INTERNATIONAL STANDARD

ISO/IEC 10536-1

First edition
1992-09-15

Identification cards — Contactless integrated circuit(s) cards —

Part 1:
Physical characteristics

Cartes d'identification — Cartes à circuits intégrés sans contacts —
Partie 1: Caractéristiques physiques

CONTENTS

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. 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.

International Standard ISO/IEC 10536-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 10536 consists of the following parts, under the general title *Identification cards — Contactless integrated circuit(s) cards*:

— *Part 1: Physical characteristics*

Annex A of this part of ISO/IEC 10536 is for information only.

Introduction

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

This International Standard does not preclude the incorporation of other standard technologies on the card, such as those referenced in clause 2.

Identification cards - Contactless integrated circuit(s) cards -

Part 1 :
Physical characteristics

1 Scope

This part of ISO/IEC 10536 specifies the physical characteristics of contactless integrated circuit(s) cards, (CICCs). It applies to identification cards of the ID-1 card type.

This part of ISO/IEC 10536 applies to integrated circuit(s) cards that have a physical interface for transmitting power, clock signal and data signals into the CICC and receiving data signals from the CICC without the use of conductive contacts; this part does not define the nature, number and position of the contactless interfaces.

Annex A includes test methods and acceptance criteria for certain of the requirements.

NOTE 1 Other types of contactless integrated circuit(s) cards, formats or interfaces, which offer a variety of operating distances, may be developed in the future which will call for additions to be made to this part of ISO/IEC 10536 or will require other International Standards to be prepared.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 10536. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 10536 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7810: 1985, *Identification cards - Physical characteristics.*

ISO 7811-1: 1985, *Identification cards - Recording technique - Part 1: Embossing*

ISO 7811-2: 1985, *Identification cards - Recording technique - Part 2: Magnetic stripe*

ISO 7811-3: 1985, *Identification cards - Recording technique - Part 3: Location of embossed characters on ID-1 cards*

ISO 7811-4: 1985, *Identification cards - Recording technique - Part 4: Location of read-only magnetic tracks - Tracks 1 and 2*

ISO 7811-5: 1985, *Identification cards - Recording technique - Part 5: Location of read-write magnetic track - Track 3*

ISO 7812: 1987, *Identification cards - Numbering system and registration procedure for issuer identifiers*

ISO 7813: 1985, *Identification cards - Financial transaction cards*

ISO 7816-1: 1987, *Identification cards - Integrated circuit(s) cards with contacts - Part 1: Physical characteristics*

ISO 7816-2: 1988, *Identification cards - Integrated circuit(s) cards with contacts - Part 2: Dimensions and location of the contacts*

3 Definitions

For the purposes of this part of ISO/IEC 10536, the following definitions apply -

3.1 integrated circuit(s) (IC): Electronic component(s) designed to perform processing and/or memory functions, control of input/output functions.

3.2 contactless: Pertaining to the achievement of signal exchange with and power supply to the card without the use of galvanic elements (i.e. the absence of direct path from the external interfacing equipment to the integrated circuit(s) contained within the card).

3.3 contactless integrated circuit(s) card (CICC): An ID-1 card type (as specified in ISO 7810, ISO 7811 Parts 1 to 5, ISO 7812 and ISO 7813) into which integrated circuit(s) have been placed and in which the coupling to such integrated circuit(s) is done in a contactless manner.

3.4 card coupling device (CCD): The device used to provide power and clock signal to, and data exchange with the CICC.

4 Physical characteristics

4.1 General

CICCs shall have physical characteristics according to the requirements specified for ID-1 cards in ISO 7810 and ISO 7813. The specification for thickness, however, shall be applicable to a non-embossed CICC.

NOTE 2 Specific test methods applicable to several of these characteristics are described in the annex (informative).

NOTE 3 Concerning "resistance to chemicals" (5.1.4 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

This part of ISO/IEC 10536 excludes requirements for protection of CICCs against the effects of ultra-violet light levels greater than those in ordinary daylight at sea-level. Where greater protection is needed it shall be the responsibility of the card manufacturer to provide it and to state the tolerable level of ultra-violet light.

4.2.2 X-rays

Exposure of either face of the CICC to medium-energy X-radiation, with energy in the range 70 keV to 140 keV, of a cumulative dose of 0,1 Gy•yr^{-1} shall not cause a malfunction of the CICC.

NOTE 4 This corresponds to approximately double the maximum acceptable dose to which humans may be exposed annually.

4.2.3 Surface profile

The difference in level between the areas incorporating the contactless interface with integrated circuits and the adjacent card surface shall be between 0,1 mm below the surface and 0,05 mm above the surface. The protection area specified in subclause 5.3.3 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

When tested by the methods described in A.1 and A.2, the CICC shall meet the criteria for acceptability specified therein.

4.2.5 Electromagnetic compatibility

The CICC shall be so constructed that the following requirements are met.

    a) The electromagnetic disturbance generated by the CICC alone or in association with its coupling device shall not exceed a level that is liable to prevent radio and telecommunications equipment and other apparatus from operating as intended.

    b) It has an adequate level of intrinsic immunity to electromagnetic disturbance to enable it to operate as intended.

4.2.6 Electromagnetic interference between magnetic stripe and electronic components

If the card carries a magnetic stripe, protection shall be provided so that the electronic components within the card will not malfunction, be damaged or be altered after reading, writing or erasing of the magnetic stripe. Conversely protection shall also be provided, so that the contactless operation of the card will not cause a malfunction of the magnetic stripe.

4.2.7 Electrical and electromagnetic interference between contact interface and electronic components

If the card carries a contact interface, protection shall be provided so that the electronic components within the card will not malfunction, be damaged or unintentionally be altered due to the use of the contact interface. Conversely protection shall also be provided, so that the contactless operation of the card will not cause a malfunction of the contact interface.

4.2.8 Magnetic fields

After exposure of the CICC to a static 79,5 kA/m magnetic field, the contactless interface and the integrated circuits shall continue to function normally.

WARNING: The data content of a magnetic stripe might be erased by such a field.

4.2.9 Static electricity

When exposed in accordance with the test in A.3, the performance of the CICC shall not be degraded.

4.2.10 Operating temperature

The CICC shall be designed and manufactured to operate at least in an ambient temperature range of 0 ˚C to 50 ˚C.

4.2.11 Surface temperature

The temperature of any part of the surface of an operating CICC shall not exceed 85 ˚C.

Annex A

(Informative)

Test methods

A.1 Bending properties

A.1.1 Procedure

Place the CICC between the jaws of a machine, as shown in figure A.1. Bend

 a) the long side with a deflection, f, of 20 mm, at a rate of 30 bendings per minute;

and then

 b) the short side, with a deflection, f, of 10 mm, at a rate of 30 bendings per minute.

Check the functioning of the CICC in the writing and/or reading mode every 125 bendings.

The CICC should then be placed in the machine with the other face up and the above procedure repeated.

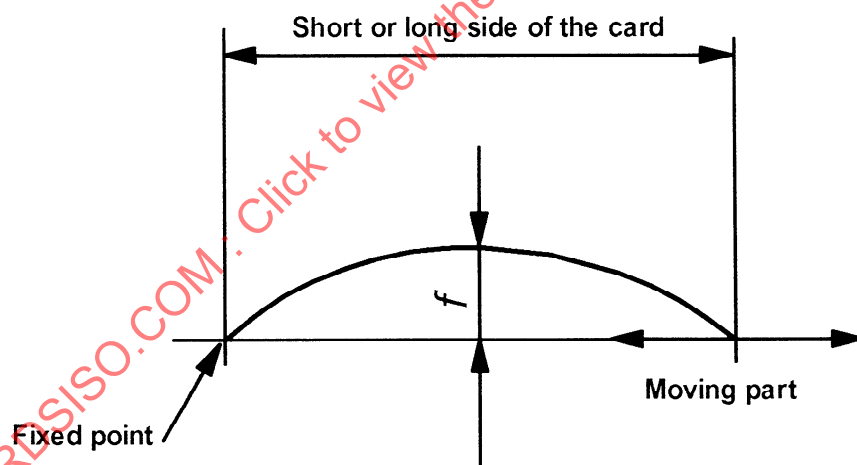The recommended test duration is at least 250 bendings in each of the four test orientations.

Figure A.1 - Bending test arrangement

A.1.2 Criteria for acceptability

The CICC shall continue to function and shall not show any cracked part after 250 bendings in each of the four test orientations.

A.2 Torsion properties

A.2.1 Procedure

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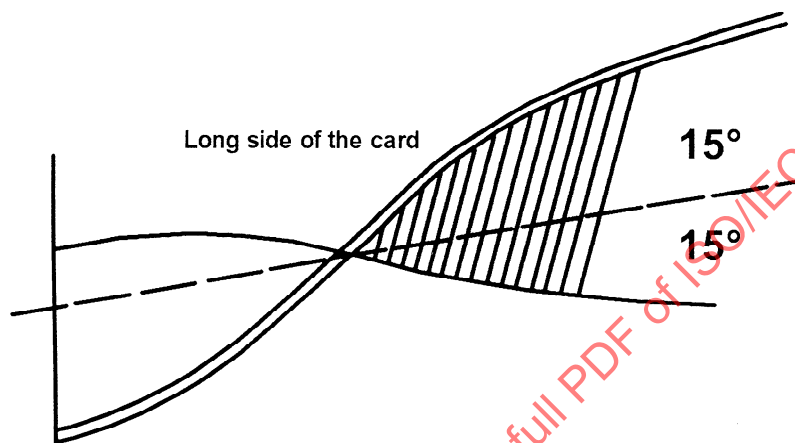
Long side of the card

15°

15°

Figure A.2 - CICC under torsion

A.2.2 Criteria for acceptability

The CICC shall continue to function and shall not show any cracked part after 1000 torsions.

A.3 Static electricity

A.3.1   Procedure

Discharge a capacitor of 100 pF, initially charged to 10 kV, through a 500 Ω resistor, as shown in figure A.3, to each of the 20 test zones consecutively with a 10 s interval between each discharge; conduct the test with one polarity and then repeat with reverse polarity.

If the card has contacts, the above test shall be done in a manner such that the Round-Tip Probe does not discharge through the contacts.

NOTE 5 - Surface of the CICC to be free from graphic design or surface-mounted foils during testing.
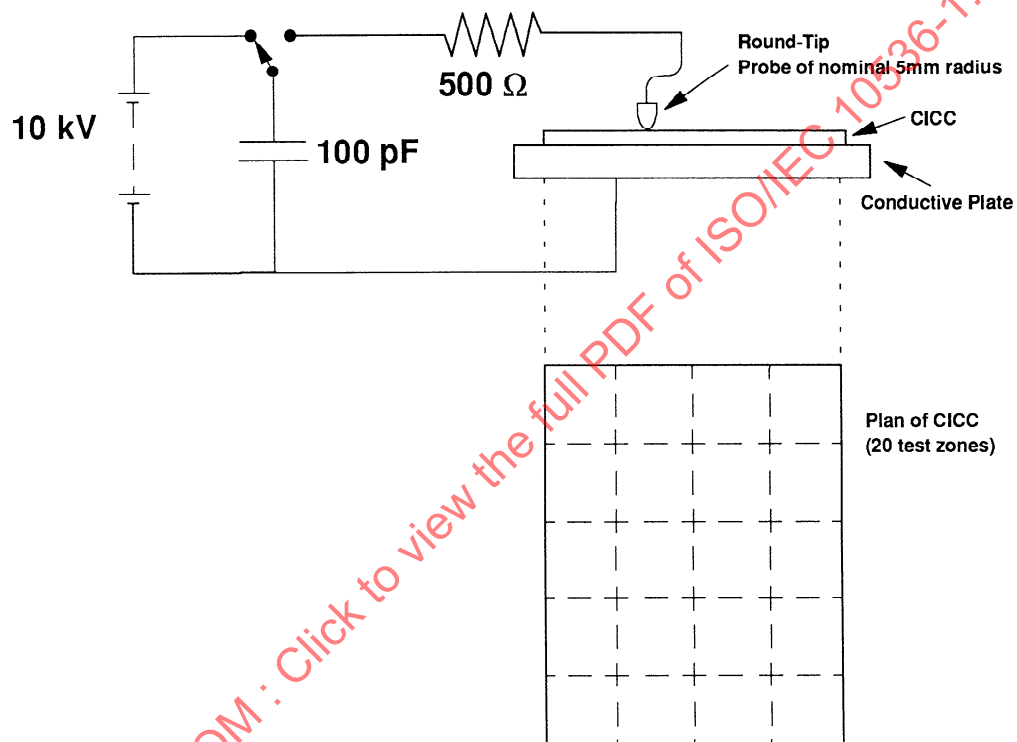

Figure A.3 - Static electricity test arrangement

A.3.2   Criteria for Acceptability

The functioning of the integrated circuit(s) in the writing and/or reading modes shall be verified at the end of the test.

5