
International Standard



5652

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Information processing — 9-Track, 12,7 mm (0.5 in) wide magnetic tape for information interchange — Format and recording, using group coding at 246 cpmm (6 250 cpi)

Traitement de l'information — Bande magnétique à 9 pistes de 12,7 mm (0,5 in) de large pour l'échange d'information — Format et enregistrement utilisant des codages de groupe à 246 cpmm (6 250 cpi)

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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 5652 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

ISO 5652 was first published in 1983. This second edition cancels and replaces the first edition, of which sub-clause B.3.2 of annex B has been technically revised.

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Information processing — File structure and labelling of magnetic tapes for information interchange

1 Scope and field of application

This International Standard specifies the file structure and the labelling of magnetic tapes for the interchange of information between users of information processing systems.

This International Standard also specifies

- volume and file structure;
- basic characteristics of the blocks containing the records constituting the file;
- recorded labels for identifying files, file sections and volumes of magnetic tapes;
- four nested levels of interchange.

Furthermore, this International Standard specifies requirements for the processes which are provided within information processing systems, to enable information to be interchanged between different systems, utilizing recorded magnetic tape as the medium of interchange. For this purpose it specifies the functions to be provided within systems which are intended to originate or receive magnetic tape volumes which conform to this International Standard.

2 Conformance

2.1 Conformance of a magnetic tape volume set

A magnetic tape volume set conforms to this International Standard when all information recorded on it conforms to the specifications of this International Standard. A statement of conformance shall identify the lowest level of interchange to which the contents of the magnetic tapes conform.

A prerequisite to such conformance is conformance of each volume of the volume set to the same International Standard for information interchange on magnetic tapes.

2.2 Conformance of an information processing system

An information processing system conforms to this International Standard if it meets all the requirements specified in this International Standard either for an originating system, or for a receiving system, or for both types of system. A statement of conformance shall identify which of these sets of requirements can be met by the system.

3 References

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

ISO 962, *Information processing — Implementation of the 7-bit coded character set and its 7-bit and 8-bit extensions on 9-track, 12,7 mm (0.5 in) magnetic tape*.

ISO 1862, *Information processing — 9-track, 12,7 mm (0.5 in) wide magnetic tape for information interchange recorded at 8 rpm (200 rpi)*.

ISO 1863, *Information processing — 9-track, 12,7 mm (0.5 in) wide magnetic tape for information interchange recorded at 32 rpm (800 rpi)*.

ISO 1864, *Information processing — Unrecorded 12,7 mm (0.5 in) wide magnetic tape for information interchange — 35 ftpmm (800 ftpi) NRZ1, 126 ftpmm (3 200 ftpi) phase encoded and 356 ftpmm (9 042 ftpi), NRZ1*.

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

ISO 3788, *Information processing — 9-track, 12,7 mm (0.5 in) wide magnetic tape for information interchange recorded at 63 rpm (1 600 rpi), phase-encoded*.

ISO 4873, *Information processing — 8-bit coded character set for information interchange*.

ISO 5652, *Information processing — 9-track, 12,7 mm (0.5 in) wide magnetic tape for information interchange — Format and recording, using group coding at 246 cpmm (6 250 rpi)*.

4 Definitions

For the purpose of this International Standard, the following definitions apply.

4.1 application program : A program that processes the contents of records belonging to a file, and may also process selected attribute data relating to the file or to the volume(s) on which it is recorded.

NOTE — An application program is a specific class of user as defined in this International Standard.

3.7 standard reference amplitude : The average peak-to-peak signal amplitude derived from the signal amplitude reference tape on the NBS measurement system, or equivalent, under the recording conditions specified in ISO 1864.

3.8 reference edge : The edge furthest from an observer when a tape is lying flat with the magnetic surface uppermost and the direction of movement for recording is from left to right.

3.9 in contact : An operation condition in which the magnetic surface of a tape is in contact with a magnetic head.

3.10 track : A longitudinal area on a tape along which a series of magnetic signals may be recorded.

3.11 row : Nine transversely related locations (one in each track) in which bits are recorded.

3.12 position of flux transition : The point which exhibits the maximum free-space flux density normal to the tape surface.

3.13 physical recording density : The number of recorded flux transitions per unit length of track (ftpmm or ftpi).

3.14 data density : The number of data characters stored per unit length of tape (cpmm or cpi).

3.15 skew : The maximum longitudinal deviation in the placement of bits within a row.

3.16 ECC character : A character used for error detection and correction within a data group.

3.17 auxiliary CRC character : A character used for error detection within the data part of a block.

3.18 CRC character : A character used for error detection within a complete block.

3.19 preamble : A pattern of signals marking the beginning of each storage block, used primarily for electronic synchronization.

3.20 postamble : A pattern of signals marking the end of each storage block.

3.21 density identification area (ID burst) : A burst of recording at the beginning of a tape identifying the use of the group-coded-recording method.

3.22 Automatic Read Amplification (ARA) burst : A burst of recording at the beginning of a tape which may be used for setting the gain of the read amplifiers.

3.23 error : The detection of a missing pulse or an extra pulse in a track. Missing pulse and extra pulse are as defined in ISO 1864 sub-clauses 5.16.1 c) and 5.16.2 respectively.

4 Operating and transportation conditions

4.1 Operating environment

Tapes used for data interchange shall be operated under the following conditions :

- temperature : 16 to 32 °C (60 to 90 °F);
- relative humidity : 20 to 80 %;
- wet bulb temperature : not greater than 26 °C (78 °F).

Conditioning before operating : If a tape has been exposed during storage and/or transportation to conditions outside the above values, it should be conditioned for a period of 2 to 12 h. depending on the extent of exposure.

4.2 Transportation

Responsibility for ensuring that adequate precautions against damage are taken during shipment shall lie with the sender (see annex A).

4.3 Wind tension

For interchange, the tape winding tension shall be between 2 N and 3,6 N (7 to 13 ozf).

5 Recording

5.1 Method of recording

The "non return to zero mark" (NRZ1) method of recording shall be used where a ONE is represented by a change of direction of longitudinal magnetization.

5.2 Density of recording

The nominal density shall be 356 ftpmm (9 042 ftpi). Other nominal densities used hereafter for specific measurements shall be

178 ftpmm (4 521 ftpi)

119 ftpmm (3 014 ftpi).

5.3 Average flux transition spacings

The following measurements shall be made after interchange using a tape recorded at a density of 178 ftpmm (4 521 ftpi). The nominal flux transition spacing at this density shall be 5,618 μm (221.2 μin) subject to the following variations.

5.3.1 The long term average (static) flux transition spacing shall be within $\pm 4\%$ of the nominal spacing. This average shall be measured over a minimum of 5×10^5 successive flux transitions.

5.3.2 The short term average (dynamic) flux transition spacing, when referred to a particular flux transition spacing, is the average of that flux transition spacing and the preceding flux transition spacing.

The short term average flux transition spacing shall be within the limits of $\pm 6\%$ of the long term average flux transition spacing.

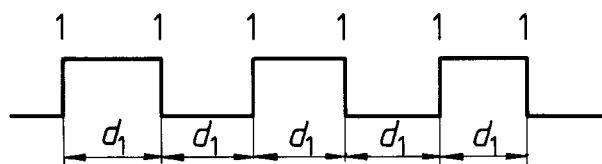
In addition, the rate of change of the short term average flux transition spacing shall not exceed 0,2 % per flux transition spacing.

5.4 Instantaneous flux transition spacings

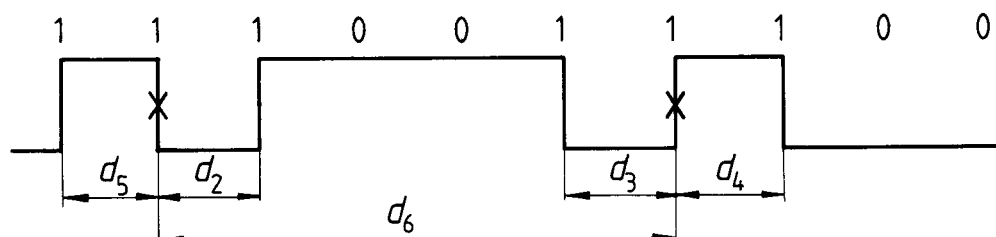
The instantaneous spacing between flux transitions may be influenced by the reading and writing processes, the pattern recorded (pulse crowding effects) and other factors.

Instantaneous spacings between flux transitions shall meet the following conditions, when tested on the reference read chain (see annex B).

5.4.1 At the nominal maximum density of 356 ftpmm (9 042 ftpi) the spacing d_1 between successive flux transitions shall be between 48 % and 52 % of the corresponding short term average flux transition spacing determined at 178 ftpmm (4 521 ftpi).



5.4.2 In a sequence of flux transitions defined by the bit pattern 111001100..., the average displacement of the spacing of the flux transitions on either side of a reference transition, from that reference transition, shall be not more than $\pm 28\%$ from the average spacing of flux transitions at 356 ftpmm (9 042 ftpi).



Crosses denote reference transitions.

$$1,28 d_1 > \text{average } d_5 > 0,72 d_1$$

$$1,28 d_1 > \text{average } d_2 > 0,72 d_1$$

$$1,28 d_1 > \text{average } d_3 > 0,72 d_1$$

$$1,28 d_1 > \text{average } d_4 > 0,72 d_1$$

The tolerances of long term average spacing and short term average spacing (see 5.3.1 and 5.3.2) are included in this deviation.

The average distance d_6 between actual consecutive reference flux transitions in a sequence defined by the bit pattern 111001100... and the calculated distance $5d_1$, of six flux transitions at nominal maximum density of 356 ftpmm (9 042 ftpi) shall not differ by more than 6 % of d_1 .

$$5,06 d_1 > \text{average } d_6 > 4,94 d_1$$