

Third edition  
2016-07-15

---

---

## Identification cards — Test methods —

### Part 6: Proximity cards

*Cartes d'identification — Méthodes d'essai —*

*Partie 6: Cartes de proximité*

---

---

Reference number  
ISO/IEC 10373-6:2016(E)





**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

This is a preview of "ISO/IEC 10373-6:2016". Click here to purchase the full version from the ANSI store.

## Contents

	Page
Foreword.....	v
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms, definitions, symbols and abbreviated terms .....</b>	<b>2</b>
3.1 Terms and definitions .....	2
3.2 Symbols and abbreviated terms.....	3
<b>4 Default items applicable to the test methods .....</b>	<b>5</b>
4.1 Test environment.....	5
4.2 Pre-conditioning .....	5
4.3 Default tolerance.....	5
4.4 Spurious inductance .....	6
4.5 Total measurement uncertainty .....	6
<b>5 Apparatus and circuits for test of ISO/IEC 14443-1 and ISO/IEC 14443-2 parameters .....</b>	<b>6</b>
5.1 Minimum requirements for measurement instruments.....	6
5.1.1 Oscilloscope .....	6
5.2 Calibration coils.....	6
5.2.1 Size of the calibration coil card.....	6
5.2.2 Thickness and material of the calibration coil card .....	7
5.2.3 Coil characteristics .....	7
5.3 Test PCD assembly.....	7
5.3.1 Test PCD antenna .....	8
5.3.2 Sense coils.....	9
5.3.3 Assembly of Test PCD .....	9
5.4 Reference PICC .....	10
5.4.1 Dimensions of the Reference PICC.....	10
5.4.2 Reference PICC construction .....	10
5.4.3 Reference PICC resonance frequency tuning.....	12
5.5 EMD test setup.....	13
5.5.1 General description.....	13
5.5.2 Computation of power versus time .....	13
5.5.3 Noise floor precondition test.....	14
<b>6 Test of ISO/IEC 14443-1 parameters .....</b>	<b>14</b>
6.1 PCD tests.....	14
6.1.1 Alternating magnetic field .....	14
6.2 PICC tests.....	15
6.2.1 Alternating magnetic field .....	15
6.2.2 Static electricity test .....	16
6.3 PXD tests.....	17
<b>7 Test of ISO/IEC 14443-2 parameters .....</b>	<b>18</b>
7.1 PCD tests.....	18
7.1.1 PCD field strength .....	18
7.1.2 Void .....	19
7.1.3 Void .....	19
7.1.4 Modulation index and waveform .....	19
7.1.5 Load modulation reception.....	20
7.1.6 PCD EMD immunity test.....	21
7.1.7 PCD EMD recovery test.....	22
7.2 PICC tests.....	23

This is a preview of "ISO/IEC 10373-6:2016". [Click here to purchase the full version from the ANSI store.](#)

7.2.1	PICC transmission .....	23
7.2.2	PICC EMD level and low EMD time test .....	25
7.2.3	PICC reception.....	26
7.2.4	PICC resonance frequency (informative).....	27
7.2.5	PICC maximum loading effect.....	28
7.3	Test methods for bit rates of $3fc/4$ , $fc$ , $3fc/2$ and $2fc$ from PCD to PICC.....	29
7.4	PXD tests.....	29
8	Test of ISO/IEC 14443-3 and ISO/IEC 14443-4 parameters.....	29
8.1	PCD tests.....	29
8.2	PICC tests.....	29
8.3	PXD tests.....	29
8.3.1	PCD and PICC Modes .....	29
8.3.2	Automatic mode alternation.....	29
Annex A (normative)	Test PCD antennas.....	34
Annex B (informative)	Test PCD Antenna tuning .....	43
Annex C (normative)	Sense coil.....	45
Annex D (normative)	Reference PICCs .....	48
Annex E (normative)	Modulation index and waveform analysis tool.....	56
Annex F (informative)	Program for the evaluation of the spectrum .....	111
Annex G (normative)	Additional PICC test methods.....	117
Annex H (normative)	Additional PCD test methods .....	179
Annex I (normative)	High bit rate selection test methods for PCD .....	218
Annex J (informative)	Program for EMD level measurements .....	232
Annex K (normative)	Test methods for bit rates of $3fc/4$ , $fc$ , $3fc/2$ and $2fc$ from PCD to PICC .....	245
Annex L (normative)	Frame with error correction test methods.....	331
Bibliography	.....	340

This is a preview of "ISO/IEC 10373-6:2016". Click here to purchase the full version from the ANSI store.

## 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](http://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](http://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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 10373-6:2011), which has been technically revised.

It also incorporates the Amendments ISO/IEC 10373-6:2011/Amd 1:2012, ISO/IEC 10373-6:2011/Amd 2:2012, ISO/IEC 10373-6:2011/Amd 3:2012, ISO/IEC 10373-6:2011/Amd 4:2012, and the Technical Corrigendum ISO/IEC 10373-6:2011/Cor 1:2013.

ISO/IEC 10373 consists of the following parts, under the general title *Identification cards — Test methods*:

- *Part 1: General characteristics*
- *Part 2: Cards with magnetic stripes*
- *Part 3: Integrated circuit cards with contacts and related interface devices*
- *Part 5: Optical memory cards*
- *Part 6: Proximity cards*

This is a preview of "ISO/IEC 10373-6:2016". [Click here to purchase the full version from the ANSI store.](#)

- *Part 7: Vicinity cards*
- *Part 8: USB-ICC*
- *Part 9: Optical memory cards — Holographic recording method*

This is a preview of "ISO/IEC 10373-6:2016". Click here to purchase the full version from the ANSI store.

# Identification cards – Test methods – Part 6: Proximity cards

## 1 Scope

ISO/IEC 10373 defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, which can be ISO/IEC 7810 or one or more of the supplementary standards that define the information storage technologies employed in identification card applications.

NOTE 1 Criteria for acceptability do not form part of ISO/IEC 10373, but will be found in the International Standards mentioned above.

NOTE 2 Test methods defined in this part of ISO/IEC 10373 are intended to be performed separately. A given proximity card or object, or proximity coupling device, is not required to pass through all the tests sequentially.

This part of ISO/IEC 10373 defines test methods which are specific to proximity cards and objects, and proximity coupling devices and proximity extended devices, defined in ISO/IEC 14443-1, ISO/IEC 14443-2, ISO/IEC 14443-3, and ISO/IEC 14443-4.

ISO/IEC 10373-1 defines test methods which are common to one or more integrated circuit card technologies and other parts deal with other technology-specific tests.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 14443-1:2016, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 1: Physical characteristics*

ISO/IEC 14443-2:2016, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 2: Radio frequency power and signal interface*

ISO/IEC 14443-3:2016, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 3: Initialization and anticollision*

ISO/IEC 14443-4:2016, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 4: Transmission protocol*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*