INTERNATIONAL STANDARD

ISO/IEC 7810

Third edition
2003-11-01

Identification cards — Physical characteristics

Cartes d'identification — Caractéristiques physiques

Reference number
ISO/IEC 7810:2003(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

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.

ISO/IEC 7810 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 7810:1995), which has been technically revised.

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Introduction

This edition is a 5 year technical revision of the previous edition and was prepared by JTC 1/SC 17/WG 1 *Physical characteristics and test methods for ID-cards*. It cancels and replaces ISO/IEC 7810:1995. The user is encouraged to review the entire standard for revisions and updates. The major changes made during this revision are listed below.

1. The addition of criteria and test method for heat resistance. This criteria should be met by existing PVC or PVCA materials, however, it allows the user to designate materials that can withstand higher temperatures.

2. Any special requirements for various recording technologies have been moved to the base standard for that particular recording technology.

3. The peel strength and opacity requirements were changed to conform with revised test methods in ISO/IEC 10373-1:1998.

4. Tolerances for ID-2 and ID-3 size cards have been added.

5. Size and tolerances for an ID-000 size card have been added along with an informative annex showing the relationship to an ID-1 size card.

6. The specified areas for opacity, previously shown in the test methods ISO/IEC 10373-1, have changed and are shown in this International Standard.

Notes in this International Standard are only used for giving additional information intended to assist in the understanding or use of the standard and do not contain provisions or requirements to which it is necessary to conform in order to be able to claim compliance with this International Standard.

This International Standard defines the minimum physical requirements for the basic plastic identification card and is used by the following identification card standards for recording technologies. Other standards not listed here may also refer to ISO/IEC 7810.

ISO/IEC 7501 series*, Identification cards — Machine readable travel documents*
ISO/IEC 7811 series, *Identification cards — Recording technique*
ISO/IEC 7812 series, *Identification cards — Identification of issuers*
ISO/IEC 7813, *Identification cards — Financial transaction cards*
ISO/IEC 7816 series, *Identification cards — Integrated circuit(s) cards with contacts*
ISO/IEC 10536 series, *Identification cards — Contactless integrated circuit(s) cards — Close-coupled cards*
ISO/IEC 14443 series, *Identification cards — Contactless integrated circuit(s) cards — Proximity cards*
ISO/IEC 15693 series, *Identification cards — Contactless integrated circuit(s) cards — Vicinity cards*
ISO/IEC 11693, *Identification cards — Optical memory cards — General characteristics*
ISO/IEC 11694 series, *Identification cards — Optical memory cards — Linear recording method*

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Identification cards — Physical characteristics

1 Scope

This International Standard is one of a series of standards describing the characteristics for identification cards as defined in the definitions clause and the use of such cards for international interchange.

This International Standard specifies the physical characteristics of identification cards including card materials, construction, characteristics, and dimensions for four sizes of cards.

ISO/IEC 10373-1 specifies the test procedures used to check cards against the parameters specified in this International Standard.

This International Standard specifies the requirements for cards used for identification. It takes into consideration both human and machine aspects and states minimum requirements.

It is the purpose of this series of standards to provide criteria to which cards shall perform. No consideration is given within these standards to the amount of use, if any, experienced by the card prior to test. Failure to conform to specified criteria should be negotiated between the involved parties.

NOTE 1 Numeric values in the SI and/or Imperial measurement system in this International Standard may have been rounded off and therefore are consistent with, but not exactly equal to, each other. Either system may be used, but the two should not be intermixed or reconverted. The original design was made using the Imperial measurement system.

NOTE 2 A different standard for thin flexible cards exists. Thin flexible cards are not within the scope of this International Standard.

2 Conformance

An identification card is in conformance with this International Standard if it meets all mandatory requirements specified herein. Unless otherwise specified default values apply.

3 Normative references

The following referenced documents are indispensable for the application 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 10373-1:1998, *Identification cards — Test methods — Part 1: General characteristics tests*

NOTE The ID-000 size card size was first defined by ENV 1375-1, Identification card systems — Intersector integrated circuit(s) card additional formats — Part 1: ID-000 card size and physical characteristics.

4 Terms and definitions

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

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4.1
identification card
card identifying its holder and issuer which may carry data required as input for the intended use of the card and for transactions based thereon

4.2
signature panel
special area on the card intended to have a signature applied

4.3
warpage
deviation from flatness

4.4
normal use
use as an identification card (see 4.1) involving equipment processes appropriate to the card technology, and storage as a personal document between equipment processes

4.5
ID-1
nominally 85,60 mm (3.370 in) wide by 53,98 mm (2.125 in) high by 0,76 mm (0.030 in) thick

4.6
ID-2
nominally 105 mm (4.134 in) wide by 74 mm (2.913 in) high by 0,76 mm (0.030 in) thick

4.7
ID-3
nominally 125 mm (4.921 in) wide by 88 mm (3.465 in) high by 0,76 mm (0.030 in) thick

4.8
raised area
area whose surface is raised above that of the surrounding card surface by addition of some feature such as a hologram, signature panel, magnetic stripe, photograph, integrated circuit contacts, embossed characters

4.9
unused card
card possessing all the components required for its intended purpose, which has not been subjected to any personalization or testing operation, and which has been stored in a clean environment with no more than 48 hour exposure to daylight at temperatures between 5 °C to 30 °C and humidity between 10 % to 90 % without experiencing thermal shock

4.10
returned card
card according to 4.9 after it has been issued to the card holder and returned for the purpose of testing

4.11
ID-000
nominally 25 mm (0.984 in) wide by 15 mm (0.591 in) high by 0,76 mm (0.030 in) thick

5 Dimensions of card

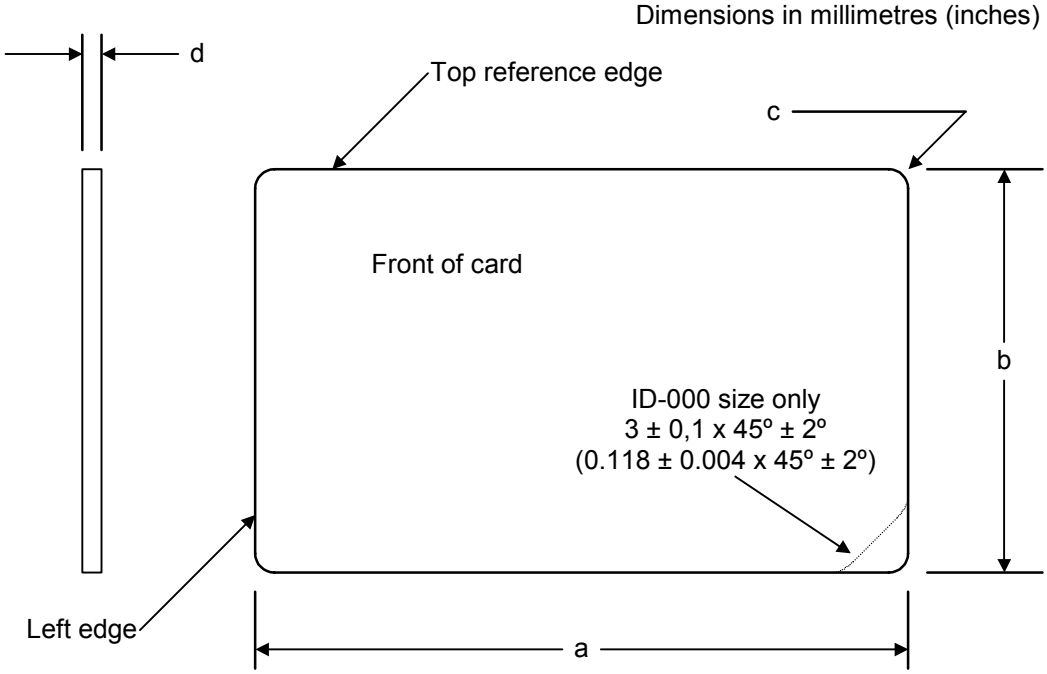
5.1 Card size

The following dimensions and tolerances apply to cards under the default test environment of 23 °C ± 3 °C (73 °F ± 5 °F) and 40 % to 60 % relative humidity.

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5.1.1 Card dimensions and tolerances

All points on the edges of the card in the finished state, except for the rounded corners, shall fall between two concentric, similarly aligned rectangles as defined in Figure 1 for maximum height and width, and minimum height and width. The corners shall be rounded with a radius as specified in Figure 1. One corner of the ID-000 size card shall have a bevel as shown in Figure 1. Care should be taken to avoid misalignment between the rounded corners and the straight edges of the card. The thickness of a card as defined here applies only to those parts of the card outside of any raised area.



	a		b		c		d	
	maximum	minimum	maximum	minimum	maximum	minimum	maximum	minimum
ID-000 Unused card	25,10 (0.988)	24,90 (0.980)	15,10 (0.594)	14,90 (0.587)	1,1 (0.043)	0,9 (0.035)	0,84 (0.033)	0,68 (0.027)
ID-1 Unused card	85,72 (3.375)	85,47 (3.365)	54,03 (2.127)	53,92 (2.123)	3,48 (0.137)	2,88 (0.113)	0,84 (0.033)	0,68 (0.027)
ID-1 Returned card	85,90 (3.382)	85,47 (3.365)	54,18 (2.133)	53,92 (2.123)	3,48 (0.137)	2,88 (0.113)	0,84 (0.033)	0,68 (0.027)
ID-2 Unused card	105,2 (4.142)	104,8 (4.126)	74,2 (2.921)	73,8 (2.906)	5 (0.197)	3 (0.118)	0,84 (0.033)	0,68 (0.027)
ID-2 Returned card	105,3 (4.146)	104,8 (4.126)	74,3 (2.925)	73,7 (2.902)	5 (0.197)	3 (0.118)	0,84 (0.033)	0,68 (0.027)
ID-3 Unused card	125,2 (4.929)	124,8 (4.913)	88,2 (3.472)	87,8 (3.457)	5 (0.197)	3 (0.118)	0,84 (0.033)	0,68 (0.027)
ID-3 Returned card	125,3 (4.933)	124,8 (4.913)	88,3 (3.476)	87,7 (3.453)	5 (0.197)	3 (0.118)	0,84 (0.033)	0,68 (0.027)

Figure 1 — Card size dimensions

NOTE 1 The definition of the front of the card is technology dependent. For example, cards supporting either ICC contacts or embossing always have these technologies on the front of the card, and the magnetic stripe always appears on the back of the card. It should be noted that not all card technologies which use the ISO/IEC 7810 standard need to define the front of the card.

NOTE 2 Tolerances may not be applicable for non-plastic materials.

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5.1.2 Card edges

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

6 Card construction

The card may be made of solid, laminated, or bonded materials, with or without inserts.

7 Card materials

The card shall be made of any material fulfilling the requirements of this International Standard. Card insert material may be used. Card inserts are not, however, specified in this International Standard and shall not interfere with other requirements specified in this International Standard.

WARNING — Some materials are sensitive to the effects of plasticizers which may be incorporated in some flexible plastic materials. Identification cards kept in contact with such flexible plastics may degrade the physical properties of the identification card.

8 Card characteristics

The following general characteristics apply to identification cards. ID-000, ID-2 and ID-3 size cards shall have the same material properties as ID-1 size cards.

8.1 Bending stiffness

The bending stiffness of the ID-1 size card 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 (1.38 in) maximum and 13 mm (0.51 in) minimum. 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.

8.2 Flammability

Resistance to flammability, if required, is specified in the International Standards dealing with the various applications of identification cards.

8.3 Toxicity

The card shall present no toxic hazard in the course of normal use.

8.4 Resistance to chemicals

The card shall meet the dimensional and warpage requirements, and there shall be no separation of card components after submersion in short term (1 minute) solutions and after submersion in the acid and alkaline artificial perspiration solutions, for 24 hours, as described in the referenced test method document.

8.5 Card dimensional stability and warpage with temperature and humidity

After exposure to the following temperature and relative humidity:

temperature: − 35 °C to + 50 °C (− 31 °F to + 122 °F)

relative humidity: 5 % to 95 %

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The structural reliability shall remain in compliance for dimensions and warpage, as specified in Clause 5 and 8.11 except for the ID-000 size card. Wider temperature ranges depending on the application are based on mutual agreement between the supplier and the card purchaser.

8.6 Light

The card and its printed text shall resist deterioration from exposure to light encountered during normal use.

8.7 Durability

Durability of the card is not established in this International Standard. It is based on a mutual agreement between the card purchaser and the supplier.

8.8 Peel strength

Component layers of material that form the card structure shall be bonded to the extent that any layer shall possess a minimum peel strength of 0,35 N/mm (2 lbf/in). If the overlay tears during the test, this signifies that the bond is stronger than the overlay, which is automatically deemed acceptable.

NOTE The issuer is warned that the card's artwork design directly influences lamination bond strength. Certain printing inks may prevent the card from meeting the delamination requirement. The peel angle for this measurement is 90°, as described in ISO/IEC 10373-1.

8.9 Adhesion or blocking

When finished cards are stacked together, the cards shall show no adverse effects such as:

a) delamination

b) discoloration or colour transfer

c) changes to surface finish

d) transfer of material from one card to another

e) deformation

The cards shall be easily separated by hand.

8.10 Opacity, ID-1 size card

All machine readable cards shall have an optical transmission density greater than 1,3 for the range of 450 nm to 950 nm, and greater than 1,1 for the range of 950 nm to 1 000 nm on all card areas except for area c and area d as shown in Figure 2. Area c and area d as shown in Figure 2 may be optically transparent and do not have a specified optical transmission density.

NOTE 1 This characteristic is required for applications in which the presence of a card is detected by its attenuation of light transmitted between a source and a sensor.

NOTE 2 There will be no opacity requirements for the range of 450 nm to 850 nm at the next revision of ISO/IEC 7810. Until that time, it is possible that a limited number of terminals may not be able to detect cards having lower than specified opacity in the 450 nm to 850 nm frequency range.

NOTE 3 Cards with area d transparent that are inserted with an incorrect orientation may not be detected in some terminals.

NOTE 4 The specified areas for opacity of machine readable cards has changed since the last edition of ISO/IEC 7810.

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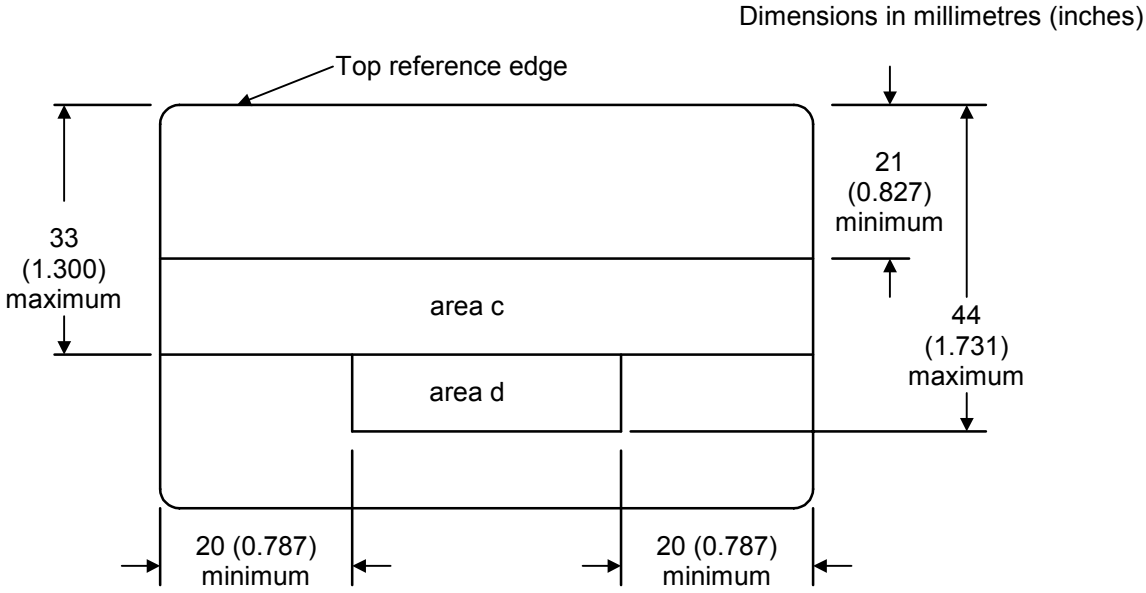


Figure 2 — Areas on ID-1 size cards with no specified opacity

8.11 Overall card warpage

The maximum distance from a flat rigid plate to any portion of the convex surface of an ID-1 size card shall not be greater than 1,5 mm (0.06 in) including the card thickness.

NOTE Card warpage for embossed cards is given in ISO/IEC 7811-1.

8.12 Resistance to heat

The ID-1 size card shall not show a deflection greater than 10 mm, delamination, or discoloration after exposure to a temperature and humidity of 50 °C ± 1 °C (122 °F ± 2 °F) and less than 60 % RH. See Annex A.

8.13 Surface distortions

Raised areas shall not increase the overall card thickness by more than 0,10 mm (0.004 in) except for embossed characters as defined in ISO/IEC 7811-1.

NOTE Scratching or marking of a signature panel may occur in some card processing devices.

8.14 Contamination and interaction of card components

The card material and any material added to the card shall not contaminate the card processing and interface devices which write and read the card. The card material shall not contain elements which might migrate into and modify other components of the card to such an extent that, during normal use of the card, this material is likely to become incapable of meeting the characteristics specified for it in this series of International Standards for identification cards.

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Annex A
(normative)

Resistance to heat test method

The test method in this annex will be superseded by the next edition of ISO/IEC 10373-1.

A.1 Scope

The purpose of this test is to determine whether the structure of the card remains stable within the requirements of the base standard while exposed to the required temperature. The resistance to heat of the complete card is measured by determining the deformation of the card after being exposed to a certain temperature.

The deformation of the card (Δh) with reference to a certain temperature is the maximum of the two results obtained with the card being placed into the test apparatus with the card front upwards (Δh_F) and the card back upwards (Δh_B).

A.2 Apparatus

Clamping device for sample cards with a clamping force $F_C = 0{,}9\ N \pm 0{,}1\ N$ (see Figure A.1), and a climatic chamber allowing temperature and humidity variations as described below.

A.3 Procedure

Precondition the sample cards according to ISO/IEC 10373-1, 4.2, before testing and conduct the test under the test environment defined in ISO/IEC 10373-1, 4.1. Mount the sample card in the clamping device such that it is clamped along the entire short side, with the front side up. For Integrated Circuit Cards with contacts, the cards shall be placed such that the contact location is opposite the clamping device. Measure h_1 as shown in Figure A.1.

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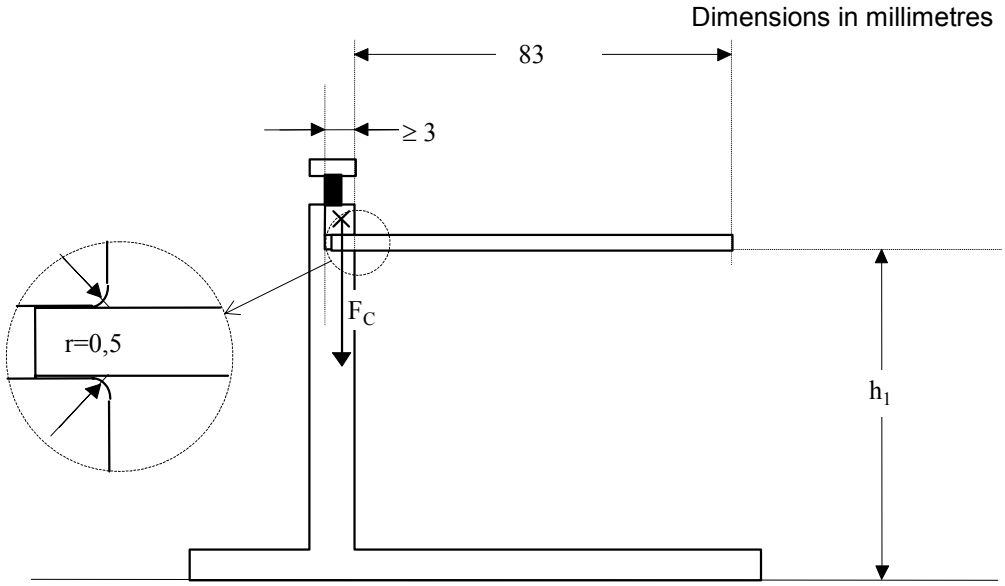


Figure A.1 — Card in clamping device before exposure to temperature

Place the clamping device with the card into a climatic chamber at the temperature and humidity conditions described in the base standard for a period of 4 hours. At temperatures above 50 °C the climatic condition may be without humidity control, due to technical limitations of the climatic chamber. Ensure that the test card is not exposed to air currents in the chamber.

At the end of the test period, the clamping device with the card is removed from the chamber. After a cooling time of at least 30 minutes in a test environment conforming to ISO/IEC 10373-1, 4.1, measure h_2 as shown in Figure A.2.

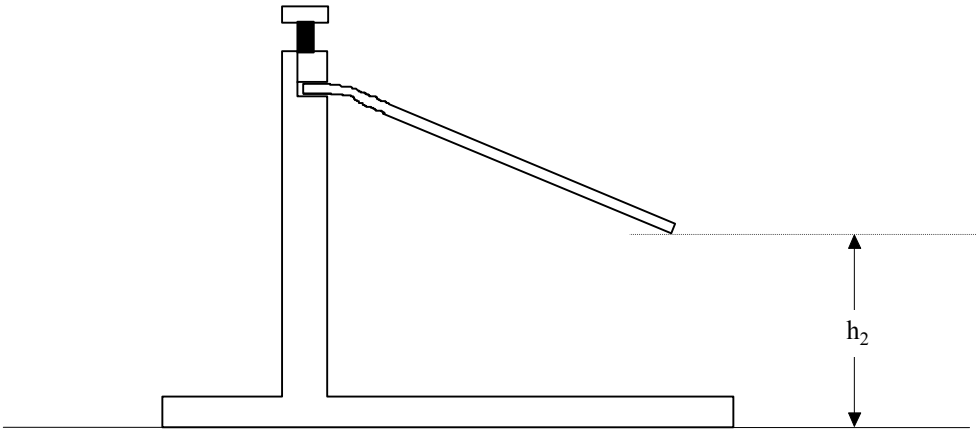


Figure A.2 — Card in clamping device after exposure to temperature

Calculate Δh_F: $\Delta h_F = h_1 - h_2$

Repeat the entire procedure with a second card of the same quality, this time with the back side up and calculate Δh_B: $\Delta h_B = h_1 - h_2$.

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Determine the maximum deflection Δh: $\Delta h = \text{Maximum}(|\Delta h_F|, |\Delta h_B|)$

Check the cards visually for delamination and discoloration.

A.4 Test report

The test report shall give the maximum deflection Δh and shall state whether delamination or discoloration occurred on the test cards.

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Annex B
(informative)

ID-000 size card as part of ID-1 size card

B.1 Scope

ID-000 size cards can be processed as part of an ID-1 size card. In this case, there may also be relief areas around the perimeter of the ID-000 size card to allow it to be removed from the ID-1 size card without punching tools. This informative annex specifies physical characteristics for such features if they are used.

B.2 Conformance

ID-1/000 size cards are made from the same materials as ID-1 size cards and meet requirements given in ISO/IEC 7810 and the following. The presence of relief areas may affect some test results.

B.3 Terms and definitions

B.3.1
ID-1/000
ID-1 size card containing an ID-000 size card

B.4 Location

The ID-000 size card is located as shown in Figure B.1.

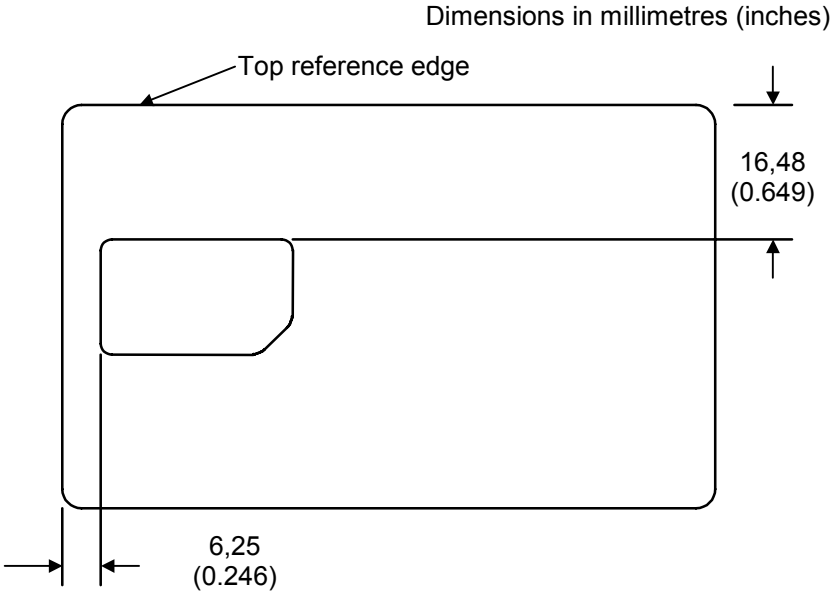


Figure B.1 — Relation of ID-000 to ID-1 size card

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B.5 Relief area

The largest boundary for the relief area around an ID-000 size card is shown in Figure B.2. Corners of the relief area may be square, rounded, or with a diagonal chamfer.

Dimensions in millimetres (inches)

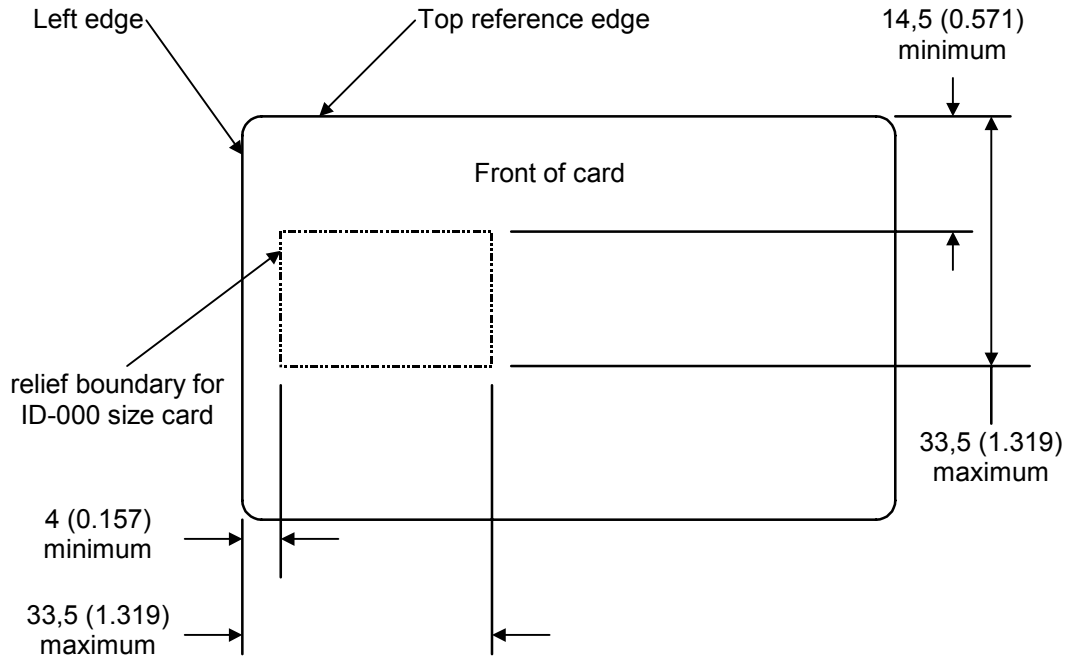


Figure B.2 — Relief area boundary

NOTE The ID-000 size card may be attached to the ISO/IEC 7810 ID-1 size card by some number of bridges or ties around the perimeter of the ID-000 size card (3 is common).

B.6 Edge burrs

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

B.7 Flatness

Single cards shall be easily removable by sliding in any direction from a stack of similar cards.

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