
Information technology — Magnetic stripes on savingsbooks

Technologies de l'information — Zone magnétique des livrets d'épargne

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](http://www.iso.org/foreword)

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 8484:2007) which has been technically revised with the following changes:

- The primary standard cards held by Q-Card are used to calibrate the manufacture of secondary reference cards. Other primary standard cards held by PTB and Card testing International (CTI) are used as backup to replace cards held by Q-Card as they wear out.
- The supplier of secondary reference cards has changed from PTB to Q-Card. Wherever possible, the terms and definitions, criteria and test methods have been taken from ISO/IEC 7811-2.

Most of the magnetic characteristics are based on ISO/IEC 7811. Because savingsbooks are generally paper-based documents, some criteria and test methods have been taken from ISO/IEC 15457-2.

Notes in this International Standard are only used for giving additional information intended to assist in the understanding or use of the International Standard and do not contain provisions or requirements to which it is necessary to conform in order to be able to claim compliance with this International Standard.

NOTE Numbers for signal amplitude and flux transition spacing variation are taken from ISO/IEC 7811-2 and ISO/IEC 15457-2 and are based on testing performed on sample passbooks at two test facilities.

Information technology — Magnetic stripes on savingsbooks

1 Scope

This International Standard specifies the characteristics and location of a magnetic stripe on a savingsbook as defined in [Clause 4](#) and the use of such savingsbooks for international interchange. Compatibility with international interchange systems is provided through the requirements of this International Standard, enabling a savingsbook with a magnetic stripe to be read and possibly encoded in a device that is compatible with reading identification cards used in international interchange.

This International Standard specifies requirements for a magnetic stripe (including any protective overlay) on a savingsbook, the encoding technique, and coded character sets. It also specifies the characteristics of the savingsbook cover such as stiffness, minimum size, surface irregularities, roughness, and interaction between the cover material and the magnetic stripe. It takes into consideration both human and machine aspects and states minimum requirements.

Coercivity influences many of the quantities specified in this International Standard but is not itself specified. Exposure of the savingsbook to a magnetic field is likely to destroy the recorded data.

This International Standard defines performance criteria for savingsbooks. No consideration is given within this International Standard to the amount of use, if any, experienced by the savingsbook prior to test. Failure to conform to specified criteria will be negotiated between the involved parties.

ISO/IEC 10373-2 specifies the test procedures used to check savingsbooks against the parameters specified in this International Standard. References in the test method to cards refer to savingsbooks.

NOTE 1 Numeric values in the SI and/or Imperial measurement system in this International Standard might have been rounded off and are therefore consistent with, but not exactly equal to, each other. Either system can be used, but the two are not to be intermixed or reconverted. The original design was made using the Imperial measurement system.

NOTE 2 National systems can use different specifications, such as DIN, as well as proprietary specifications for closed systems.

2 Conformance

A savingsbook is in conformance with this International Standard if it meets all mandatory requirements specified herein. Default values apply if no others are specified.

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2493, *Paper and board — Determination of resistance to bending*

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

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

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1 primary standard

set of reference cards established by Physikalisch-Technische Bundesanstalt (PTB) and maintained by PTB, Q-Card, and WG1 secretariat that represent the values of U_R and I_R designated RM 7811-2

4.2 secondary standard

reference card designated RM 7811-2 that is related to the primary standard as stated in the calibration certificate supplied with each card

Note 1 to entry: Secondary standards can be ordered from Q-Card, 301 Reagan St., Sunbury, PA 17801, USA. The source of secondary standards will be maintained at least until 2018.

4.3 unused unencoded savingsbook

savingsbook 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 a 48 h exposure to daylight at temperatures between 5 °C and 30 °C and a humidity between 10 % and 90 % without experiencing thermal shock

4.4 unused encoded savingsbook

unused unencoded savingsbook (4.3) that has only been encoded with all the data required for its intended purpose (e.g. magnetic encoding, electronic encoding)

4.5 returned savingsbook

unused encoded savingsbook (4.4) after it has been issued to the savingsbook 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 4](#)

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} = recording current corresponding to 3,5 F_R

I_{\max} = recording current corresponding to 5,0 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

Note 1 to entry: It is expressed in bits/mm or bpi.

4.15**bit cell**distance between two clocking flux transitions as shown in [Figure 8](#)**4.16****subinterval**distance that is nominally half of the distance between two clocking flux transitions as shown in [Figure 8](#)**4.17****savingsbook**

bound and folded document comprising at least a front and back cover, usually made of paper-based materials, for identifying its holder and issuer, and which may carry data required as input for the intended use for transactions based thereon

4.18**normal use**use as a *savingsbook* ([4.17](#)), involving equipment processes appropriate to the savingsbook technology and storage as a personal document between equipment processes**5 Physical characteristics of the savingsbook cover**

Before testing is carried out, the savingsbook shall be stored for a minimum of 24 h in an environment with a temperature of $23\text{ °C} \pm 2\text{ °C}$ and relative humidity of $(50 \pm 10)\%$. Testing shall be carried out in the same environment, or as specified in ISO/IEC 10373-2. Unused encoded savingsbooks shall conform to the following characteristics.

A savingsbook with magnetic stripe shall remain usable under the following conditions:

temperature 5 °C to 40 °C

relative humidity 20% to 80%

non-condensing maximum wet bulb temperature 25 °C

WARNING — The attention of savingsbook 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 sides of the savingsbook back cover in the area shown in [Figure 1](#) that might interfere with the contact between the magnetic head and magnetic stripe.

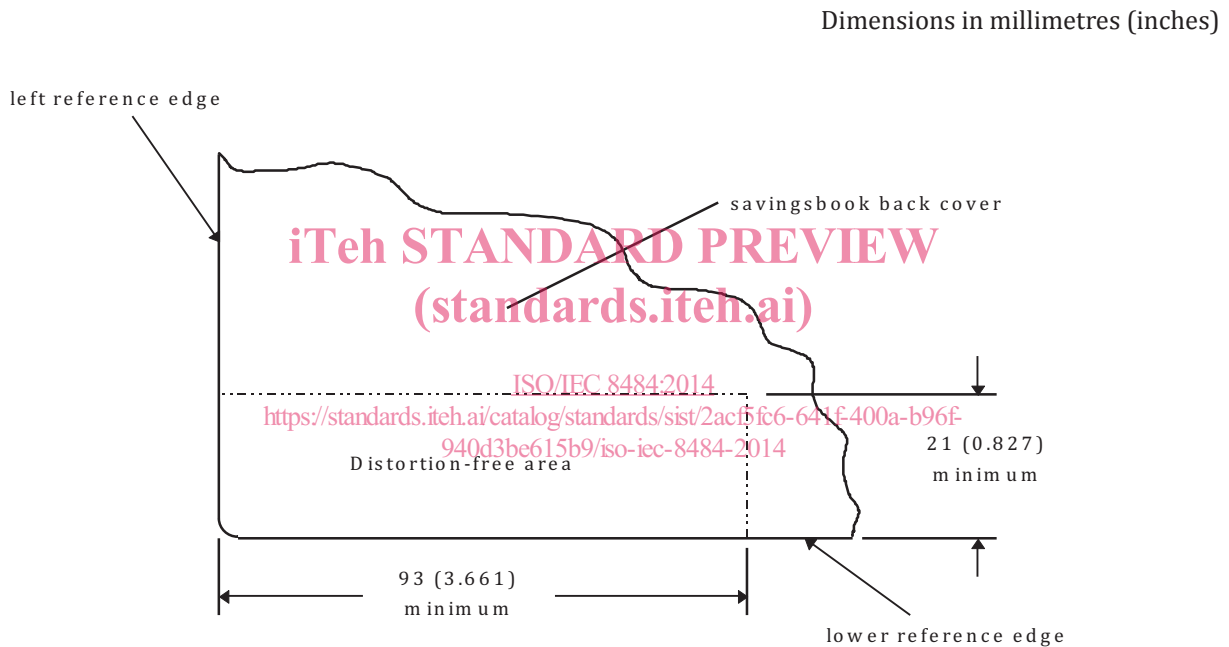


Figure 1 — Distortion-free area on savingsbook with magnetic stripe

Labels or other attachments located on the front or back of the savingsbook cover shall be outside of the distortion-free area.

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

5.3 Stiffness

The bending moment shall be greater than or equal to 0,032 N in the direction of the magnetic stripe (parallel to the lower reference edge) according to the bending moment method specified in ISO 2493.

NOTE The original test method was based on Tappi T489 os-76, which is now obsolete. According to this test method the arm is 50 mm long and the speed was 210 ± 20 degrees/minute. The requirement for the Tappi method was 0,0016 Nm which converts to 0,032 N = 1,6 Nmm / 0,05 m.

5.4 Materials

After the magnetic stripe has been placed on the savingsbook cover, there shall be no reaction between the cover materials (both front and back) and the magnetic stripe that could cause any malfunction of the magnetic stripe in normal use.

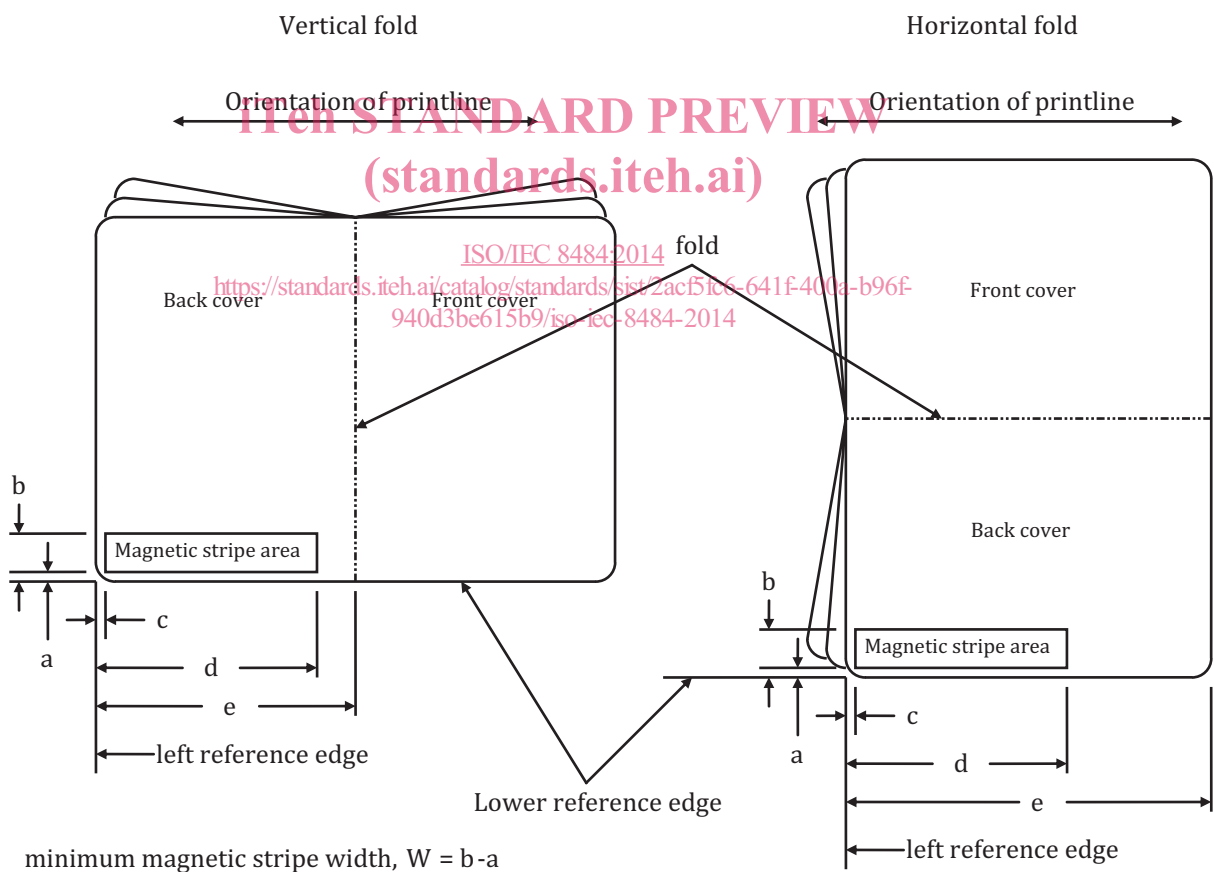
6 Physical characteristics of the magnetic stripe

6.1 Location

The magnetic stripe area shall be located on the outside of the savingsbook back cover as shown in [Figure 2](#).

If the reader/encoder is integrated into a savingsbook printer, the magnetic stripe shall be parallel to the printline. In applications where a separate reader/encoder is used, it is generally preferable to have the magnetic stripe parallel to the fold irrespective of the type of savingsbook used. See [Figure 2](#).

Dimensions in millimetres (inches)



a	b	c	d	E
maximum	minimum	maximum	minimum	Minimum
5 (0,197)	19 (0,748)	2,9 (0,114)	90 (3,543)	100 (3,937)

Figure 2 — Location of magnetic material for savingsbook

NOTE This area is based on the magnetic stripe area defined by ISO/IEC 7811-2 for tracks 1, 2, and 3.

6.2 Surface profile of the magnetic stripe area

The maximum vertical deviation (a) of the transverse surface profile of the magnetic stripe area shall be less than or equal to 8 μm (315 μin). See [Figure 3](#).

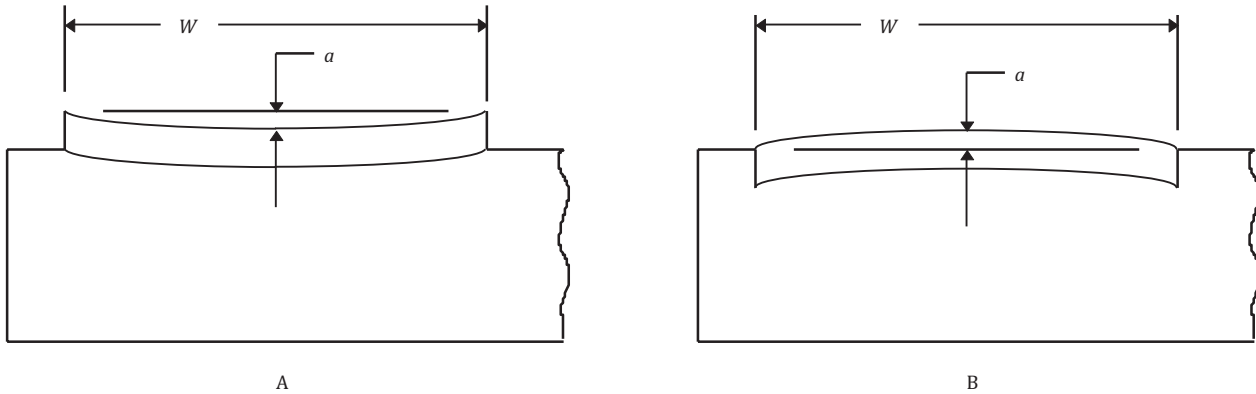


Figure 3 — Surface profile

6.3 Height of the magnetic stripe area

The vertical deviation (h) of the magnetic stripe area relative to the adjacent surface of the savingsbook shall be less than 0,102 mm (4000 μin).

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6.4 Surface roughness

The surface roughness, R_a , of the magnetic stripe area shall be less than or equal to 1,4 μm (55.2 μin) in both the longitudinal and transverse directions when measured according to ISO 4287.

6.5 Adhesion of stripe to savingsbook

The stripe shall not separate from the savingsbook under normal use.

6.6 Resistance to environment

The magnetic stripe shall resist deterioration from exposure to light and other environmental factors encountered in normal use.

7 Performance characteristics for the magnetic material

7.1 General

The purpose of this clause is to enable magnetic interchangeability between savingsbook and processing systems. Media coercivity is not specified. Media performance criteria, regardless of coercivity, are specified in [7.3](#).

This method uses a reference card whose material is traceable to the primary standard (see [Clause 4](#)). All signal amplitude results from the use of the secondary reference card must be corrected by the factor supplied with the secondary reference card.

7.2 Testing and operating environment

The testing environment for signal amplitude measurements is 23 °C ± 3 °C (73 °F ± 5 °F) and 40 % to 60 % relative humidity. When tested under otherwise identical conditions, the average signal amplitude measured at 8 ft/mm (200 ftpi) shall not deviate from its value in the above test environment by more than 15 % after 5 min exposure over the following operating environment range:

temperature -35 °C to 50 °C (-31 °F to 122 °F)

relative humidity 5 % to 95 %

7.3 Signal amplitude requirements for magnetic media

The requirements for recording characteristics of the savingsbook are shown in [Table 1](#), [Figure 4](#), and [Figure 5](#).

Table 1 — Signal amplitude requirements for unused unencoded savingsbooks

Description	Density ft/mm (ftpi)	Test recording current	Signal amplitude result	Requirement
Signal amplitude	8 (200)	I_{min}	U_{A1}	$0,8 U_R \leq U_{A1} \leq 1,3 U_R$
Signal amplitude	8 (200)	I_{min}	U_{i1}	$U_{i1} \leq 1,36 U_R$
Signal amplitude	8 (200)	I_{max}	U_{A2}	$U_{A1} \geq U_{A2} \geq 0,8 U_R$
Signal amplitude	20 (500)	I_{max}	U_{i2}	$U_{i2} \geq 0,65 U_R$
Resolution	20 (500)	I_{max}	U_{A3}	$U_{A3} \geq 0,7 U_{A2}$
Erasure	0	$I_{min, DC}$	U_{A4}	$U_{A4} \leq 0,03 U_R$
Extra pulse	0	$I_{min, DC}$	U_{i4}	$U_{i4} \leq 0,05 U_R$

The slope of the saturation curve shall never be positive between I_{min} and I_{max} .

NOTE 1 It is not permissible to combine the above requirements mathematically. These values are for unencoded savingsbooks tests and are not applicable for encoded savingsbooks.

NOTE 2 It has been observed that low resolution as measured per [Table 1](#) can correlate with high flux transition spacing variation as measured per [Table 2](#).

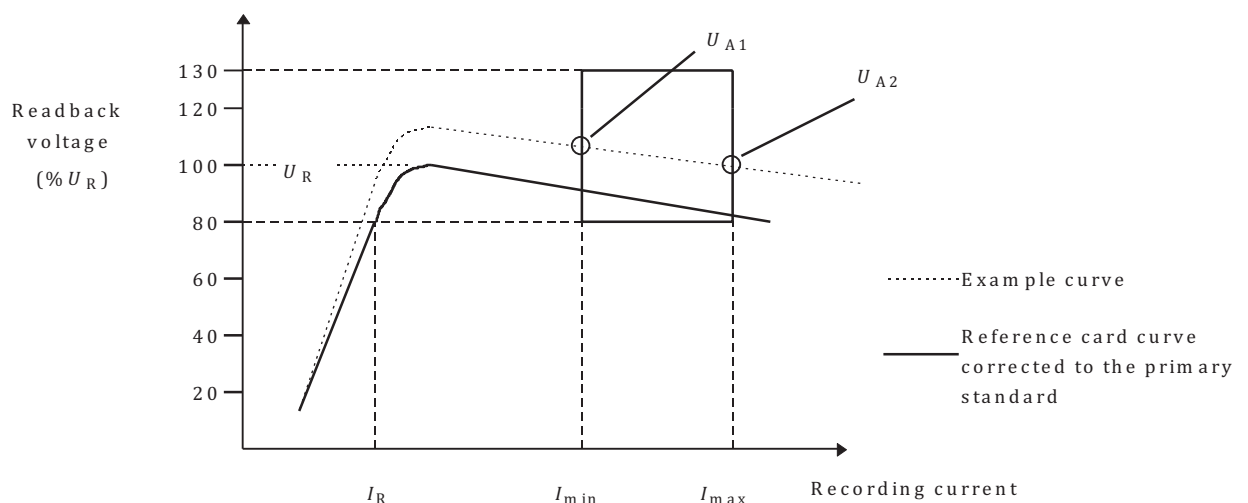


Figure 4 — Saturation curve example showing tolerance area at 8 ft/mm (200 ftpi)