INTERNATIONAL STANDARD

ISO/IEC
7811-6

Identification cards — Recording technique —

Part 6:
Magnetic stripe — High coercivity

Cartes d'identification — Technique d'enregistrement —
Partie 6: Bandeau magnétique — Haute coercitivité

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 7811 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 7811-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Identification cards and related devices*.

This second edition of ISO/IEC 7811-6 cancels and replaces ISO/IEC 7811-6:1996, ISO/IEC 7811-4:1995 and ISO/IEC 7811-5:1995. The user is encouraged to review the entire standard for revisions and updates. The major changes made during this revision are listed below.

1. The requirements given in ISO/IEC 7811-4:1995 and ISO/IEC 7811-5:1995 are included in this edition of ISO/IEC 7811-6.

2. Wherever possible the same definitions, criteria and test methods have been used for both Part 2 and Part 6.

3. Revised the bandpass filter requirements for the test method.

4. Change the definition of the waveform measurements.

5. Revised the definitions for some static magnetic characteristics.

ISO/IEC 7811 consists of the following parts, under the general title *Identification cards — Recording technique*:

⎯ *Part 1: Embossing*

⎯ *Part 2: Magnetic stripe — Low coercivity*

⎯ *Part 6: Magnetic stripe — High coercivity*

Annex B forms a normative part of this part of ISO/IEC 7811. Annexes A, C and D are for information only.

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Identification cards — Recording technique —

Part 6:
Magnetic stripe — High coercivity

1 Scope

This part of ISO/IEC 7811 is one of a series of standards describing the characteristics for identification cards as defined in the definitions clause and the use of such cards for international interchange.

This part of ISO/IEC 7811 specifies requirements for a high coercivity magnetic stripe (including any protective overlay) on an identification card, the encoding technique and coded character sets. It takes into consideration both human and machine aspects and states minimum requirements.

Coercivity influences many of the quantities specified in this part of ISO/IEC 7811 but is not itself specified. The main characteristic of the high coercivity magnetic stripe is its improved resistance to erasure. This is achieved with minimal probability of damage to other magnetic stripes by contact while retaining read compatibility with magnetic stripes as defined in ISO/IEC 7811-2.

It is the purpose of this series of standards to provide criteria to which cards shall perform. No consideration is given within these standards to the amount of use, if any, experienced by the card prior to test. Failure to conform to specified criteria should be negotiated between the involved parties.

ISO/IEC 10373-2 specifies the test procedures used to check cards against the parameters specified in this part of ISO/IEC 7811.

NOTE   Numeric values in the SI and/or Imperial measurement system in this part of ISO/IEC 7811 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 not be intermixed or reconverted. The original design was made using the Imperial measurement system.

2 Conformance

A prerequisite for conformance with this part of ISO/IEC 7811 is conformance with ISO/IEC 7810. An identification card is in conformance with this part of ISO/IEC 7811 if it meets all mandatory requirements specified herein. Default values apply if no others are specified.

3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 7811. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 7811 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*.

ISO/IEC 7810, *Identification cards — Physical characteristics*.

ISO/IEC 10373-1, *Identification cards — Test methods — Part 1: General characteristics tests*.

ISO/IEC 10373-2, *Identification cards — Test methods — Part 2: Cards with magnetic stripes*.

4 Terms and definitions

For the purposes of this part of ISO/IEC 7811, the terms and definitions given in ISO/IEC 7810 and the following apply.

4.1
primary standard
set of reference cards established and maintained by Physikalisch-Technische Bundesanstalt (PTB) that represent the values of U_R and I_R designated RM7811-6

4.2
secondary standard
reference card designated RM7811-6 that is related to the primary standard as stated in the calibration certificate supplied with each card

NOTE   Secondary standards can be ordered from Physikalisch-Technische Bundesanstalt (PTB), FLab. 2.24 - Bundesallee 100, D-38116 Braunschweig, Germany. The source of secondary standards will be maintained at least until 2005.

4.3
unused un-encoded card
card possessing all the components required for its intended purpose, which has not been subjected to any personalization or testing operation, and which has been stored in a clean environment with no more than 48 hour exposure to daylight at temperatures between 5 °C to 30 °C and humidity between 10% to 90% without experiencing thermal shock

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4.4
unused encoded card
card according to 4.3 that has only been encoded with all the data required for its intended purpose (e.g. magnetic encoding, embossing, electronic encoding)

4.5
returned card
card according to 4.4 after it has been issued to the card holder and returned for the purpose of testing

4.6
flux transition
location of the greatest rate of change with distance of the magnetisation

4.7
reference current
I_R
minimum recorded current amplitude under the given test conditions that causes, on the reference card, a readback signal amplitude equal to 80% of the reference signal amplitude U_R, at a density of 8 flux transitions per millimetre (200 flux transitions per inch) as shown in Figure 6

4.8
reference flux level
F_R
flux level in the test head that corresponds to the reference current I_R

4.9
test recording currents
two recording currents defined by:

$$I_{min} = \text{Recording current corresponding to } 2,8\ F_R$$

$$I_{max} = \text{Recording current corresponding to } 3,5\ F_R$$

4.10
individual signal amplitude
U_i
base-to-peak amplitude of a single readback voltage signal

4.11
average signal amplitude
U_A
sum of the absolute value of the amplitude of each signal peak (U_i) divided by the number of signal peaks (n) for a given track over the length of the magnetic stripe area

4.12
reference signal amplitude
U_R
maximum value of the average signal amplitude of a reference card corrected to the primary standard

4.13
physical recording density
number of flux transitions per unit length recorded on a track

4.14
bit density
number of data bits stored per unit of length (bits/mm or bpi)

4.15
bit cell
distance between two clocking flux transitions. See Figure 10

4.16
sub interval
distance that is nominally half of the distance between two clocking flux transitions. See Figure 10

4.17
demagnetisation current
I_d
D C current value that reduces the average signal amplitude to 80% of the reference signal amplitude (U_R) on a secondary reference card that has been encoded at a density of 20 ft/mm (500 ftpi) at a current of I_{min}

5 Physical characteristics of the identification card

The identification card shall conform to the specification given in ISO/IEC 7810.

WARNING --The attention of card issuers is drawn to the fact that information held on the magnetic stripe may be rendered ineffective through contamination by contact with dirt and certain commonly used chemicals including plasticizers. It should also be noted that any printing or screening placed on top of the magnetic stripe must not impair the function of the magnetic stripe.

5.1 Magnetic stripe area warpage

Application of a 2,2 N (0.5 lbf) load evenly distributed on the front face opposite the magnetic stripe shall bring the entire stripe within 0,08 mm (0.003 in) of the rigid plate.

5.2 Surface distortions

There shall be no surface distortions, irregularities or raised areas on both the front and the back of the card in the area shown in Figure 1 that might interfere with the contact between the magnetic head and magnetic stripe.
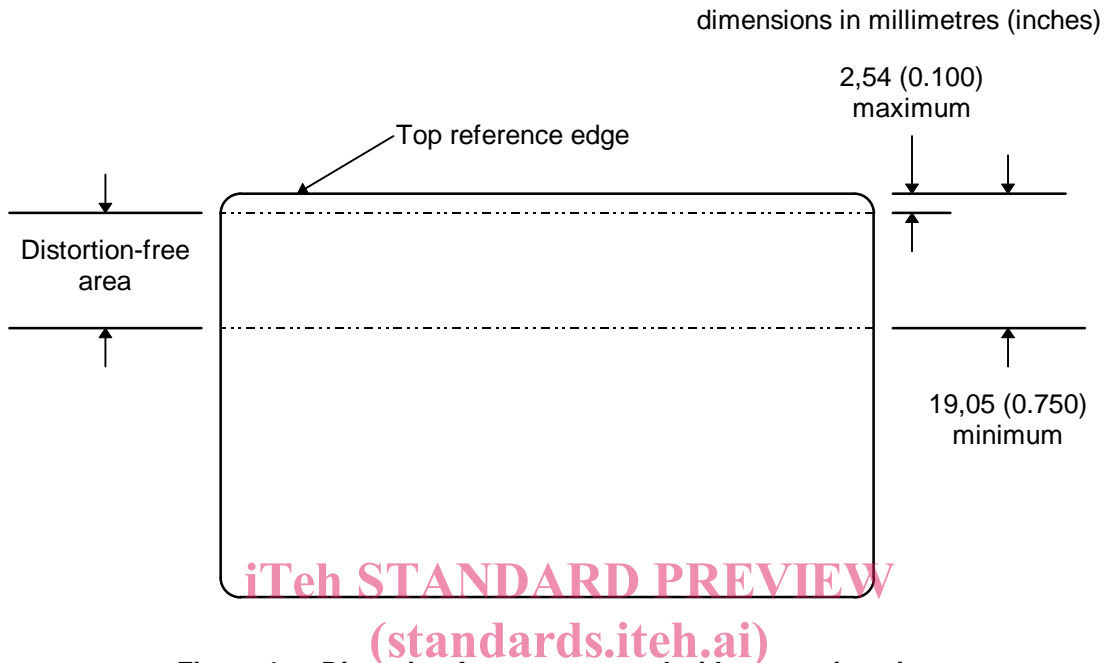
dimensions in millimetres (inches)

**Figure 1 — Distortion-free area on card with magnetic stripe**

If a raised signature panel area is located on the front or back of the card, then it shall be no closer to the top edge of the card than 19,05 mm (0.750 in).

NOTE   Raised areas and distortions on other areas of the card may cause card transport problems with magnetic stripe processing equipment resulting in reading or writing errors.

6 Physical characteristics of the magnetic stripe

6.1 Height and surface profile of the magnetic stripe area

The magnetic stripe area is located on the back of the card as shown in Figure 2.

dimensions in millimetres (inches)
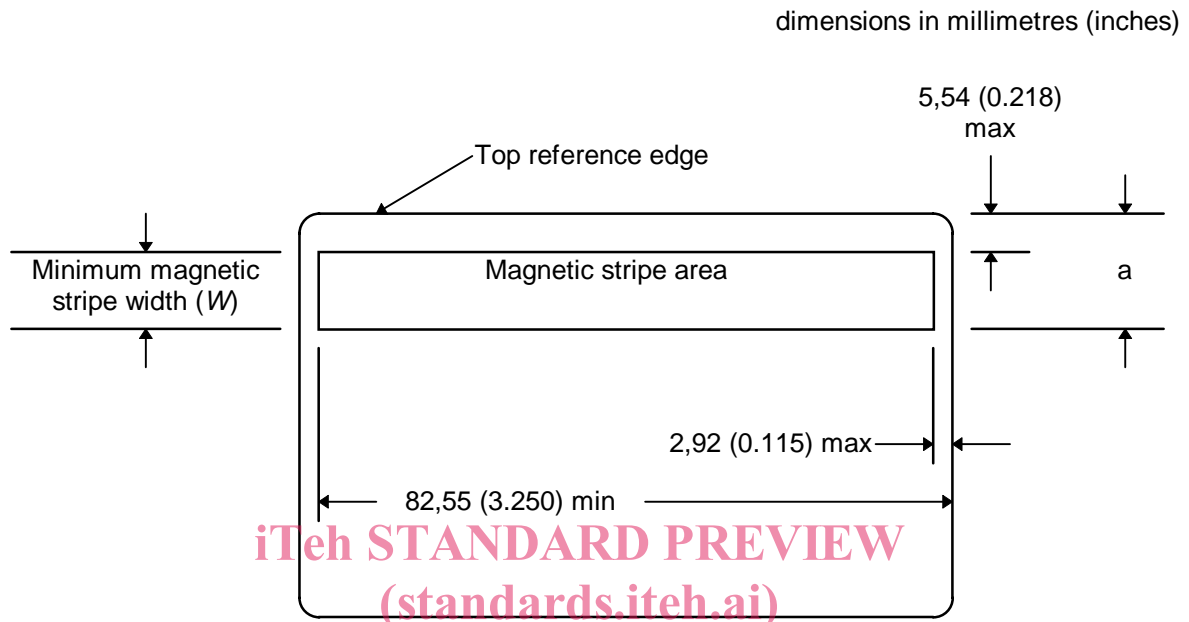
For use of tracks 1 and 2:   a = 11,89 (0.468) min
For use of tracks 1, 2, and 3:   a = 15,95 (0.628) min

NOTE   In the case of the magnetic stripe area used for track 1 and 2, the dimension a as shown in Figure 2 of the magnetic media could be less than the maximum dimension b as shown in Figure 11 for the location of track 2 data on the card. It is desirable that the magnetic stripe area extend beyond the limits of the encoded track.

Figure 2 — Location of magnetic material for ID-1 type card

6.1.1 Surface profile of the magnetic stripe area

The maximum vertical deviation (a) of the transverse surface profile of the magnetic stripe area is shown below. See Figures 3, 4, and 5. The slope of the surface profile curve shall be limited to: -4a/W < slope < 4a/W

When the bending stiffness value (see ISO/IEC 7810) for the card is 20 mm or more then the surface profile limits are:

Minimum stripe width	As shown in Figure 3A	As shown in Figure 3B
W = 6,35 mm (0.25 in)	a ≤ 9,5 µm (375 µin)	a ≤ 5,8 µm (225 µin)
W = 10,28 mm (0.405 in)	a ≤ 15,4 µm (607 µin)	a ≤ 9,3 µm (365 µin)

When the bending stiffness value (see ISO/IEC 7810) for the card is less than 20 mm then the surface profile limits are:

Minimum stripe width	As shown in Figure 3A	As shown in Figure 3B
W = 6,35 mm (0.25 in)	a ≤ 7,3 µm (288 µin)	a ≤ 4,5 µm (175 µin)
W = 10,28 mm (0.405 in)	a ≤ 11,7 µm (466 µin)	a ≤ 7,3 µm (284 µin)

A   B
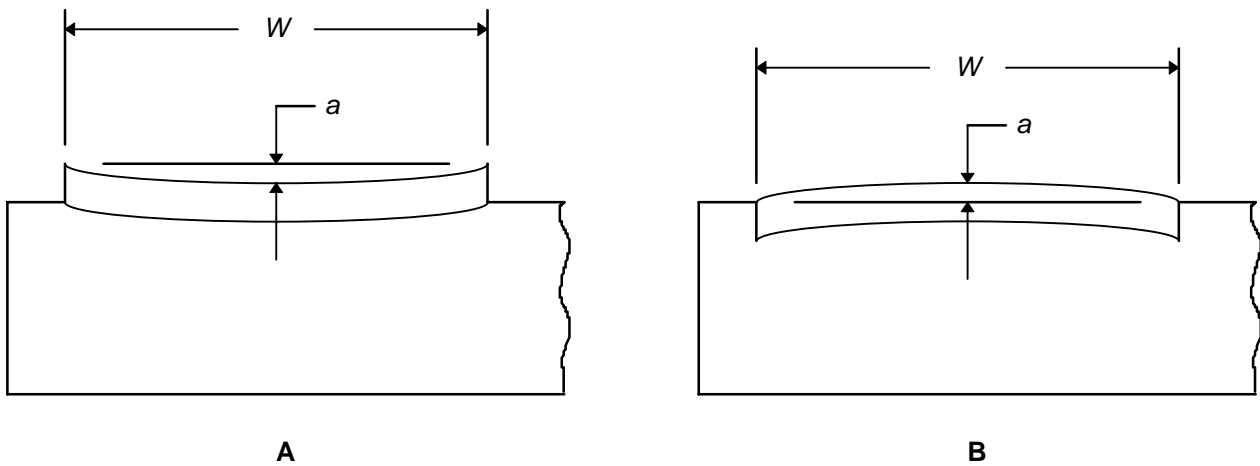
Figure 3 — Surface profile

Permitted   Not permitted

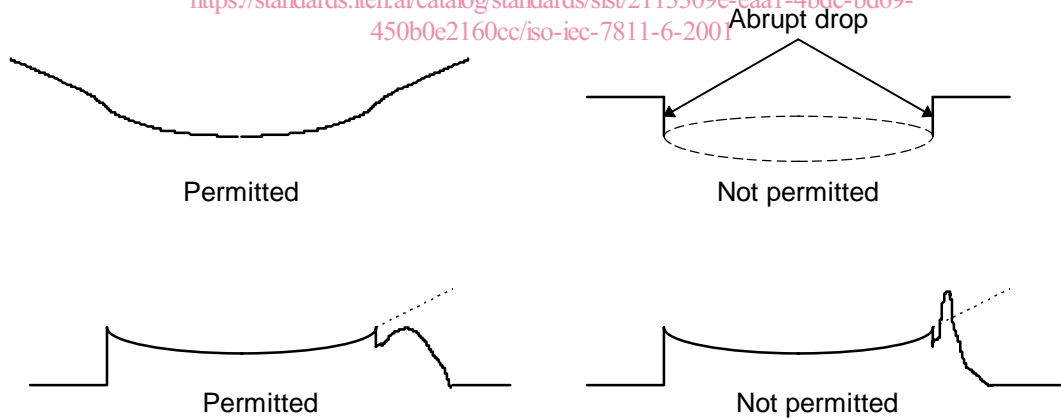Permitted   Not permitted

Figure 4 — Surface profile examples

Irregular profiles as shown may result in poor quality encoding.

Figure 5 — Irregular surface profile examples