BS ISO/IEC 10373-2:2015

BSI Standards Publication

Identification cards — Test methods

Part 2: Cards with magnetic stripes

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National foreword

This British Standard is the UK implementation of ISO/IEC 10373-2:2015. It supersedes BS ISO/IEC 10373-2:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/17, Cards and personal identification.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL STANDARD

ISO/IEC 10373-2

Third edition
2015-01-15

Identification cards — Test methods —

Part 2: Cards with magnetic stripes

Cartes d'identification — Méthodes d'essai —

Partie 2: Cartes à bandeaux magnétiques

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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 document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 10373-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology,* Subcommittee SC 17, *Cards and personal identification.*

This third edition cancels and replaces the second edition (ISO/IEC 10373-2:2006), which has been technically revised. It also incorporates the Technical Corrigendum ISO/IEC 10373-2:2006/Cor1:2010.

The user is encouraged to review the entire standard for revisions and updates. The major changes made during this revision are listed below.

— References to ISO/IEC 7811-8 and ISO/IEC 8484 were added.

— Calibration of reference current for ISO/IEC 7811-2 has been added. This will result in a small offset in requirements from the existing 2006 edition but will be equivalent to the requirements as written originally.

— Test densities of 500 ftpi have been changed to 508 ftpi to more closely agree with actual values used.

— Requirements that are different for different base standards have been moved into tables in most cases.

— In 5.5.2.3, Note 2 contained a normative requirement so it was moved out of note.

— The 2 cases of Figure 14 have been combined and a table was given. Conflicting symmetry requirements were resolved by taking T1 = T2 ± 0,02 T1.

— Description of correcting reference values was clarified and terms were deleted since these were not used. Reference to older editions of base standards was deleted.

— Contents of the technical corrigendum have been incorporated.

ISO/IEC 10373 consists of the following parts, under the general title *Identification cards — Test methods*:

— *Part 1: General characteristics*

— *Part 2: Cards with magnetic stripes*

— *Part 3: Integrated circuit cards with contacts and related interface devices*

— *Part 5: Optical memory cards*

— *Part 6: Proximity cards*

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— *Part 7: Vicinity cards*

— *Part 8: USB-ICC*

— *Part 9: Optical memory cards — Holographic recording method*

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INTERNATIONAL STANDARD ISO/IEC 10373-2:2015(E)

Identification cards — Test methods —

Part 2: Cards with magnetic stripes

1 Scope

ISO/IEC 10373 defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, for example ISO/IEC 7810, or one or more of the supplementary standards that define the information storage technologies employed in identification card applications.

This part of ISO/IEC 10373 defines test methods which are specific to magnetic stripe technology.

NOTE 1 Criteria for acceptability do not form part of this part of ISO/IEC 10373 but will be found in the International Standards mentioned above.

NOTE 2 Test methods described in this part of ISO/IEC 10373 are intended to be performed separately. A given card is not required to pass through all the tests sequentially.

2 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 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 2409, *Paints and varnishes — Cross-cut test*

ISO 3274, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments*

ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

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

ISO/IEC 7811-2, *Identification cards — Recording technique — Part 2: Magnetic stripe — Low coercivity*

ISO/IEC 7811-6, *Identification cards — Recording technique — Part 6: Magnetic stripe — High coercivity*

ISO/IEC 7811-7, *Identification cards — Recording technique — Part 7: Magnetic stripe — High coercivity, high density*

ISO/IEC 7811-8, *Identification cards — Recording technique — Part 8: Magnetic stripe — Coercivity of 51,7 kA/m (650 Oe)*

ISO/IEC 8484, *Information technology — Magnetic stripes on savingsbooks*

IEC 60454-2, *Pressure-sensitive adhesive tapes for electrical purposes — Part 2: Methods of test*

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3 Terms and definitions

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

NOTE Static magnetic characteristics definitions were originally derived from IEC 50–221 (which has been replaced by IEC 60050–221) and ISO 31-5:1992 (which has been replaced by IEC 80000–6).

3.1
test method
method for testing characteristics of identification cards for the purpose of confirming their compliance with International Standards

3.2
testably functional
has survived the action of some potentially destructive influence to the extent that

a) any magnetic stripe present on the card shows a relationship between signal amplitudes before and after exposure that is in accordance with the base standard

b) any integrated circuit(s) present in the card continue to show an Answer to Reset response[1)] which conforms to the base standard

c) any contacts associated with any integrated circuit(s) present in the card continue to show electrical resistance and impedance which conform to the base standard

d) any optical memory present in the card continues to show optical characteristics which conform to the base standard

e) any contactless integrated circuit(s) in the card continue to operate as intended

3.3
warpage
deviation from flatness

3.4
flux transitions per millimetre
ft/mm
linear recording density applied to a track on a magnetic stripe

3.5
recording
creating a track of flux reversals according to a test method given in this part of ISO/IEC 10373, with the values of all applicable test parameters specified

3.6
encoding
creating a track of flux reversals whose spacing is modified, according to a coding scheme, to represent data

3.7
surface roughness
surface topology of an area of surface, qualified in the International Standards by reference to various resolution determinants and methods of calculation

3.8
amplitude measurements
⟨magnetic stripe⟩ measurement of read-back signal amplitude according to a test method given in this part of ISO/IEC 10373, with the values of all applicable test parameters specified

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1) This part of ISO/IEC 10373 does not define any test to establish the complete functioning of integrated circuit(s) cards. The test methods require only that the minimum functionality (testably functional) be verified. This can, in appropriate circumstances, be supplemented by further application-specific functionality criteria which are not available in the general case.

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3.9
flux transition spacing variation
deviation from nominal of measured values of the distance between adjacent flux transitions along a line parallel to the centreline of the encoded track

3.10
magnetic stripe adhesion
strength of the bond between the magnetic stripe and the card

3.11
normal use
use as an identification card according to ISO/IEC 7810, involving equipment processes appropriate to the card technology and storage as a personal document between equipment processes

3.12
static saturation *M(H)* loop
normal hysteresis loop for which the magnetic field strength is cycled between the extremes $-H_{max}$ to $+H_{max}$ at such a low rate of change that the loop is not influenced by the rate of change

3.13
coercivity
$H'_{cM} = H'_{cJ}$
continuously applied magnetic field which reduces the magnetization to zero from a previously saturated state in the opposite direction, measured parallel to the longitudinal axis of the stripe

3.14
remanent coercivity
H_r
applied magnetic field which when removed returns the material to a zero magnetization state from a previously saturated state in the opposite direction, measured parallel to the longitudinal axis of the stripe

3.15
Oersted
Oe
Gaussian CGS unit of magnetic field strength which is commonly used in the magnetic recording industry, equal to approximately 79,578 A/m

3.16
static demagnetization
S_{160}
reduction in magnetization under the influence of an opposing magnetic field; characterised by $[M_r - M^+(-160)] \div M_r$; the average slope of the "demagnetization" quadrant of the static saturation $M(H)$ loop between magnetic field strength values of $H = 0$ and $H = -160$ kA/m

3.17
squareness
SQ
ratio of M_r, the value of magnetization (M) at zero magnetic field strength ($H = 0$), to $M(H_{max})$, the value of magnetization at H_{max} obtained from the static saturation $M(H)$ loop

3.18
longitudinal squareness
$SQ_{||}$
squareness of the medium measured parallel to the longitudinal axis of the magnetic stripe

3.19
perpendicular squareness
$SQ_{\perp}$
squareness of the medium measured perpendicular to the plane of the magnetic stripe

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3.20
switching field by derivative
SF_D
width at half height of the differentiated static magnetization curve $M(H)$ divided by the coercivity from the same curve

3.21
switching field by slope
SF_S
difference between the field values at the intercept of the static magnetization $M(H)$ loop, $M(H)$ of $0{,}5M_r$ and $M(H)$ of $-0{,}5M_r$, divided by the coercivity

3.22
angle of maximum squareness
$\Theta(SQ_{max})$
angle between the direction at which the maximum value of squareness is found and the longitudinal axis of the magnetic stripe

3.23
resolution
average signal amplitude at some specified higher recording density divided by the average signal amplitude at some specified lower recording density, multiplied by 100 and expressed as a percentage

3.24
U_{Fi}
magnitude of the individual element at specified frequency of the Fourier spectrum of the entire waveform of the stripe

4 Default items applicable to the test methods

4.1 Test environment

Unless otherwise specified, testing shall take place in an environment of temperature 23°C ± 3°C (73°F ± 5°F) and of relative humidity 40 % to 60 %.

4.2 Pre-conditioning

Where pre-conditioning is required by the test method, the identification cards to be tested shall be conditioned to the test environment for a period of 24 h before testing.

4.3 Selection of test methods

Tests shall be applied as required to test the attributes of the card defined by the relevant base standard.

4.4 Default tolerance

Unless otherwise specified, a default tolerence of ± 5 % shall be applied to the quantity values given to specify the characteristics of the test equipment (e.g. linear dimensions) and the test method procedures (e.g. test equipment adjustments).

4.5 Total measurement uncertainty

The total measurement uncertainty for each quantity determined by these test methods shall be stated in the test report.

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