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Magnetic stripes on savingsbooks

Zone magnétique des livrets d'épargne

Reference number
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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 8484 was prepared by Technical Committee ISO/TC 97, *Information processing systems.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Magnetic stripes on savingsbooks

0 Introduction

This International Standard specifies the characteristics and position of a magnetic stripe on a savingsbook that is used in interchange. Compatibility with international interchange systems is provided through the requirements of this International Standard, enabling a magnetic striped savingsbook to be read and possibly encoded in a device that is compatible with reading identification cards used in international interchange. National systems may use different specifications.

1 Scope and field of application

This International Standard specifies the location, dimensions, electromagnetic properties, recording characteristics, character coding and character set of magnetic stripes on savingsbooks used in interchange. This International Standard describes features of the savingsbook cover i.e. stiffness, minimum dimensions, surface irregularities, roughness as well as the interaction between cover material and magnetic stripe.

This International Standard does not include requirements for the contents of recording or use of certain control characters.

2 References

ISO 7811, *Identification cards — Recording technique —*

Part 2 : Magnetic stripe.

Part 5 : Location of read-write magnetic track — Track 3.

TAPPI T489 os-76, *Stiffness of Paperboard.* [1)]

3 Definitions

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

3.1 magnetic stripe : Magnetic material in the shape of a stripe, on which signals can be stored electromagnetically.

3.2 reference medium : A card the size of a savingsbook with a magnetic stripe[2)], consisting of secondary standard magnetic tape (Computer amplitude reference SRM 3200; see ISO 7811-2).

3.3 typical field : The minimum recording field that causes under the given test conditions a signal amplitude equal to 95 % of the maximum signal amplitude.

3.4 reference field : The typical field of the reference medium.

3.5 test recording current : The recording current between 200 % and 220 % of the current which is required to produce the reference field at a recording density of 16,5 ftpmm (420 ftpin).

3.6 average signal amplitude : The average peak-to-peak amplitude of the read signal at 16,5 ftpmm (420 ftpin), averaged over the total recording.

3.7 reference signal amplitude : The average signal amplitude of the reference medium when recorded with the test recording current.

3.8 individual signal amplitude : The peak-to-peak amplitude, not averaged, of the read signal at 16,5 ftpmm (420 ftpin).

3.9 location of a flux transition : The position of the maximum flux change on the surface of the magnetic stripe.

3.10 recording area : The area of the magnetic stripe on which data may be recorded.

3.11 drop-in : A read signal which, when measured base to peak, exceeds 10 % of half the reference signal amplitude.

1) This standard is available from : Technical Secretary, Technical Association of the Pulp and Paper Industry, 360 Lexington Avenue, New York 10017, USA.

2) One reference medium source is : Fleischhauer Datenträger GmbH & Co. KG, Hansastr. 41, D-4630 Bochum 6; Germany F.R.

4 Location of magnetic stripe

The magnetic stripe shall be located on the outside of the back cover of the savingsbook. Two positions are defined relative to one corner and the adjacent edges (see figure 1).

4.1 Parallel to printline

If the reader-encoder is integrated into a savingsbook printer, the magnetic stripe shall be parallel to the printline (see figure 1).

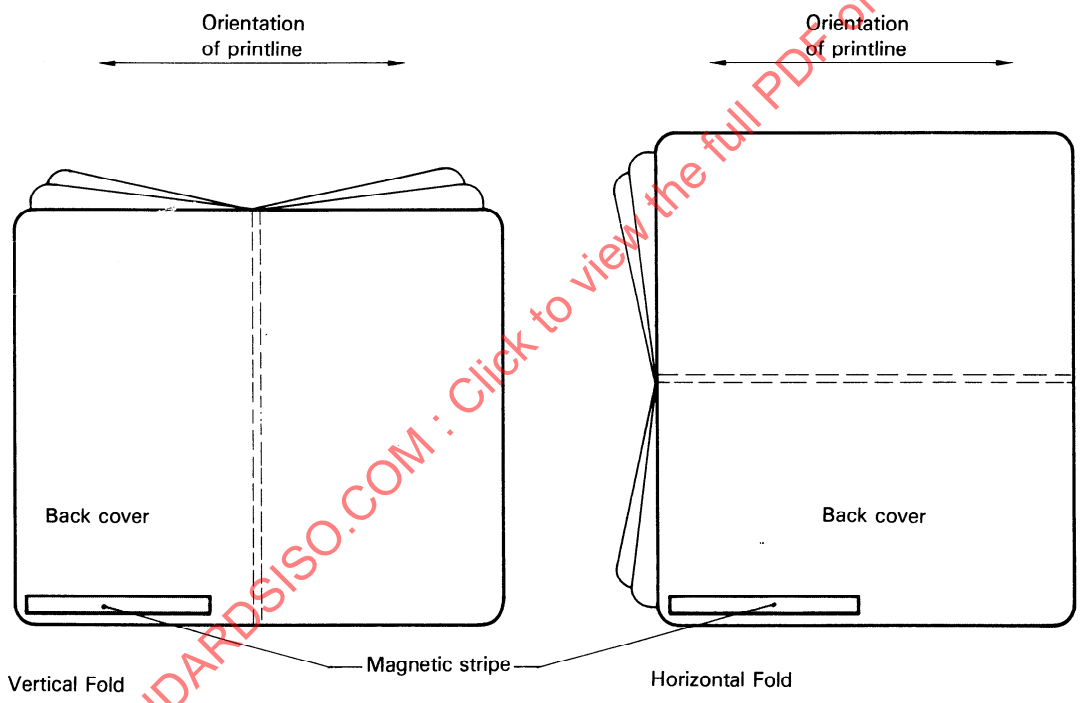


Figure 1 — General location of magnetic stripe on savingsbooks

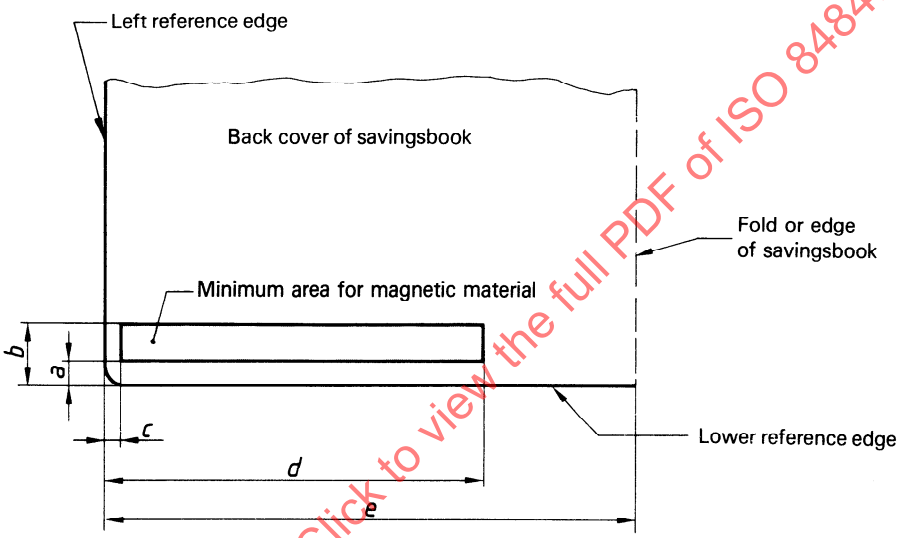
4.2 Parallel to fold

In applications where a separate reader-encoder is used, it is generally preferable to have the stripe parallel to the fold, irrespective of the type of savingsbook used.

5 Area of magnetic material

The minimum area to be covered by magnetic material shall be as shown in figure 2.

NOTE — This area is based on the use of a read-write track equivalent to track 3 on an identification card.



a max.		*b* min.		*c* max.		*d* min.		*e* min.	
mm	in	mm	in	mm	in	mm	in	mm	in
5	0.197	19	0.748	2,9	0.114	90	3.54	100	3.94

Figure 2 — Minimum area of magnetic material

6 Requirements and testing

Before testing is carried out, the savingsbook shall be stored for a minimum of 24 h in an environment with a temperature of 23 ± 2°C and relative humidity of 50 ± 10 %. Testing shall be carried out in the same environment. All signal amplitude measurements shall be performed in such a way that the values measured are proportional to the voltage induced in the read head.

Prior to issue all savingsbooks shall satisfy the following requirements :

6.1 Properties of the savingsbook cover with magnetic stripe

6.1.1 Stiffness

For the determination of stiffness the bending moment is used. In the direction of the magnetic stripe the bending moment shall be not less than 16×10^{-4} N·m when tested in accordance with TAPPI T489 os-76.

6.1.2 Irregularities of the savingsbook cover in the area of the magnetic stripe

There shall be no deformation, unevenness, or irregularities on the surface, in the area shown in figure 3, which would interfere with the magnetic stripe or its designed function or which come in mechanical contact with the magnetic head.

6.1.3 Roughness of the magnetic stripe surface

The average roughness R_a of the magnetic stripe surface shall be measured in the longitudinal and transverse direction. Measurements shall be made with a cut-off wavelength of 0,8 mm (0.030 in) using a probe with a nominal radius of 2,5 µm (100 µin). The average roughness shall not be more than 1,4 µm (55,1 µin).

6.1.4 Cover material

After the magnetic stripe has been placed on the savingsbook cover, there shall be no reaction between the cover and the magnetic stripe which would cause any malfunction of the magnetic stripe in normal use. The magnetic stripe shall not separate from the savingsbook cover under normal use.

6.2 Electromagnetic properties

The reference medium is used to compare the properties of different savingsbooks with magnetic stripes and for the adjustment of devices which use them.

The individual signal amplitudes of the reference medium shall be from 90 % to 110 % of the reference signal amplitude. All measurements shall be made in the recording area during the first read pass after recording with the test recording current.

6.2.1 Nominal density of flux transitions

The nominal density of flux transitions shall be 16,5 ftpmm (420 ftpin).

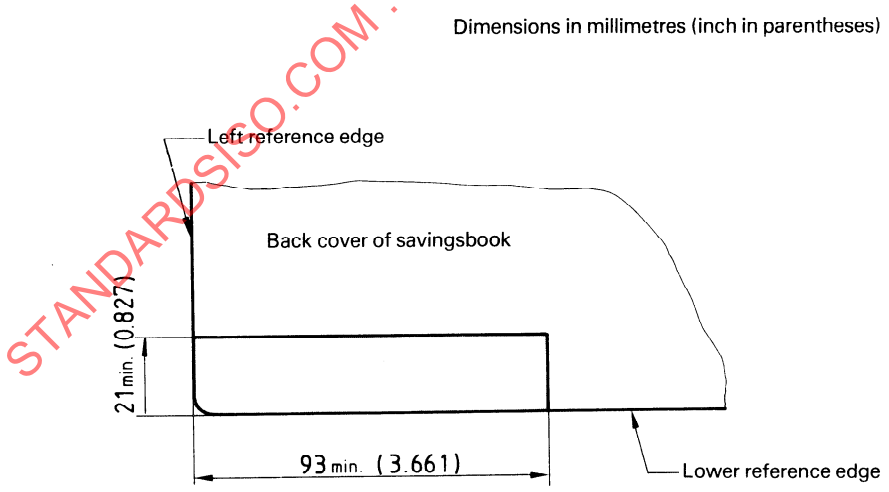


Figure 3 — Area free of irregularities

6.2.2 Typical field

The typical field of the magnetic stripe under test shall be from 80 % to 120 % of the reference field.

6.2.3 Average signal amplitude

The average signal amplitude shall be from 80 % to 145 % of the reference signal amplitude, as shown in figure 4.

6.2.4 Individual signal amplitude

All individual signal amplitudes shall be from 60 % to 160 % of the reference signal amplitude, as shown in figure 4.

6.2.5 Erasability

The magnetic material shall be capable of being erased to a signal level of 4 % or less of its average signal amplitude by a direct write current equal to 200 % of the current which produces the reference field.

6.2.6 Test for drop-ins

After the magnetic stripe has been erased with a direct current equal to the test recording current, any read signal which, when measured base-to-peak, exceeds 10 % of half the reference signal amplitude is a drop-in.

The test shall be performed across the nominal track width and along the length of the magnetic stripe. During the test the signal amplitude of the magnetic stripe and the reference signal amplitude shall be measured under the same conditions on the first read pass after write.

A magnetic stripe is unacceptable if it shows at least one drop-in during the tests.

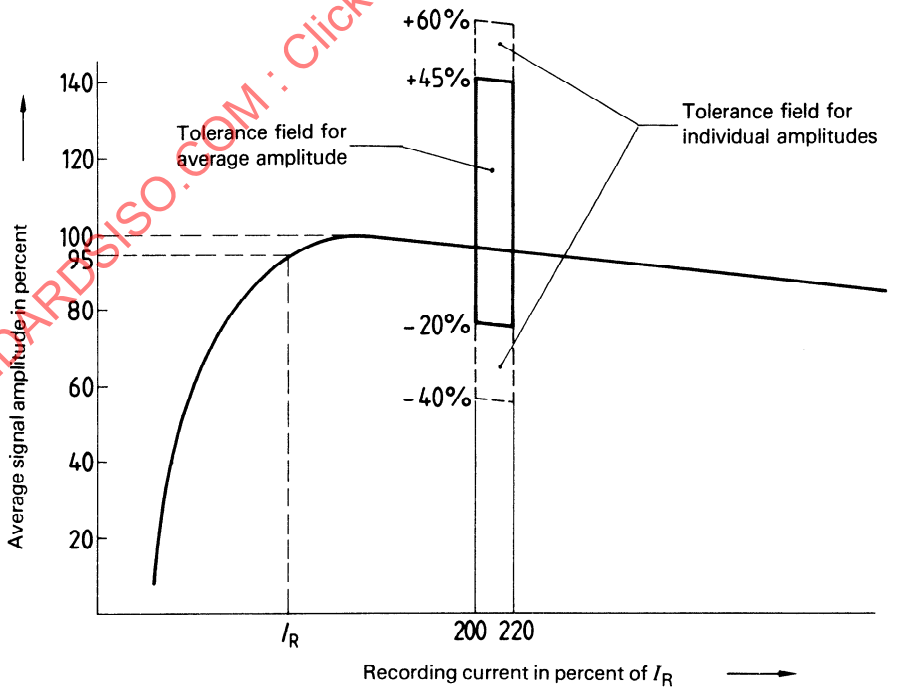
7 Operating environment

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

temperature : 5 to 40° C

relative humidity : 20 % to 80 %

maximum wet bulb temperature : 25° C



I_R = Current which produces the reference field

Figure 4 — Saturation curve of reference medium and tolerance area

8 Recording characteristics

8.1 Position of track

The minimum width of the recording shall be 2,8 mm (0.110 in). The area between two parallel lines 12,5 mm (0.493 in) and 15,3 mm (0.603 in) from the lower reference edge shall be covered completely by the recording.

8.2 Recording area

The direction of recording shall be from the left reference edge to the right. The recording area shall begin 9,5 mm (0.374 in) and end 85,0 mm (3.346 in) from the left reference edge.

For each new recording the whole recording area shall be re-recorded and areas not used for data or control characters shall be filled with zero-bits.

The total recording located within the recording area shall begin and end with a minimum of 20 zero-bits for synchronization purposes.

The recording area shall accommodate a maximum number of 108 characters of 5-bit groups in addition to the synchronization bits. This includes any duplicate recording and inter-record gap(s).

NOTE — The layout of the recording, for example number of characters, number of records, definition of gap between records etc. should be specified in a separate application standard. The same applies for the contents of the records.

8.3 Orientation of magnetic head

When the read gap of the magnetic head is adjusted for maximum read signal amplitude, the angle between the lower reference edge and the centreline of the read gap shall be $90° \pm 0,7°$.

8.4 Method of recording

The recording technique used shall be two-frequency coherent phase recording (see ISO 7811-2).

8.5 Bit density

The average bit density shall be $8,3 \pm 5$ % bits/mm (210 ± 5 % bits/inch), measured in longitudinal direction parallel to the lower reference edge. The distance between adjacent flux transitions is $0,121 \pm 0,010$ mm ($4\,762 \pm 381$ µin) for a "zero" and $0,060 \pm 0,006$ mm ($2\,381 \pm 238$ µin) for a "one".

9 Character coding and character set

Character coding shall be a 5-bit-code (4 bits plus parity bit), starting with the lowest bit and ending with the parity bit.

The bit assignments of the characters 0 to 9 and the control characters are given in the table.

10 Error recognition

Each character shall be supplemented with a parity bit to odd parity.

The end sentinel shall be followed by an LRC-Character (LRC = Longitudinal Redundancy Check). This LRC-character supplements all bits of the same value within the record to even parity. The LRC-character itself shall be supplemented to odd parity.

Table — Character set and coding

Bits					Line	Character
P	b_4	b_3	b_2	b_1		
1	0	0	0	0	0	0
0	0	0	0	1	1	1
0	0	0	1	0	2	2
1	0	0	1	1	3	3
0	0	1	0	0	4	4
1	0	1	0	1	5	5
1	0	1	1	0	6	6
0	0	1	1	1	7	7
0	1	0	0	0	8	8
1	1	0	0	1	9	9
1	1	0	1	0	10	a
0	1	0	1	1	11	a
1	1	1	0	0	12	a
0	1	1	0	1	13	b
0	1	1	1	0	14	c
1	1	1	1	1	15	d

a : Reserved for hardware control only
b : Start sentinel
c : Separator
d : End sentinel

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