INTERNATIONAL STANDARD

ISO/IEC 10373-1

Third edition
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Cards and security devices for personal identification — Test methods —

Part 1: General characteristics

Cartes et dispositifs de sécurité pour l'identification personnelle — Méthodes d'essai —

Partie 1: Caractéristiques générales

Reference number
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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.

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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 10373-1:2006), which has been technically revised. It also incorporates the Amendment ISO/IEC 10373-1:2006/Amd.1:2012. The main changes compared to the previous edition are as follows:

— three electrostatic discharge tests and the mechanical strength of contacts have been added;

— the ultraviolet light and static magnetic fields tests have been removed;

— the peel strength including the edge of the card test has been added; this test differs from the peel strength test by allowing layer bond strength measurement at the card edge and the middle area of the card;

— chemical lists have been revised into tables, which now include the base chemicals for Fuel B and artificial perspiration solutions (a normative reference was provided in the second edition);

— technical changes have been made to the dynamic bending stress calibration method and opacity measurement reporting;

— figures, tables and NOTEs have been revised to facilitate understanding of the tests;

— address for availability of optical reference (ORM7810) media has been changed;

— test methods have been refined and relaxed where technically appropriate.

A list of all parts in the ISO/IEC 10373 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The changes to the last version are a result of industry feedback, harmonisation of standards, and inter-laboratory studies (round robin studies) performed by experts from SC 17's Working Group 1. Additional information has been provided as NOTEs within the test methods

This document defines the ISO/IEC test methods for physical requirements of cards and security devices for personal identification and is utilised by other requirements and test methods. For example, the following ISO/IEC standards refer to this document for one or more test methods.

— ISO/IEC 7501 (all parts)

— ISO/IEC 7811 (all parts)

— ISO/IEC 7812 (all parts)

— ISO/IEC 7813

— ISO/IEC 7816 (all parts)

— ISO/IEC 10373 (all parts)

— ISO/IEC 10536 (all parts)

— ISO/IEC 11693 (all parts)

— ISO/IEC 11694 (all parts)

— ISO/IEC 11695 (all parts)

— ISO/IEC 14443 (all parts)

— ISO/IEC 15693 (all parts)

— ISO/IEC 18013 (all parts)

— ISO/IEC 18328 (all parts)

— ISO/IEC 18745 (all parts)

— ISO/IEC 24789 (all parts)

Cards and security devices for personal identification — Test methods —

Part 1: General characteristics

1 Scope

This document describes the test methods for characteristics of identification cards according to ISO/IEC 7810 and other standards, such as those listed in the Introduction.

NOTE 1 Criteria for acceptability do not form part of this document but are found in other International Standards including those mentioned in the introduction.

NOTE 2 Test methods described in this document 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/IEC 7810, *Identification cards — Physical characteristics*

ISO/IEC 7816-2, *Identification cards — Integrated circuit cards — Part 2: Cards with contacts — Dimensions and location of the contacts*

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

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*

IEC 60749-26, *Semiconductor devices — Mechanical and climatic test methods — Part 26: Electrostatic discharge (ESD) sensitivity testing — Human body model (HBM)*

ANSI/ESDA/JEDEC JS-002, *ESDA/JEDEC Joint Standard For Electrostatic Discharge Sensitivity Testing - Charged Device Model (CDM) - Device Level*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
test method
method for testing characteristics of identification cards for the purpose of confirming their compliance with International Standards

3.1.2
testably functional
having survived the action of some potentially destructive influence to the extent that any:

a) 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) integrated circuit connected to contacts continues to provide an Answer to Reset response which conforms to the *base standard* (3.1.13);

c) integrated circuit connected to an antenna continues to provide a response to an ATQA (Type A) or ATQB (Type B);

d) other integrated circuit continues to operate as intended;

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

Note 1 to entry: ISO/IEC 7816-2 defines the contacts.

Note 2 to entry: ISO/IEC 14443 (all parts) defines the antenna, ATQA and ATQB.

Note 3 to entry: ISO/IEC 7811 (all parts) defines the magnetic strip.

Note 4 to entry: ISO/IEC 11693 (all parts) defines the optical memory.

3.1.3
warpage
deviation from flatness

3.1.4
embossing relief height
local increase in the height of the card surface produced by the embossing process

3.1.5
peel strength
ability of a card to resist separation of adjacent layers of material in its structure

3.1.6
resistance to chemicals
ability of a card to resist degradation of its performance and appearance as a result of exposure to commonly encountered chemicals

3.1.7
dimensional stability
ability of a card to resist dimensional variation when exposed to defined temperatures and humidity

3.1.8
adhesion or blocking
tendency of cards to stick together when stacked

3.1.9
bending stiffness
ability of a card to resist bending

3.1.10
dynamic bending stress
cyclically applied bending stress of defined magnitude and orientation relative to the card

3.1.11
dynamic torsional stress
cyclically applied torsional stress of defined magnitude and orientation relative to the card

3.1.12
dual interface chip card
DICC
card or object combining the functionality of a ICC and a PICC

3.1.13
base standard
standard to which the *test method* (3.1.1) is used to verify conformance

3.1.14
electrostatic discharge
ESD
sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or dielectric breakdown

3.1.15
electrostatic stress
ESS
stress applied to a PICC or VICC by an electrostatic field

3.1.16
electrostatic discharge conductivity
ESDC
ability of a card to conduct or transport *electrostatic discharge* (3.1.14)

3.2 Abbreviated terms

ICC integrated circuit card as defined in ISO/IEC 7810 (all parts)

PICC proximity integrated circuit(s) card or object as defined in ISO/IEC 14443 (all parts)

VICC vicinity integrated circuit(s) card or object as defined in ISO/IEC 15693 (all parts)

4 Default items applicable to the test methods

4.1 Test environment

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

4.2 Pre-conditioning

Where pre-conditioning is required by the test method, the identification card 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 tolerance 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 should be reported with the results and be considered when judging conformity. The total measurement uncertainty should be less than 20 % of the permitted tolerance range. ISO/IEC Guide 98 (all parts) provides guidance for determining and expressing the total measurement uncertainty.

5 Test methods

5.1 Card warpage

5.1.1 General

The purpose of this test is to measure the degree of warpage of a card test sample.

5.1.2 Apparatus

The test apparatus shall consist of:

— a flat level rigid plate;

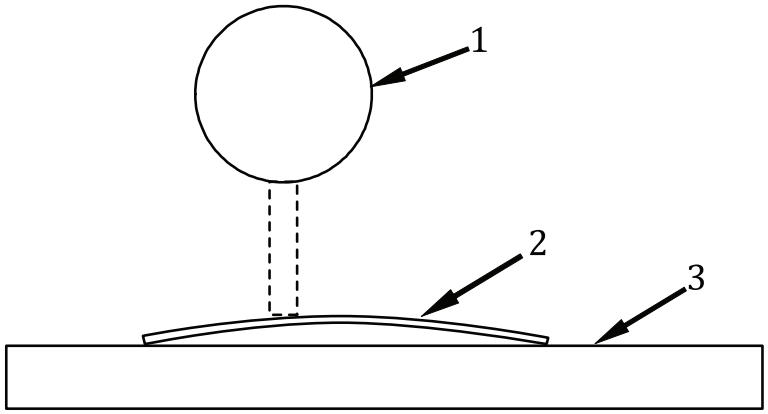
— a suitable measurement device or a gauge with an accuracy of ±0,03 mm (0.0012 in).

5.1.3 Procedure

Pre-condition the sample card according to 4.2 before testing and conduct the test under the test environment defined in 4.1.

Place the sample card on the level rigid plate of the measuring apparatus. At least three corners of the card shall rest on the plate (warpage of the card in convex form to the plate). Use a suitable measurement device or gauge to determine that no point on the card's surface is at a distance of more than the permitted maximum warpage from the level rigid plate, as shown in Figure 1. The measurement device or gauge shall not change the warpage of the card.

NOTE The point of maximum displacement is not necessarily at the centre of the card.



Key

1 measurement device or gauge
2 card
3 level rigid plate

NOTE This figure is not to scale.

Figure 1 — Warpage measurement apparatus

5.1.4 Test report

The test report shall state if the warpage of the card complies with the requirement and optionally the measured warpage.

5.2 Dimensions of cards

5.2.1 General

The purpose of this test is to measure the height, width and thickness of a card test sample.

5.2.2 Thickness of card measurements

5.2.2.1 Apparatus

The test apparatus shall consist of a micrometer with a flat anvil and spindle whose diameter is within the range of 3 mm to 8 mm (0.12 in to 0.32 in), having a precision of 0,005 mm (0.00020 in) and a pressure range of 0,1 N/mm^2 to 0,4 N/mm^2 (14.5 lbf/in^2 to 58.0 lbf/in^2).

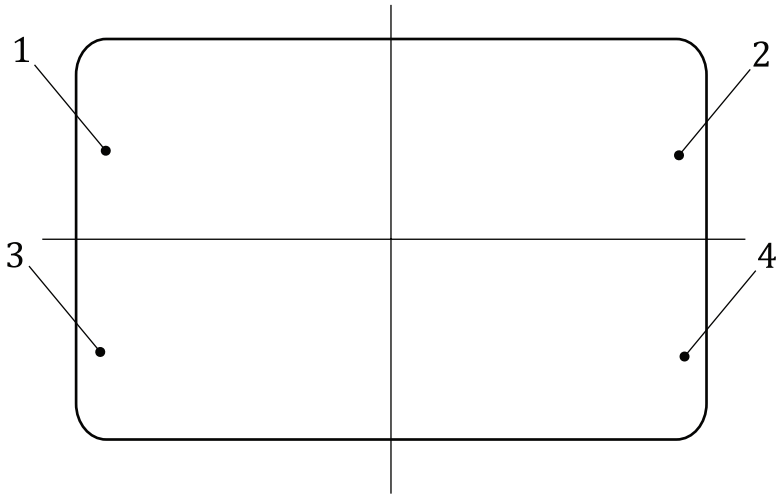
5.2.2.2 Procedure

Pre-condition the sample card according to 4.2 before testing and conduct the test under the test environment defined in 4.1.

Use the micrometer to measure the thickness of the card at four points, one in each of the four quadrants of the card (see Figure 2 for the location of the quadrants). The measurements shall be made at locations on the card that do not include signature panels, magnetic stripes or contacts (integrated circuit/s cards), or any other raised area.

5.2.2.3 Test report

The test report shall give the maximum and the minimum values of the four measurements.



Key

1, 2, 3, 4 quadrant

Figure 2 — Assignment of quadrants

5.2.3 Height and width of card measurement

5.2.3.1 Apparatus

The following items are required:

— a level horizontal rigid surface having a deviation from flatness not greater than 3,2 µm (0.000128 in) over the width of the card;

— a measuring device with a precision of 2,5 µm (0.0001 in);

— a load of 2,2 N ± 0,2 N (0.495 lbf ± 0.045 lbf).

5.2.3.2 Procedure

Pre-condition the sample card according to 4.2 before testing and conduct the test under the test environment defined in 4.1.

Place the sample card on the level horizontal rigid surface and flatten it under the load. Measure the height and width of the card. Find the maximum and minimum height and the maximum and minimum width.

5.2.3.3 Test report

The test report shall state whether the card conforms to the base standard and shall record the maximum and minimum values of height and width recorded.

5.3 Peel strength

5.3.1 General

The purpose of this test is to measure the peel strength between card layers.

