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Identification cards — ICC-managed devices —

Part 2:
Physical characteristics and test methods for cards with devices

Cartes d'identification — Dispositifs contrôlés par carte à circuit intégré (ICC) —
Partie 2: Caractéristiques physiques et méthodes d'essai des cartes avec les dispositifs

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 18328-2:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

— updated Annex A and changed status to normative: ID-T size card;

— added a new normative Annex B: ID-B size card;

— added a new informative Annex C: Applicability of ISO/IEC 10373-1 test methods for ID-T and ID-B size cards;

— added a new informative Annex D: Further test methods.

A list of all parts in the ISO 18328 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.

Identification cards — ICC-managed devices —

Part 2:
Physical characteristics and test methods for cards with devices

1 Scope

This document defines physical characteristics and test methods for cards with devices, including but not limited to, power supplying devices, displays, sensors, microphones, loudspeakers, buttons or keypads. This document also covers aspects of coexistence of technologies of devices on the card and other machine-readable card technologies.

Additional requirements related to biometric capture devices are defined in ISO/IEC 17839-2. Such requirements can be applied in addition to the ones defined in this document. ISO/IEC 17839-2 defines a type S2 card; the physical dimensions of the type S2 card are specified in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 7816-1, *Identification cards — Integrated circuit cards — Part 1: Cards with contacts — Physical characteristics*

ISO/IEC 10373-1, *Cards and security devices for personal identification — Test methods — Part 1: General characteristics*

ISO/IEC 14443-1, *Cards and security devices for personal identification — Contactless proximity objects — Part 1: Physical characteristics*

ISO/IEC 18328-1, *Identification cards — ICC-managed devices — Part 1: General framework*

ISO/IEC 18745-1:2018, *Test methods for machine readable travel documents (MRTD) and associated devices — Part 1: Physical test methods for passport books (durability)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 7810, ISO/IEC 18328-1 and the following 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 https://www.electropedia.org/

3.1
active display area
area of the display that has active dots or segments

3.2
ID-B
nominally 85,60 mm (3.370 in) wide by 53,98 mm (2.125 in) high with a thickness between 0,84 mm and 2,25 mm (between 0.033 in and 0.089 in)

3.3
ID-T
nominally 85,60 mm (3.370 in) wide by 53,98 mm (2.125 in) high with a thickness between 2,25 mm and 3,25 mm (between 0.089 in and 0.128 in)

3.4
machine-readable zone
MRZ
fixed dimensional area located on an identity card, containing mandatory and optional data formatted for machine reading using optical character recognition (OCR) methods

3.5
new device
device to be integrated in the card, except for existing technology, e.g. displays, sensors, microphones, loudspeaker, buttons and keypads

3.6
total display area
total area of the ICC related to the display

Note 1 to entry: The total display area typically extends beyond the *active display area* (3.1).

3.7
zone 1
<zones of a display> *total display area* (3.6) excluding the *active display area* (3.1)

3.8
zone 2
<zones of a display> *active display area* (3.1)

4 Abbreviated terms

ICC integrated circuit card

LED light-emitting diode

MSA mechanically sensitive area

OLED organic light-emitting diode

5 Requirements

5.1 General requirements

5.1.1 Integrated circuit cards (ICCs)

ICCs with integrated devices shall be in accordance with the requirements defined for ID-1 cards as specified in ISO/IEC 7810. Note that for ID-T cards the requirements specified differently from ISO/IEC 7810 in Annex A and for ID-B cards the requirements specified differently from ISO/IEC 7810 in Annex B shall apply. Annex C summarizes the applicability of test methods for characteristics of identification cards specified in ISO/IEC 10373-1 for ID-T and ID-B size cards.

Annex D provides additional test methods for ICCs with integrated devices employed by various card industry experts, based upon field experience for specific applications and card technologies.

Guidance about the co-existence of different technologies on such cards is given in Annex E. A description of different display and input element technologies is provided in Annex F.

5.1.2 ICCs with contacts

ICCs with contacts shall in addition meet the requirements specified in ISO/IEC 7816-1.

5.1.3 Contactless ICCs

Contactless ICCs shall in addition meet the requirement specified in ISO/IEC 14443-1. Note that for ID-T cards the requirements specified differently from ISO/IEC 7810 in Annex A and for ID-B cards the requirements specified differently from ISO/IEC 7810 in Annex B shall apply.

5.2 Requirements for ICCs containing displays

5.2.1 General requirements

The requirements specified in 5.2.2 and 5.2.3 apply to ICCs containing electronic displays.

NOTE 1 The requirements described in this document are preliminary. The detailed requirements for ICCs containing electronic displays depend on the specific use-case.

NOTE 2 Readability and contrast: An observer's ability to perceive the information from an electronic display depends on two major factors. These are (a) size and font of the displayed information in relationship to the viewing position and (b) the optical contrast of the displayed information to the surrounding environment. Optical contrast is the comparison of the brightness or sterance of the display to the brightness of the surrounding environment. High readability results by optimizing specific contrast ratios.

5.2.2 Requirements for matrix displays

In addition to the test requirements in 5.2.1, for ICCs with matrix displays, it is required that not less than a defined percentage of all pixels remain functional after the test, as specified by the application.

5.2.3 Requirements for segmented displays

In addition to the test requirements in 5.2.1, for ICCs with segmented displays, no segment failure (dead segment) is allowed, i.e. after the test all segments should be working in both directions from white to black and from black to white.

— Dead spots in zone 1 (i.e. outside the active display area) can be accepted.

— Dead spots in zone 2 (i.e. within the active display area) can be accepted if their size and number are lower than values specified by the application.

5.3 Requirements for cards containing biometric capture devices

ICCs that embed a biometric capture device can be required to conform to requirements in ISO/IEC 17839-2, in addition to the mandatory requirements of this document. Annex A and Annex B specify the physical characteristics of two alternative card sizes.

Annex A
(normative)

ID-T size card

A.1 General

ID-T size cards are the same length and width as a normal ID-1 size card but are thicker. The additional thickness typically is used to accommodate electronic card components used for biometric capture devices. This card format is intended to accommodate certain restrictions of the current manufacturing technology.

ID-T size cards are not intended for use with any type of insertion reader typically used with an ID-1 size card such as for magnetic stripes or ICC contact readers. ID-T size cards typically only support contactless interfaces as specified in ISO/IEC 14443-1.

This annex specifies physical characteristics for a thicker card if it is used.

A.2 Conformance

ID-T size cards shall meet all requirements given in ISO/IEC 7810 for ID-1 size cards except as noted in this annex.

NOTE Dynamic bending stress and dynamic torsional stress in ISO/IEC 10373-1 apply only to ID-T size cards complying with ISO/IEC 7810 bending stiffness of ID-1 size cards, see also Annex C.

A.3 Dimensions

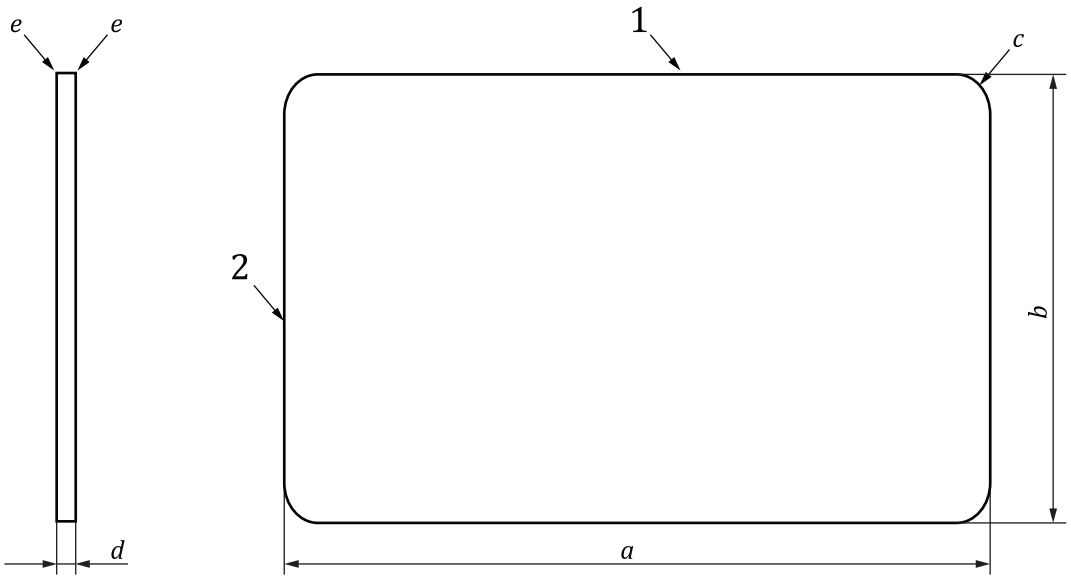
— Dimensions *a*, *b* and *c* (see Figure A.1) shall be as defined for an ID-1 size card, however, with an extended tolerance of ±0,5 mm, i.e. dimension *a* shall be between 85,10 mm and 86,10 mm and dimension *b* shall be between 53,48 mm and 54,48 mm.

— Dimension *d* shall be between 2,25 mm (0.089 in) and 3,25 mm (0.128 in).

— Dimension *e* (optional radius all around the perimeter of the card).

— Edge burrs shall not exceed 0,08 mm (0.003 in) above the card surface.

The addition of an optional 0,3 mm ± 0,1 mm radius, *e*, is recommended. Adding such a radius will make it easier to slide this thicker card into a wallet card holder.



Key

1 top reference edge

2 left edge

Figure A.1 — ID-T size card dimensions

A.4 Bending stiffness

The bending stiffness of ID-T size cards shall be such that deformations in normal use (bends not creases) can be removed by the recording or printing device without impairing the function of the card. The deformation which occurs when the card is subjected to the test load as described in ISO/IEC 10373-1 shall be 35 mm (1.378 in) maximum. The card shall return to within 1,5 mm (0.06 in) of its original flat condition within one minute after the load is removed.

A.5 Overall card warpage

The maximum distance from a flat rigid plate to any portion of the surface of an ID-T size card shall not be greater than the card thickness *d* + 1,5 mm (*d* + 0.059 in).

Annex B
(normative)

ID-B size card

B.1 General

ID-B size cards have the same length and width as a normal ID-1 size card with a thickness between that of an ID-1 card and an ID-T card. The additional thickness relative to that of an ID-1 card typically is used to accommodate electronic card components used for biometric capture devices. This card format is intended to accommodate certain restrictions of current manufacturing technology.

ID-B size cards are not intended for use with any type of insertion reader typically used with an ID-1 size card such as for magnetic stripe or ICC contact readers and shall not support interfaces such as magnetic stripes or contact IC cards. ID-B size cards typically only support contactless interfaces as specified in ISO/IEC 14443-1.

ID-B cards, which are cards containing functionality specified in this document, with the width and height of an ID-1 card and a thickness between 0,84 mm and 2,25 mm, shall not be issued into applications that include any card reading devices other than contactless readers that do not require insertion of the card, or into applications where such cards could be easily mistaken for a card intended for such card reading devices. ID-B cards are intended only for environments where there is a low risk of inserting a card into a card reader intended for ID-1 sized cards.

NOTE Manufacturers, personalizers, and issuers are encouraged to inform the users of ID-B cards of the above risks and restrictions.

This annex specifies physical characteristics for such a thicker card if it is used.

B.2 Conformance

ID-B size cards shall meet all requirements given in ISO/IEC 7810 for ID-1 size cards except as noted in this annex.

NOTE Dynamic bending stress and dynamic torsional stress in ISO/IEC 10373-1 apply only to ID-B size cards complying with ISO/IEC 7810 bending stiffness of ID-1 size cards, see also Annex C.

B.3 Dimensions

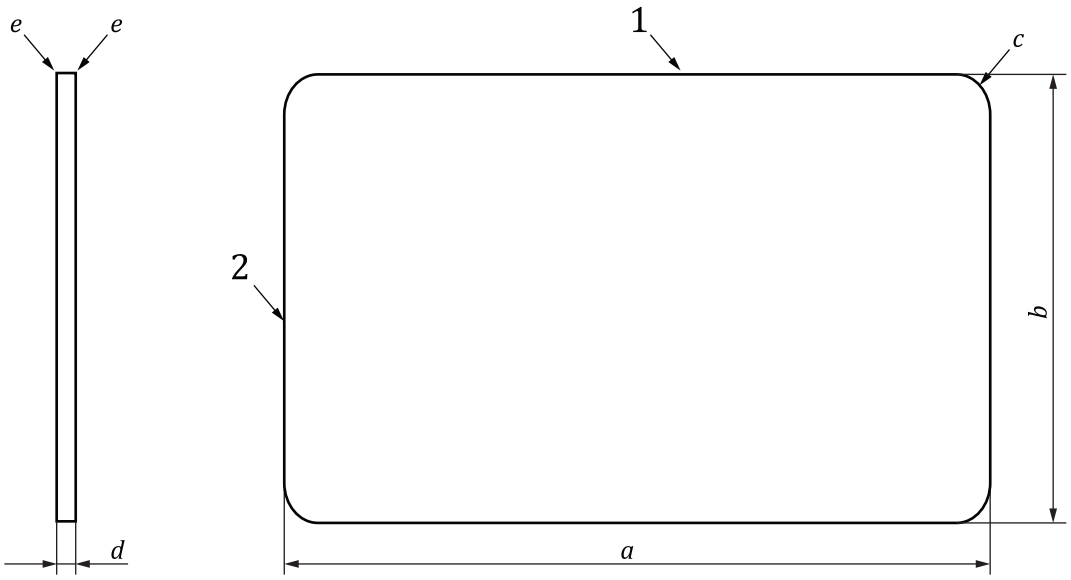
— Dimensions *a*, *b* and *c* (see Figure B.1) shall be as defined for an ID-1 size card, however, with an extended tolerance of ±0,5 mm, i.e. dimension *a* shall be between 85,10 mm and 86,10 mm and dimension *b* shall be between 53,48 mm and 54,48 mm.

— Dimension *d* shall be between 0,84 mm (0.033 in) and 2,25 mm (0.089 in), non-inclusive.

— Dimension *e* (optional radius all around the perimeter of the card).

— Edge burrs shall not exceed 0,08 mm (0.003 in) above the card surface.

The addition of an optional 0,3 mm ± 0,1 mm radius, *e*, is recommended. Adding such a radius will make it easier to slide this thicker card into a wallet card holder.



Key

1 top reference edge

2 left edge

Figure B.1 — ID-B size card dimensions

B.4 Bending stiffness

The bending stiffness of ID-B size cards shall be such that deformations in normal use (bends not creases) can be removed by the recording or printing device without impairing the function of the card. The deformation which occurs when the card is subjected to the test load as described in ISO/IEC 10373-1 shall be 35 mm (1.378 in) maximum. The card shall return to within 1,5 mm (0.06 in) of its original flat condition within one minute after the load is removed.

B.5 Overall card warpage

The maximum distance from a flat rigid plate to any portion of the surface of an ID-B size card shall not be greater than the card thickness *d* + 1,5 mm (*d* + 0.059 in).

Annex C
(informative)

Applicability of ISO/IEC 10373-1 test methods for ID-T and ID-B size cards

Table C.1 summarizes the applicability of test methods for characteristics of identification cards specified in ISO/IEC 10373-1 for ID-T and ID-B size cards.

Table C.1 — Tests for ID-T and ID-B size cards

ISO/IEC 10373-1:2020 sub-clause	Test	Applicability
5.1	Card warpage	see A.5 (ID-T) or B.5 (ID-B)
5.2	Dimensions of cards	see A.3 (ID-T) or B.3 (ID-B)
5.3	Peel strength	typically n.a. for displays, buttons, keypads
5.4	Peel strength including the edge of the card	typically n.a. for displays, buttons, keypads
5.5	Resistance to chemicals	applicable
5.6	Card dimensional stability and warpage with temperature and humidity	applicable
5.7	Adhesion or blocking	applicable
5.8	Bending stiffness	see A.4 (ID-T) or B.4 (ID-B)
5.9	Dynamic bending stress	applicable only to cards that comply with the ID-1 bending stiffness requirement
5.10	Dynamic torsional stress	applicable only to cards that comply with the ID-1 bending stiffness requirement
5.11	Opacity	applicable
5.12	X-rays	applicable
5.13	Embossing relief height of characters	applicable
5.14	Resistance to heat	applicable
5.15	Surface distortions, raised areas and de-pressed areas	applicable
6.6	ESS - Electrostatic stress for PICC and VICC	applicable
6.9	ICC - Mechanical strength: 3 wheel test for ICCs with contacts	applicable only to cards that comply with the ID-1 bending stiffness requirement