

INTERNATIONAL STANDARD

ISO
7816-1

First edition
1987-07-01



INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Identification cards — Integrated circuit(s) cards with contacts —

Part 1 : Physical characteristics

Cartes d'identification — Cartes à circuit(s) intégré(s) à contacts —

Partie 1 : Caractéristiques physiques

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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 7816-1 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.

Identification cards — Integrated circuit(s) cards with contacts —

Part 1 : Physical characteristics

0 Introduction

This International Standard is one of a series of standards describing the parameters for identification cards as defined in ISO 7810 and the use of such cards for international interchange.

1 Scope and field of application

This part of ISO 7816 specifies the physical characteristics of integrated circuit(s) cards with contacts. It applies to identification cards of the ID-1 card type which may include embossing and/or a magnetic stripe as specified in ISO 7811 parts 1 to 5.

This part of ISO 7816 applies to cards which have a physical interface with electrical contacts. It does not, however, define the nature, number and position of the integrated circuits in the cards.

NOTE — Other types of IC cards, formats or interfaces may be developed in the future which will call for additions to be made to this part of ISO 7816 or will result in the need for other International Standards to be prepared.

2 References

ISO 7810, *Identification cards — Physical characteristics*.

ISO 7811, *Identification cards — Recording technique —*

Part 1 : Embossing.

Part 2 : Magnetic stripe.

Part 3 : Location of embossed characters on ID-1 cards.

Part 4 : Location of read-only magnetic tracks — Tracks 1 and 2.

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

ISO 7812, *Identification cards — Numbering system and registration procedure for issuer identifiers*.

ISO 7813, *Identification cards — Financial transaction cards*.

3 Definitions

For the purpose of this part of ISO 7816, the following definitions apply.

3.1 integrated circuit(s) : Electronic component(s) designed to perform processing and/or memory functions.

3.2 integrated circuit(s) card (IC card) : An ID-1 card type (as specified in ISO 7810, ISO 7811 parts 1 to 5, ISO 7812 and ISO 7813) into which has been inserted one or more integrated circuits.

3.3 contact : Conducting element ensuring galvanic continuity between integrated circuit(s) and the external interfacing equipment.

4 Physical characteristics

The following physical characteristics describe the card after the insertion of integrated circuit(s) with contacts into an ID-1 card type meeting the requirements of ISO 7810, ISO 7811 parts 1 to 5, ISO 7812 and ISO 7813.

NOTE — Specific test methods applicable to several of these characteristics are described in the annex which forms part of this International Standard.

4.1 General

The physical characteristics specified for all types of identification cards in ISO 7810 shall apply to IC cards. The requirements for flammability and overall dimensions specified for financial transaction cards in ISO 7813 shall also apply to these cards.

NOTES

1 The thickness of the cards as specified in ISO 7810 applies to a non-embossed card including contacts and integrated circuits.

2 Concerning "resistance to chemicals" (see sub-clause 6.1.4 of ISO 7810) the attention of card issuers is drawn to the fact that information held on a magnetic stripe or in the integrated circuit(s) may be rendered ineffective as a result of contamination.

4.2 Additional characteristics

4.2.1 Ultra-violet light

Any protection beyond the ambient UV light level shall be the responsibility of the card manufacturer.

4.2.2 X-rays

Exposure of either side of the card to a dose of 0,1 Gy relative to a medium-energy X-radiation of 70 to 140 Kv (cumulative dose per year) shall not cause malfunction of the card.

NOTE — This corresponds to twice the generally accepted human dose of 0,05 Gy per year.

4.2.3 Surface profile of contacts

The difference in level between all contacts and the adjacent card surface shall be less than 0,10 mm. The protection area specified in sub-clause 6.3.3 of ISO 7810 shall be extended to the area between B and C shown in the figure in ISO 7810.

4.2.4 Mechanical strength (of cards and contacts)

The card shall resist damage to its surface and to any components contained in it and shall remain intact during normal use, storage and handling.

Each contact surface and contact area (entire galvanic surface) shall not be damaged by a working pressure equivalent to a steel ball of diameter 1 mm to which is applied a force of 1,5 N.

See the test methods in clauses A.1 and A.2 of the annex.

4.2.5 Electrical resistance (of contacts)

The contact resistance of a card connector assembly can be defined and measured by using a test card with a short circuit between the contacts within the card.

When a d.c. current of any value between 50 μ A and 300 mA is applied, the resistance measured between any two lines of the connector (two contacts in series) shall be less than 0,5 Ω .

The impedance shall be such that the voltage across the impedance shall remain lower than 10 mV for an a.c. current of 10 mA peak at a frequency of 4 MHz.

4.2.6 Electromagnetic interference [between magnetic stripe and integrated circuit(s)]

If the card carries a magnetic stripe, the IC card shall not be damaged, malfunction or be altered after reading, writing or erasing of the magnetic stripe. Conversely, the writing or reading of the integrated circuit(s) shall not cause a malfunction of the magnetic stripe or its associated reading, writing or handling mechanisms.

4.2.7 Electromagnetic fields

The exposure of the card to a 79 500 A·r/m (1 000 Oe) magnetic field shall not cause malfunction of the integrated circuit(s). The test shall be effected with a static magnetic field of the indicated value.

WARNING — This magnetic field will erase the contents of a magnetic stripe (if used).

4.2.8 Static electricity

The integrated circuit shall not be damaged in normal use by a person charged with static electricity.

The performance of the card shall not be degraded by exposure to a static discharge between any contact and ground of 1 500 V through a resistance of 1 500 Ω from a capacitance of 100 pF.

See the test method in clause A.3 of the annex.

4.2.9 Heat dissipation

The IC in the card shall not dissipate more than 2,5 W.

WARNING — Whatever the environmental conditions may be, care shall be taken so that the temperature on the surface of the card does not exceed 50 °C.

Annex

Test methods

(This annex forms part of this standard.)

A.1 Bending properties

A.1.1 Procedure

Place the card between the two jaws of a machine, one of them being a moving part and bend

- a) the long side :
 - deflection (f) : 2 cm;
 - periodicity : 30 bendings per minute;
- b) the short side :
 - deflection (f) : 1 cm;
 - periodicity : 30 bendings per minute.

Check the functioning of the card in the writing or reading mode every 125 bendings.

Recommended test duration : at least 250 passes in each of the four test orientations.

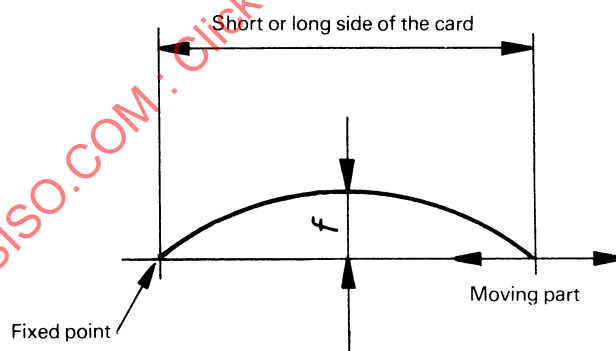


Figure 1

A.1.2 Criteria for acceptability

The card shall still function and shall not show any cracked part after 1 000 bendings.

A.2 Torsion properties

A.2.1 Procedure

Place the card in a machine which applies torsion to its short sides, the maximum displacement being through $15^\circ \pm 1^\circ$ in alternate directions at a rate of 30 torsions per minute. Check the correct functioning of the card in the writing and/or reading mode (as appropriate) every 125 torsions.

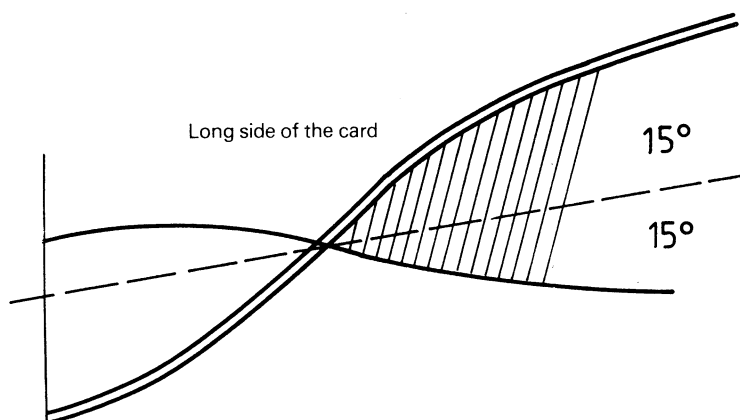


Figure 2

A.2.2 Criteria for acceptability

The card shall still function and shall not show any cracked part after 1 000 torsions.

A.3 Static electricity

A.3.1 Procedure

Send the discharge of a capacitor of 100 pF through a 1 500 Ω resistance as shown in figure 3; send the discharge successively in normal polarity, then in reversed polarity between the other contacts of the card.

Discharge potential : 1 500 V

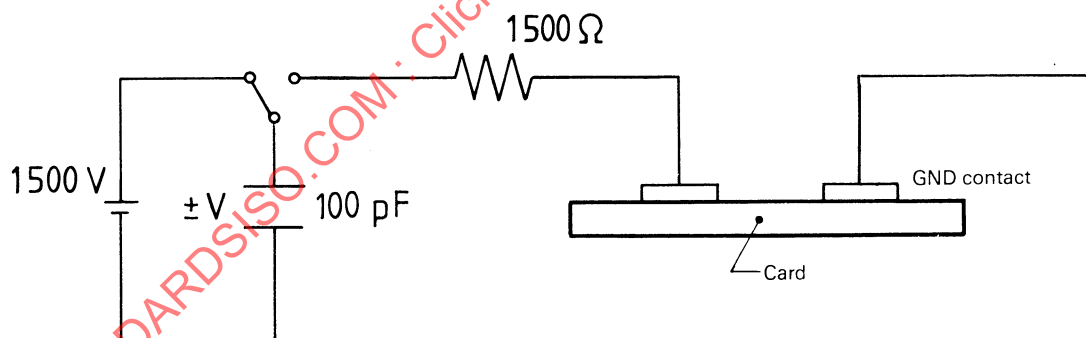


Figure 3

A.3.2 Criteria for acceptability

The functioning of the integrated circuit in the writing and reading modes shall be checked at the beginning and at the end of the test.