 sectors.

(4E) for (B8 to B1) = 01001110

(FE) for (B8 to B1) = 11111110

**4.1.9 Cylinder**

A pair of tracks, one on each side, having the same track number.

(FB) for (B8 to B1) = 11111011

(F8) for (B8 to B1) = 11111000

**4.1.10 Cylinder number**

The cylinder number shall be a two-digit number identical with the track number of the tracks of the cylinder.

(A1)\* for (B8 to B1) = 10100001

where the boundary transition between B3 and B4 is missing.

**4.1.11 Data capacity of a track**

The data capacity of track 00, side 0 shall be 2 048 bytes. The data capacity of all tracks other than track 00, side 0 shall be 4 096 bytes.

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**4.1.13 Error detection characters (EDC)**

The two EDC-bytes are hardware generated by shifting serially the relevant bits, specified later for each part of the track, through a 16-bit shift register described by

**4.1.12 Hexadecimal notation**

Hexadecimal notation shall be used hereafter to denote the following bytes :

$$X^{16} + X^{12} + X^5 + 1$$

(See also annex A.)

(00) for (B8 to B1) = 00000000

(01) for (B8 to B1) = 00000001

(FF) for (B8 to B1) = 11111111

(FE)\* for (B8 to B1) = 11111110

where the clock transitions of B6, B5 and B4 are missing

(FB)\* for (B8 to B1) = 11111011

where the clock transitions of B6, B5 and B4 are missing

(F8)\* for (B8 to B1) = 11111000

where the clock transitions of B6, B5 and B4 are missing

**4.2 Track layout after the first formatting for track 00, side 0**

After first formatting, there shall be 16 usable sectors on the track. The layout of the track shall be as shown in figure 3.

During formatting the rotational speed of the disk, averaged index to index, shall be  $300 \pm 6$  r/min.

**4.2.1 Index gap**

At nominal density, this field shall comprise 16 (FF)-bytes. Writing the index gap is started when the index hole is detected. Any of the first 8 bytes may be ill-defined due to subsequent overwriting.