
Identification cards — Thin flexible cards —

**Part 1:
Physical characteristics**

Cartes d'identification — Cartes flexibles fines —

Partie 1: Caractéristiques physiques

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 15457 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 15457-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Identification cards and related devices*.

ISO/IEC 15457 consists of the following parts, under the general title *Identification cards — Thin flexible cards*:

- *Part 1: Physical characteristics*
- *Part 2: Magnetic recording techniques*
- *Part 3: Test methods*

Annexes A to C form a normative part of this part of ISO/IEC 15457. Annex D is for information only.

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Identification cards — Thin flexible cards —

Part 1: Physical characteristics

1 Scope

Thin flexible cards, the subject of this International Standard, are used to automate the controls for access to goods or services such as mass transit, highway toll systems, car parks, vouchers, stored value, etc.

For these applications, data can be written and/or read by machines using various recording techniques such as magnetic stripe, optical character recognition (OCR), bar code, etc.

This part of ISO/IEC 15457 specifies the physical characteristics of thin flexible cards at two points in the card life cycle:

1. at the point of loading into the card issuing equipment,
2. at the point of issue to the public.

It takes into consideration both human and machine aspects and states the minimum requirements.

The principal card sizes are identified and the characteristics and dimensions are specified.

Guidance concerning the storage and use of cards under various environmental conditions is given.

NOTE Thicker cards, for example ID-1 cards, specified in ISO/IEC 7810, do not come within this scope.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 15457. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 15457 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 534, *Paper and board — Determination of thickness and apparent bulk density or apparent sheet density*

ISO 1184, *Plastics — Determination of tensile properties of films*

ISO 1831, *Printing specifications for optical character recognition*

ISO 1924-2, *Paper and board — Determination of tensile properties — Part 2: Constant rate of elongation method*

ISO 2144, *Paper board and pulps — Determination of residue (ash) on ignition at 900 °C*

ISO 2471, *Paper and board — Determination of opacity (paper backing) — Diffuse reflectance method*

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ISO 2758, *Paper — Determination of bursting strength*

ISO 4593 *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*

ISO 5626, *Paper — Determination of folding endurance*

ISO 5627, *Paper and board — Determination of smoothness (Bekk method)*

ISO 5629, *Paper and board — Determination of bending stiffness — Resonance method*

ISO 5636-3, *Paper and board — Determination of air permeance (medium range) — Part 3: Bendtsen method*

ISO 6383-2, *Plastics — Film and sheeting — Determination of tear resistance — Part 2: Elmendorf method*

ISO 8226-2, *Paper and board — Measurement of hygroexpansivity — Part 2: Hygroexpansivity up to a maximum relative humidity of 86 %*

ISO 8295, *Plastics — Film and sheeting — Determination of the coefficients of friction*

ISO 8570, *Plastics — Film and sheeting — Determination of cold-crack temperature*

ISO/IEC 15457-2, *Identification cards — Thin flexible cards — Part 2: Magnetic recording techniques*

ISO/IEC 15457-3, *Identification cards — Thin flexible cards — Part 3: Test methods*

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3 Terms and definitions

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

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3.1

back face

face of the card opposite the front

3.2

finished card

card at the point of issue to the public

3.3

front face

reference face of the card (which normally bears printed information relating to its origin and ownership).

3.4

height

dimension parallel to the shortest edge of the card

3.5

print contrast signal

PCS

the print contrast of a machine readable printed mark, defined as:

$$PCS = \frac{R_w - R_p}{R_w}$$

where

R_p is the reflectance of the printed mark, measured in accordance with ISO 1831 for the B 900 spectral band

R_w is the reflectance of the background surrounding the printed mark, measured in accordance with ISO 1831 for the B 900 spectral band

3.6

recording technique

technique, such as magnetic or optical encoding etc., used to store data on the card

3.7

reference edges

datum edges for dimensioning and orientation, having a fixed relationship to the front of the card

3.8

regular card

card without thermal sensitive coating

3.9

tactile identifier

a feature used to determine the orientation of the card

3.10

thermal card

card with thermal sensitive coating

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3.11

width

dimension parallel to the longest edge of the card

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3.12

wood free

(of paper) 100 % chemical pulp, containing no ground wood

3.13

normal use

use as an identification card involving equipment processes appropriate to the card technology and storage as a personal document between equipment processes

3.14

twist

off-axis curl resulting in the four corners of the card not being co-planar

3.15

sizing and pen writing factor

capacity of a paper for receiving lines of aqueous ink (pen ink) without smudging or going through the paper

4 General characteristics

4.1 Introduction

Three card formats are recognized, and classified as follows to correspond with other existing schemes of classification:

— TFC.0, size 66 mm × 30 mm;

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- TFC.1, size 85 mm × 54 mm;
- TFC.5, size 187 mm or 203 mm × 83 mm.

For each format of card, the geometrical and topographical characteristics are specified separately in the relevant clause of this part of the standard. The remaining physical characteristics, which are common to all sizes, are specified in this clause.

Magnetic stripe and track characteristics are specified in ISO/IEC 15457-2.

All clauses in all parts of ISO/IEC 15457 apply to finished cards or to the reels/packs from which such cards are taken. Certain clauses however concern the characteristics of the card throughout its life.

As a matter of convenience and practicality, certain tests can be carried out on unfinished cards where it can be demonstrated that no significant change in that characteristic can arise during subsequent processing.

4.2 Materials

Materials for TFCs of various thicknesses are defined in Annexes A, B and C, as shown in Table 1.

Table 1 — Permitted materials

TFC size	0 ¹	1	5
Paper	A270	A178, A250, A270	A178
Composite	B270	B250	not specified
Plastic	C270	C250, C270	not specified

NOTE Table entries refer to the nominal thickness of the material and the annex in which its specification is given, e.g. A178 refers to 178 micron material from annex A.

4.3 Finishing

Thin flexible cards are finished in a variety of ways, in accordance with the requirements of the system in which they are to be used. They may be

- printed or pre-printed except in areas used by recording techniques and machine functions (e.g. magnetic stripes, positioning marks, where used);
- equipped for one or more recording techniques (e.g. magnetic stripes, optical bar codes).

Thin flexible cards shall not be embossed.

Regardless of any of these finishing processes, the finished cards shall continue to conform to the requirements of this standard.

4.4 Quality of TFC products

All cards, however presented, shall be generally free from minor defects which could interfere with the performance of TFCs or which detract from their visual appearance, such as joins, excessive dust, cutting debris, folds, tears, creases and thick spots.

¹ Note that TFC.0 materials are not necessarily the same as TFC.1 materials of the same thickness.

4.5 Reference edges

Any specification for a thin flexible card conforming to this standard shall nominate a reference face (the front) and two reference edges, having the relationship shown in Figure 1, such that all features of the finished card can be located within the same frame of reference.

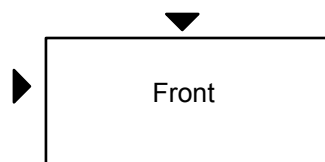


Figure 1 — Relationship between card front and reference edges

It is preferred that the front of the card should be that which is designated to carry the major printed identification information (e.g. system logo or name) and that human readable information on the front shall be upright when the card is held with one of the two reference edges at the top.

Once identified, these same reference edges shall be used exclusively and consistently when locating all features specified in this and the other applicable parts of ISO/IEC 15457.

4.6 Card life

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4.6.1 Before issue

Cards stored in their original packing, under conditions specified in 4.7.2, shall remain in conformance with this standard for at least one year.

Cards stored in operational devices (e.g. issuing machines), under the conditions specified in 4.7.3, shall remain in conformance with this standard for at least two months.

4.6.2 After issue

Finished cards stored under the conditions specified in 4.7.2, without further use, shall remain in conformance with this standard for at least one year.

NOTE Paper materials specified in Annex A may be expected to withstand up to 50 transaction cycles, composite materials specified in Annex B may be expected to withstand up to 500 transaction cycles; plastic materials specified in Annex C may be expected to withstand up to 2 500 transaction cycles. The actual lifetimes achieved will of course be affected by many external factors.

Cards shall resist deterioration from exposure to light and other environmental factors encountered in normal use.

Where abnormally demanding conditions of use are likely to affect life expectancy, these shall be taken into account when selecting suitable card materials and methods of manufacture.

4.7 Environmental conditions

4.7.1 Testing environment

Each of the characteristics specified in this standard shall be measured under the environmental conditions specified in ISO/IEC 15457-3. For most characteristics, these conditions are 23 °C and 50 % relative humidity.

NOTE Under different conditions, certain characteristics will change significantly, including dimensions (width, height, thickness), weight, flatness and many of the physical parameters listed in Tables A.1, B.1 and C.1. At the extremes of the operating environment (see 4.7.3), these changes can be substantial, and should be taken into account in the design of TFC handling devices.

4.7.2 Storage environment and packaging

Thin flexible cards shall be stored under the conditions specified in Table 2.

Table 2 — Storage conditions

Card type	Temperature °C	Relative humidity %
Regular cards	0 to 50	30 to 65
Thermal cards	0 to 40	30 to 65

The purpose of the packaging is to protect cards from physical damage and to reduce the rate of humidity variation. As a consequence:

- cards shall be kept in their original packaging for as long as is practical;
- boxes shall be stored on a flat surface, respecting "top" and "bottom" indications;
- boxes shall not show any apparent distortion or other damage.

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The packaging may be defined by the user but shall enable the above conditions to be met.

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4.7.3 Operating environment <https://standards.iteh.ai/catalog/standards/sist/05ebd712-3d80-4697-8205-7ab1ef5b5304/iso-iec-15457-1-2001>

Sudden changes in environmental conditions can cause card distortion. Packages containing cards shall therefore be approximately in equilibrium with surrounding conditions before they are opened.

Cards shall remain in conformance with Table 4, retain their structural integrity and remain usable within the range of ambient conditions specified in Table 3.

Table 3 — Operating conditions

Card type	Temperature ¹ °C	Relative humidity %
All cards	−35 to 50	15 to 85
¹ In some applications, the temperature range can be limited by the cold crack temperature (see Annex C).		

5 Outline geometry

Table 4 shows, for each TFC format, the values of the quantities specified in clause 5.