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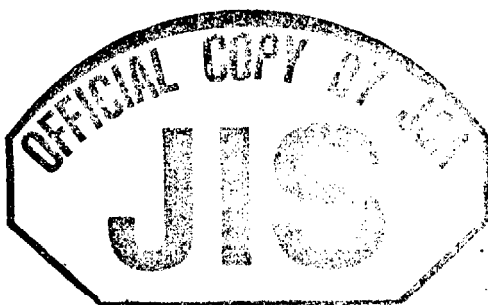
JAPANESE INDUSTRIAL STANDARD

Magnetic Tape Cassette for Information Interchange

JIS C 6280—1975

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JAPANESE INDUSTRIAL STANDARD

Magnetic Tape Cassette for
Information InterchangeX 6121-1975
(Reaffirmed: 1983)1. Scope

This Japanese Industrial Standard specifies the characteristics of a 3.81 mm magnetic tape cassette, hereinafter referred to as the "tape cassette", which is used as a recording media of information interchanged between digital computer systems and the similar equipments each other.

2. Definitions

For the purpose of this standard the following principal definitions apply:

- (1) signal amplitude reference tape cassette A tape cassette selected as a standard for signal amplitude whose characteristics are defined by International Organization for Standardization (ISO).
- (2) secondary signal amplitude reference tape cassette A tape cassette which enables and is used for indirect comparison of electromagnetic characteristics of the tape cassette under test and that of the signal amplitude reference tape cassette, in such a manner that the deviation of this tape cassette from the signal amplitude reference tape cassette in characteristics is indicated, and the measured values with this tape are corrected by means of this indicated deviation.
- (3) reference field The minimum field applied to the signal amplitude reference tape cassette which causes an output signal voltage equal to 95 % of the maximum output voltage (saturated), when consecutive codes "1" recorded at the specified packing density by phase encoding method on the tape cassette are reproduced.
- (4) test recording current A recording current between 145 % to 155 % of the current required to produce the reference field.

Applicable Standard:

JIS B 7502-External Micrometers

Reference Standard:

JIS C 6281-Recorded Magnetic Tape Cassette for Information Interchange

- (5) reference peak output voltage The average peak output voltage measured over at least 4000 flux transitions derived⁽¹⁾ from the signal amplitude reference tape cassette recorded at the density of 63 flux transitions per mm using the test recording current.

Note (1) In recording and reproducing, the same procedure shall be used for both the tape cassette under test and the secondary signal amplitude reference tape cassette. For example, the same procedure such as reading-while-writing, or reading-after-writing shall be made on both of the tape cassettes.

- (6) average signal amplitude The average peak output voltage measured over at least 4000 flux transitions.
- (7) track A longitudinal area on a magnetic tape along which a series of magnetic signals may be recorded.
- (8) leader tape Non-magnetic transparent tapes joined to each end of a magnetic tape to strengthen the magnetic tape.
- (9) splicing tape A non-magnetic tape used to connect the magnetic tape and the leader tape.
- (10) write-enable plug A plug installed to the tape cassette to activate the recording circuit.
- (11) pad A buffering material provided at the head-inserting portion of the tape cassette to hold the magnetic tape against the head.
- (12) nearly empty hub A condition of the hub on which the tape is scarcely wound.
- (13) nearly full hub A condition of the hub on which the tape is almost fully wound.
- (14) reference hole A hole which is used for positioning of the tape cassette when the tape cassette is loaded to equipment.
- (15) tape A general term used to designate the magnetic tape joined to leader tapes at its each end by the specified method.
- (16) cassette A frame in which the tape is contained according to the specified method, and which is constructed for loading to the read and write mechanism.
- (17) cassette tape A tape accommodated in the cassette.
- (18) block A series of characters recorded on the magnetic tape, and which is read from the magnetic tape as a unit.

3. Characteristics of Tape

3.1 Materials, Construction and Appearances of Tape

3.1.1 Materials The magnetic tape shall consist of a base material made of polyethylene terephthalate or its equivalent and a homogeneous layer of ferro-magnetic material stuck together firmly. The magnetic tape shall be continuous and splice-free in the whole length and shall not be inflammable.

3.1.2 Appearances The surface of the magnetic tape shall be smooth, flawless, and free of curl and irregular elongation in the whole length.

3.1.3 Tape End The magnetic tape shall be provided with a marker of a circular hole or transparent portion at its beginning and end for detecting ends of the magnetic tape.

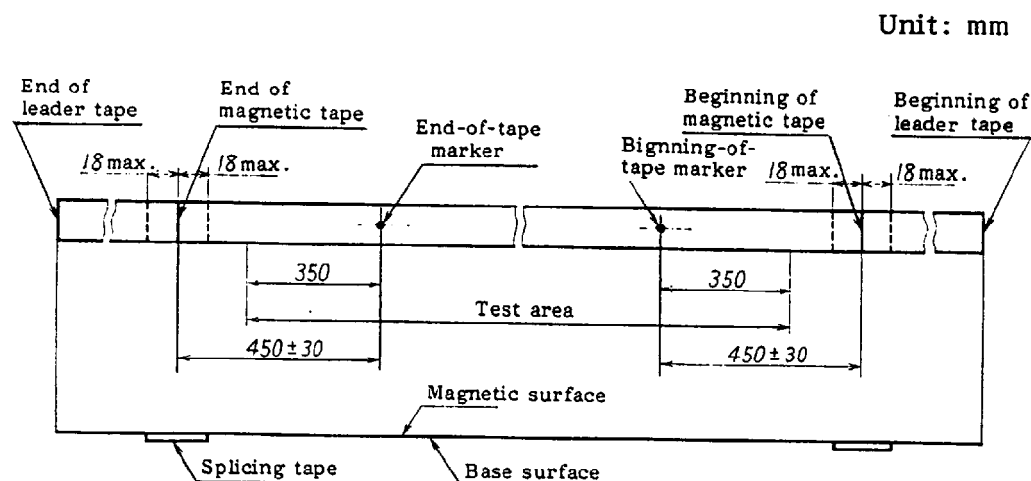
The location of the markers is as specified in Fig. 1. The distance between tape center line and marker center line shall be within 0.1 mm. Each marker shall be a circle having a diameter of 0.6 ± 0.05 mm.

The leader tapes shall be joined to each end of the magnetic tape by such an appropriate way that the longitudinal tension of the tape becomes 2 N (about 0.204 kgf) or more. No overlap is permitted between the leader tape and the magnetic tape and any gap shall not exceed 0.5 mm.

If a splicing tape is used at the joint, it shall be adhered to the base surface side as shown in Fig. 1, and the thickness of the splicing tape shall be not more than 0.050 mm and the length of the splicing tape between the leader tape and the magnetic tape shall be not more than 18 mm.

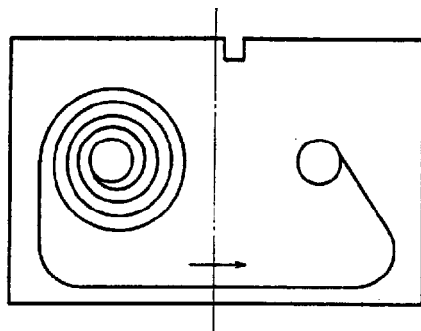
Furthermore, at the area of the splice, there shall be no lateral discontinuity greater than 0.05 mm.

Fig. 1. Tape End and Test Area



3.1.4 Tape Winding The tape shall be wound on the hubs with the magnetic coating out and be unwound in the direction of allowhead shown in Fig. 2.

Fig. 2. Tape Winding



3.1.5 Winding Torque The winding torque shall be not less than 3×10^{-3} N·m (about 30.6 gf·cm). The tape tension of the winding side shall be constant or decrease with increasing reel diameter and shall not exceed 0.5 N (about 0.051 kgf).

3.2 Tape Dimensions

3.2.1 Width The width of tape shall be $3.81_{-0.05}^0$ mm. The test method of the width is as specified in 6.2.1 (1).

3.2.2 Thickness The thickness of tape is specified below. The test method of the thickness is as specified in 6.2.1 (2).

- (1) Thickness of Magnetic Tape The thickness of magnetic tape shall not exceed 0.019 mm at any portion of magnetic tape.
- (2) Thickness of Leader Tape The thickness of leader tape shall not exceed 0.038 mm at any portion of the leader tape.

3.2.3 Length The length of tape is as follows:

- (1) Length of Magnetic Tape The length of magnetic tape shall be 86_{-0}^{+4} m.
- (2) Length of Leader Tape The length of leader tape shall be 500 ± 50 mm. The test method of the length of leader tape is as specified in 6.2.2.

3.3 Mechanical Characteristics of Tape

3.3.1 Elastoplastic Properties The elastoplastic properties of the tape shall meet each of the following items. However, the length of the tape under test is not necessarily 500 mm in the following items (1) to (4) if the judgment is not affected by it.

Remark: The units and numerical values given in { } in this sub-clause are in accordance with the International System of Units (SI), and are appended for reference.

- (1) When the magnetic tape of 500 mm length is subjected to a load of 50 gf {about 0.5 N} for a period of 3 min, the elongation shall be not more than 0.50 %.
- (2) The force load applied uniformly to the magnetic tape of 500 mm length is increased at a rate of 30 gf/s {about 0.3 N/s} until the force becomes 450 gf {about 4.4 N} after 15 sec., and the elongation at that time shall be not more than 3.0 %.
- (3) When the leader tape of 500 mm length is subjected to a load of 100 gf {about 1 N} for a period of 3 min, the elongation shall be not more than 0.50 %.
- (4) A load of 300 g is applied to the magnetic tape of 500 mm length for a period of 3 min, the load is removed, the tape is allowed to stand without load for 3 min, and then the permanent elongation measured with a mass of about 5 g shall be not more than 1.0 %.

3.3.2 Adhesion The angle θ measured according to the test method given in 6.2.3 shall not exceed 45°.

3.3.3 Longitudinal Curvature When the tape of 1 m or more in length is placed freely on a flat surface in its natural state, the radius of curvature of the tape shall be not less than 33 m.

3.3.4 Light Transmittance The light transmittance of the tape shall meet the following requirements, when measured according to 6.2.4 (2).

- (1) Light Transmittance of Magnetic Tape The magnetic tape shall have a light transmittance of 1 % or less.
- (2) Light Transmittance of Leader Tape The leader tape shall have a light transmittance of 75 % or more.
- (3) Light Transmittance of Splicing Tape The splicing tape shall have a light transmittance of 1 % or less.

3.4 Electro-Magnetic Properties of Magnetic Tape

3.4.1 Recording Current and Density The electro-magnetic properties of the magnetic tape shall be tested by using the test recording current at a nominal packing density of 63 ftp/mm.

3.4.2 Reproduced Output When a tape has been recorded with the test recording current, then played back on a system which has been calibrated by means of a signal amplitude reference tape cassette recorded under the same conditions, the average signal amplitude of the tape under test shall be within 90 to 125 % of the output of the signal amplitude reference tape cassette. When performing this test, the output signal shall be measured on the read-while-write⁽²⁾ pass for both the tape under test and the signal amplitude reference tape cassette or the secondary signal amplitude reference tape cassette.

Note (2) The read-while-write pass is applied to the case if it is possible. If it is not possible, the read-on-first-pass-after-write may be used.

3.4.3 Rejected Region The rejected region is as follows:

- (1) **Test for Drop-outs and Drop-ins** These tests shall be carried out in the condition in which the magnetic surface of a magnetic tape is in contact with a magnetic head. The test area shall, in length, extend from 350 mm before the BOT-marker to 350 mm beyond the EOT-marker, and in width over the track widths (refer to Fig. 1).
- (2) **Drop-outs** When a magnetic tape has been recorded with the test recording current, the measured peak value of playback signal which is less than 50 % of the output peak value of the signal amplitude reference tape cassette is considered a drop-out.
- (3) **Drop-ins** When a magnetic tape has been recorded with a constant recording current equivalent to the test recording current, the measured peak value of playback signal which exceeds 10 % of the output peak value of the signal amplitude reference tape cassette is considered a drop-in.
- (4) **Rejected Region** A rejected region is an area of magnetic tape extending across the width of either track in problem and not more than 10 mm in length, which always exhibits drop-outs or drop-ins on three consecutive tests.

The acceptable number of rejected regions in an interchange environment is a matter of agreement between interchange parties.

3.4.4 Ease of Erasure When a magnetic tape is recorded with the test recording current at 63 ftp/mm nominal, and then erased through a longitudinal steady d.c. field of 80000 A/m (about 1000 Oe), the average signal amplitude of the remaining unwanted signal shall not exceed 3 % of output of the signal amplitude reference tape cassette. The erasure field shall be reasonably uniform, for example the field in the middle of a solenoid.

This measurement shall be made with a band pass filter passing at least the first three harmonics.

3.4.5 Print-through Several groups of a signal pattern extending on one wind or less on the hub shall be written on the magnetic tape using the test recording current at 63 ftp/mm nominal with intervals of about 10 winds on the hub. The magnetic tape shall then be rewound and stored for a minimum of 16 h at a temperature of 60°C. At the end of this period, the peak value of the measured printed signal shall be within 2 % from the peak value of the original signal.

3.5 Electrical Properties of Tape

3.5.1 Surface Resistivity The surface resistivity shall be less than $10^9 \Omega$ when measured with the test method specified in 6.2.5.

4. Characteristics of Cassette

4.1 Structure and Mechanical Characteristics of Cassette

4.1.1 Material The burning length of the cassette shall not exceed 40 mm after 1 min when the burning test is made according to 6.3.1.

4.1.2 Appearance and Dimensions There shall be no defect in external appearance of the cassette such as curvature.

The external dimensions which permit physical interchangeability of the cassette are shown in Figs. 3 and 4.