

Final Committee Draft

ISO/IEC 14443-1

Identification cards -
Contactless integrated circuit(s) cards -
Proximity cards

Part 1: Physical characteristics

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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 organizations 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 JTC1. 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 14443-1 was prepared by Joint Technical Committee ISO/IEC/JTC1, *Information technology*.

ISO/IEC 14443 consists of the following parts, under the general title *Identification cards - Contactless integrated circuit(s) cards - Proximity cards*:

- *Part 1: Physical characteristics*
- *Part 2: Radio frequency power and signal interface*
- *Part 3: Initialization & anticollision*
- *Part 4: Transmission protocols*

Introduction

ISO/IEC 14443 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 part of ISO/IEC 14443 describes the physical characteristics of proximity cards.

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

Contactless Card Standards cover a variety of types as embodied in ISO/IEC 10536 (Close coupled cards), ISO/IEC 14443 (Proximity cards), ISO/IEC 15693 (Vicinity cards). These are intended for operation when very near, nearby and at a longer distance from associated coupling devices respectively.

Identification cards - Contactless integrated circuit(s) cards - Proximity cards

Part 1:

Physical characteristics

1 Scope

This part of ISO/IEC 14443 specifies the physical characteristics of proximity cards, (PICC). It applies to identification cards of the ID-1 card type operating in proximity of a coupling device.

This part of ISO/IEC 14443 shall be used in conjunction with later parts of ISO/IEC 14443 which are in development.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 14443. 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 14443 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/IEC 7810:1995, Identification cards - Physical characteristics.

ISO/IEC 10373, Identification cards - Test methods.

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of this part of ISO/IEC 14443, the following definitions apply:

3.1.1 Integrated circuit(s) (IC):

Electronic component(s) designed to perform processing and memory functions.

3.1.2 Contactless:

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

3.1.3 Contactless integrated circuit(s) card:

An ID-1 card type (as specified in ISO/IEC 7810) into which integrated circuit(s) have been placed and in which communication to such integrated circuit(s) is done in a contactless manner.

3.1.4 Proximity card (PICC):

An ID-1 card type into which integrated circuit(s) and coupling means have been placed and in which communication to such integrated circuit(s) is done by inductive coupling in proximity of a coupling device.

3.1.5 Proximity coupling device (PCD):

The reader/writer device that uses inductive coupling to provide power to the PICC and also to control the data exchange with the PICC.

4 Physical characteristics

4.1 General

The PICC shall have physical characteristics according to the requirements specified for ID-1 cards in ISO/IEC 7810.

4.2 Dimensions

The nominal dimensions of the PICC shall be as specified in ISO/IEC 7810 for the ID-1 type cards.

4.3 Additional characteristics

4.3.1 Ultra-violet light

This part of the ISO/IEC 14443 excludes requirements for protection of PICCs 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.

4.3.2 X-rays

The PICC shall continue to function normally after exposure of either face to medium-energy X-radiation, with energy 100 keV, of a cumulative dose of 0.1 Gy per year.

NOTE 1. This corresponds to approximately double the maximum acceptable dose to which humans may be exposed annually.

4.3.3 Dynamic bending stress

The PICC shall continue to function normally after testing in accordance with the test methods described in ISO/IEC 10373 where the maximum deflections about the short and long cards axes are $h_wA = 20\text{mm}$ and $h_wB = 10\text{mm}$.

4.3.4 Dynamic torsional stress

The PICC shall continue to function normally after testing in accordance with the test methods described in ISO/IEC 10373 where the angle of rotation α equals 15° .

4.3.5 Alternating magnetic fields

- a) The PICC shall continue to function normally after exposure to a magnetic field of average level given in the table below:

Frequency Range (MHz)	Average Magnetic Field Strength (A/m)	Averaging Time (minutes)
0,3 - 3,0	1,63	6
3,0 - 30	4,98/f	6
30 - 300	0,163	6

f - frequency in MHz

The peak level of the magnetic field is limited to 30 times the average level.

- b) The PICC shall continue to function normally after exposure to a magnetic field of 12 A/m at 13,56 MHz.

4.3.6 Alternating electric field

The PICC shall continue to function normally after exposure to a electric field of average level given in the table below:

Frequency Range (MHz)	Average Electric Field Strength (V/m)	Averaging Time (minutes)
0,3 - 3,0	0,614	6
3,0 - 30	1842/f	6
30 - 300	61,4	6

f - frequency in MHz

The peak level of the electric field is limited to 30 times the average level.

4.3.7 Static electricity

The PICC shall continue to function normally after testing in accordance with the test methods described in ISO/IEC 10373 (IEC 1000-4-2:1995), where the test voltage is 6kV.

4.3.8 Static magnetic field

The PICC shall continue to function normally after exposure to a static 640 kA/m magnetic field.

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

4.3.9 Operating temperature

The PICC shall function normally over an ambient temperature range of 0°C to 50°C .

ANNEX A **(Informative)**

Standards compatibility and Surface quality

A.1 Standards compatibility

This standard does not preclude the addition of other existing card standards on the PICC. Restrictions may apply to embossing of the PICC.

A.2 Surface quality for printing

Where there is a requirement to customise the PICC after the manufacturing process by overprinting, care should be taken to ensure the areas used for printing are of sufficient quality appropriate to the printing technique or printer used.

ANNEX B (Informative)

Bibliography of other ISO/IEC card standards.

ISO/IEC 7811-1:1995, *Identification cards - Recording technique - Part 1: Embossing.*

ISO/IEC 7811-2:1995, *Identification cards - Recording technique - Part 2: Magnetic stripe.*

ISO/IEC 7811-3:1995, *Identification cards - Recording technique - Part 3: Location of embossed characters on ID-1 cards.*

ISO/IEC 7811-4:1995, *Identification cards - Recording technique - Part 4: Location of read-only magnetic tracks - Tracks 1 and 2.*

ISO/IEC 7811-5:1995, *Identification cards - Recording technique - Part 5: Location of read-write magnetic track - Track 3.*

ISO/IEC 7811-6:1996, *Identification cards - Recording technique - Part 6: Magnetic stripe - High coercivity*

ISO/IEC 7812-1:1993, *Identification cards - Identification of issuers - Part 1: Numbering system.*

ISO/IEC 7812-2:1993, *Identification cards - Identification of issuers - Part 2: Application and registration procedures.*

ISO/IEC 7813:1995, *Identification cards - Financial transaction cards.*

ISO/IEC 7816-1:1998, *Identification cards - Integrated circuit(s) cards with contacts - Part 1: Physical characteristics.*

ISO/IEC 7816-2:1998, *Identification cards - Integrated circuit(s) cards with contacts - Part 2: Dimensions and location of the contacts.*

ISO/IEC 7816-3:1997, *Identification cards - Integrated circuit(s) cards with contacts - Part 3: Electronic signals and transmission protocols.*

ISO/IEC 10536-1:1992, *Identification cards - Contactless integrated circuit(s) cards - Part 1: Physical characteristics.*

ISO/IEC 10536-2:1995 *Identification cards - Contactless integrated circuit(s) cards - Part 2: Dimensions and location of coupling areas*