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**Identification cards — Thin flexible  
cards —**

**Part 3:  
Test methods**

*Cartes d'identification — Cartes flexibles fines —*

*Partie 3: Méthodes d'essai*

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# Contents

Page

Foreword.....	vii
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions.....	2
4 Test methods for physical characteristics.....	4
4.1 General.....	4
4.1.1 Reference.....	4
4.1.2 Apparatus .....	4
4.1.3 Sampling, preparation and storage of samples .....	4
4.1.4 Conditioning and testing environment.....	4
4.1.5 Test report .....	5
4.2 Dimensions (except thickness).....	5
4.2.1 Reference.....	5
4.2.2 Principle .....	5
4.2.3 Procedure .....	5
4.3 Thickness .....	5
4.3.1 Reference.....	5
4.3.2 Apparatus .....	5
4.3.3 Procedure .....	5
4.4 Separation force.....	5
4.4.1 Reference.....	5
4.4.2 Principle .....	6
4.4.3 Apparatus .....	6
4.4.4 Procedure .....	6
4.4.5 Expression of result .....	6
4.5 Reel winding.....	6
4.5.1 Reference.....	6
4.5.2 Apparatus .....	7
4.5.3 Procedure .....	7
4.6 Bursting strength.....	7
4.6.1 Reference.....	7
4.6.2 Procedure .....	7
4.7 Stiffness .....	8
4.7.1 Reference.....	8
4.7.2 Procedure .....	8
4.8 Folding endurance.....	8
4.8.1 Reference.....	8
4.8.2 Apparatus .....	8
4.8.3 Procedure .....	8
4.9 Ash content .....	8
4.9.1 Reference.....	8
4.9.2 Procedure .....	8
4.10 Smoothness .....	8
4.10.1 Reference.....	8
4.10.2 Procedure .....	8
4.11 Opacity (paper backing) and opacity (700-1 000 nm).....	9
4.11.1 Reference.....	9
4.11.2 Procedure .....	9
4.12 Coefficient of friction and destacking force.....	9
4.12.1 Reference.....	9

4.12.2	Procedure.....	9
4.13	Reflectance factor .....	10
4.13.1	Reference .....	10
4.13.2	Procedure.....	10
4.14	Air permeance .....	10
4.14.1	Reference .....	10
4.14.2	Procedure.....	10
4.15	Sizing and pen-writing factor.....	10
4.15.1	Reference .....	10
4.15.2	Principle .....	11
4.15.3	Apparatus and reagents .....	11
4.15.4	Preparation of test pieces .....	12
4.15.5	Procedure.....	12
4.15.6	Expression of results.....	13
4.16	Tear resistance .....	13
4.16.1	Reference .....	13
4.16.2	Procedure.....	13
4.17	Delamination resistance.....	14
4.17.1	Reference .....	14
4.17.2	Principle .....	14
4.17.3	Apparatus.....	14
4.17.4	Preparation for test .....	15
4.17.5	Procedure.....	15
4.17.6	Expression of results.....	16
4.17.7	Test report.....	16
4.18	Cold-crack temperature (brittleness).....	17
4.18.1	Reference .....	17
4.18.2	Procedure.....	17
4.18.3	Expression of results.....	19
5	Test methods for magnetic stripe physical characteristics .....	20
5.1	Preparation and storage of samples.....	20
5.2	Conditioning and test environments.....	20
5.3	Protrusion .....	20
5.3.1	Reference .....	20
5.3.2	Principle .....	20
5.3.3	Apparatus.....	20
5.3.4	Procedure.....	20
5.4	Profile deviation .....	20
5.4.1	Reference .....	20
5.4.2	Principle .....	21
5.4.3	Procedure.....	21
5.5	Roughness $R_a$ and $R_z$ .....	22
5.5.1	Reference .....	22
5.5.2	Principle .....	22
5.5.3	Procedure.....	22
5.6	Warpage .....	22
5.6.1	Reference .....	22
5.6.2	Procedure.....	22
5.7	Adherence.....	22
5.7.1	Reference .....	22
5.7.2	Apparatus.....	22
5.7.3	Procedure.....	22
5.8	Wear test .....	23
5.8.1	Reference .....	23
5.8.2	Principle .....	23
5.8.3	Procedure.....	23
5.9	Dimensional measurement of the magnetic stripe.....	23
5.9.1	Principle .....	23
5.9.2	Procedure.....	23

6	Test methods for static magnetic characteristics .....	23
6.1	Principle .....	23
6.2	Apparatus .....	24
6.3	Preparation and storage of sample.....	24
6.3.1	Preparation .....	24
6.3.2	Storage .....	25
6.3.3	Conditioning and testing environment.....	25
6.4	Procedure .....	25
6.4.1	VSM .....	25
6.4.2	HM.....	26
6.5	Expression of results .....	26
6.6	Coercivity, $H_{CM}$ .....	27
6.6.1	Reference.....	27
6.6.2	Procedure .....	27
6.7	Squareness, $SQ$ .....	27
6.7.1	Reference.....	27
6.7.2	Procedure .....	28
6.8	Switching field distribution, ( $SF_D$ ).....	28
6.8.1	Reference.....	28
6.8.2	Procedure .....	28
6.9	Test report .....	28
7	Test method for dynamic magnetic characteristics.....	28
7.1	Principle .....	28
7.2	Reference cards .....	29
7.3	Apparatus .....	29
7.3.1	Measuring instrument for classes L and S .....	29
7.3.2	Measuring instrument for class H.....	29
7.4	Preparation and preservation of test samples .....	29
7.4.1	Preparation .....	29
7.4.2	Preservation .....	29
7.4.3	Conditioning and testing environment.....	30
7.5	Test procedure .....	30
7.5.1	Test densities ( $D_{max}$ and $D_{min}$ ).....	30
7.6	Expression of results .....	30
7.6.1	Resolution .....	30
7.6.2	Modulation.....	30
7.7	Test report .....	31
8	Tests for cards containing contactless chips and antennas .....	31
8.1	Reliability of the chip/antenna connection for a strip of connected cards.....	31
8.1.1	Reference.....	31
8.1.2	Principle .....	31
8.1.3	Equipment .....	31
8.1.4	Procedure .....	32
8.1.5	Test report .....	32
8.2	Reliability of the chip/antenna connection for a single card .....	32
8.2.1	Reference.....	32
8.2.2	Principle .....	32
8.2.3	Equipment .....	33
8.2.4	Procedure .....	33
8.2.5	Test report .....	33
8.3	Test for chip/antenna connection withstanding scratch test .....	34
8.3.1	Reference.....	34
8.3.2	Principle .....	34
8.3.3	Equipment .....	34
8.3.4	Procedure .....	35
8.3.5	Test report .....	35
8.4	Test for card withstanding to Crumpling / Folding .....	35
8.4.1	Reference.....	35
8.4.2	Principle .....	35

8.4.3 Procedure..... 35

8.4.4 Test report..... 36

Bibliography ..... 37

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[ISO/IEC 15457-3:2008](https://standards.iteh.ai/catalog/standards/sist/d9489a9c-a637-4c17-9a43-7d69ac4993cc/iso-iec-15457-3-2008)  
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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member 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 shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15457-3 was prepared by Technical Committee ISO/TC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 15457-3:2002), of which has been technically revised.

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 technique*
- *Part 3: Test methods*

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# Identification cards — Thin flexible cards —

## Part 3: Test methods

### 1 Scope

Thin flexible cards (TFC), 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 test methods and procedures required to carry out measurements of the magnetic stripe and encoding characteristics of thin flexible cards.

Many of the standard methods available for checking physical properties of base materials are intended to be applied to samples cut from continuous material or large sheets. However, all test methods given herein, unless explicitly stated otherwise, apply to finished cards.

The test methods described are to be performed on separate samples. It is not intended that any individual card should pass through more than one test procedure, unless explicitly stated.

Acceptance criteria are not covered by this part of ISO/IEC 15457.

### 2 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 186, *Paper and board — Sampling to determine average quality*

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 534, *Paper and board — Determination of thickness, density and specific volume*

ISO 1831, *Printing specifications for optical character recognition*

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

ISO 2409, *Paints and varnishes — Cross-cut test*

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

ISO 2758, *Paper — Determination of bursting strength*

ISO 3274, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments*

ISO 4094, *Paper, board and pulps — International calibration of testing apparatus — Nomination and acceptance of standardizing and authorized laboratories*

ISO 4287-1, *Surface roughness — Terminology — Part 1: Surface and its parameters*

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

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

ISO/IEC 7811-2, *Identification cards — Recording technique — Part 2: Magnetic stripe — Low coercivity*

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

ISO/IEC 10373-1, *Identification cards — Test methods — Part 1: General characteristics-*

ISO/IEC 10373-2, *Identification cards — Test methods — Part 2: Cards with magnetic stripes*

ISO/IEC 15457-1, *Identification cards — Thin flexible cards — Part 1: Physical characteristics*

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

IEC 60454-2, *Specifications for pressure-sensitive adhesive tapes for electrical purposes — Part 2: Methods of test*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 15457-1, ISO/IEC 15457-2 and the following apply.

#### 3.1

##### **substrate**

material of which the TFC is made without any recording media

#### 3.2

##### **composite**

material made from at least two layers of different material, one of which is paper

**3.3****reference signal amplitude** $U_R$ 

primary standard read back signal amplitude; the maximum value of the average signal amplitude of the reference card, corrected to the primary standard

**3.4****reference write current** $I_R$ 

primary standard write current, obtained from the secondary reference card by measurement

**3.5****reference flux** $F_R$ 

flux in the test write head when the write current is  $I_R$

**3.6****test piece**

part of the sample or test sample on which the test is conducted

**3.7****uncertainty of measurement**

estimate characterising the range of values within which the true value of a measurand lies

[International vocabulary of basic and general terms in metrology (VIM)]

**3.8****⟨optical⟩ transmittance factor** $T$ 

ratio of the measured ⟨optical⟩ flux transmitted by a specimen to the measured flux when the specimen is removed from the sampling aperture of the measuring device;

$$T = \Phi_\tau / \Phi_j$$

where

$T$  is the transmittance factor;

$\Phi_\tau$  is the transmitted ⟨optical⟩ flux;

$\Phi_j$  is the aperture flux.

[ISO 5-2:1991]

**3.9****opacity****⟨optical⟩ transmission density** $D_T$ 

logarithm to the base 10 of the reciprocal of the transmittance factor:

$$D_T = \log_{10} 1/T = \log_{10} \Phi_j / \Phi_\tau$$

[ISO 5-2:1991]

## 4 Test methods for physical characteristics

### 4.1 General

#### 4.1.1 Reference

ISO/IEC 15457-1.

#### 4.1.2 Apparatus

In order to obtain consistent and reproducible results, the apparatus and test devices used to carry out the tests shall comply with ISO 4094, wherever applicable.

#### 4.1.3 Sampling, preparation and storage of samples

##### 4.1.3.1 Sampling

The sampling shall be in accordance with Table 1.

In certain cases samples may be taken from the base material before card manufacture if it can be demonstrated that no significant change in the property to be tested can arise during subsequent processing.

The samples used to prepare a set of test pieces shall be taken from the same batch of TFC base material.

##### 4.1.3.2 Preparation

Test samples shall wherever possible be either finished cards or prepared from finished cards. They shall be conditioned in accordance with 4.1.4.

Test pieces shall, as necessary, be prepared from the test samples in the particular form required by the test apparatus used.

##### 4.1.3.3 Storage

Any test samples or test pieces retained for reference shall be stored under the environmental conditions specified in 5.3.2 of ISO/IEC 15457-1 in such a manner that degradation due to moisture, light, physical distortion, plasticisers and other contamination shall not occur.

All such samples shall be clearly cross-referenced to the test report and any relevant supplementary documentation.

#### 4.1.4 Conditioning and testing environment

Unless otherwise specified, the conditioning of test samples, and environment for the tests specified in this standard shall be in accordance with Table 1.

**Table 1 — Sampling, conditioning and test environment parameters**

Card material	Sampling	Conditioning and testing environment standard	Conditioning and testing environment atmosphere <sup>a</sup>
Paper	ISO 186	ISO 187	23 °C/50 °C ordinary tolerances
Composite	ISO 186	ISO 187	23 °C/50 °C ordinary tolerances
Plastic	ISO 186	ISO 291	normal atmosphere 23 °C/50 °C
<sup>a</sup> "Ordinary tolerances" and "normal atmosphere" are explicit terms taken from the referenced standards.			

#### 4.1.5 Test report

The test report shall be accurate, clear and ensure full traceability.

### 4.2 Dimensions (except thickness)

#### 4.2.1 Reference

ISO/IEC 15457-1:2001, Clause 5.

ISO/IEC 15457-1:2001, Clause 7.

#### 4.2.2 Principle

The principle is direct linear measurement. The dimensions shall be measured with an accuracy appropriate to the tolerance of the prescribed value of the characteristics of ISO/IEC 15457-1.

#### 4.2.3 Procedure

Measure TFC dimensions using a method and apparatus that ensures a total measurement uncertainty equal to or less than 25 % of the absolute value of the tolerance of the dimension to be checked.

EXAMPLE Value =  $d$  mm  $\pm$  0,2 mm; total uncertainty  $\leq$  0,05 mm.

During the performance of the measurement, ensure that any mechanical force applied to the edge of the card during measurement does not exceed 6 N per 10 mm length.

NOTE An optical method can be used.

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### 4.3 Thickness

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#### 4.3.1 Reference

ISO/IEC 15457-1:2001, Annex A or B, as applicable.

#### 4.3.2 Apparatus

Dead weight micrometer.

#### 4.3.3 Procedure

Determine the thickness of paper or composite TFCs in accordance with ISO 534, using a pressure of 100 kPa, outside the data recording area. Thickness shall be the average measurement of three different measurements taken on the same card in three different locations.

### 4.4 Separation force

#### 4.4.1 Reference

ISO/IEC 15457-1:2001, 6.3.4.

ISO/IEC 15457-1:2001, 6.1.4.