INTERNATIONAL STANDARD

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Identification cards — Test methods —

Part 9: Optical memory cards — Holographic recording method

Cartes d'identification — Méthodes d'essai —

Partie 9: Cartes à mémoire optique — Méthode d'enregistrement holographique

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Foreword

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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.

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ISO/IEC 10373-9 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

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*

— *Part 7: Vicinity cards*

— *Part 8: USB-ICC*

— *Part 9: Optical memory cards — Holographic recording method*

Introduction

ISO/IEC 10373 defines test methods in support of ISO/IEC 11695, which specifies optical holographic memory cards and the use of such cards for the storage and interchange of digital data.

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Identification cards — Test methods —

Part 9:
Optical memory cards — Holographic recording method

1 Scope

This part of ISO/IEC 10373 defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. It is specific to optical memory cards that use the holographic recording method technology. Each test method is cross-referenced to one or more base standards, i.e. ISO/IEC 7810 or one or more of the supplementary International 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 card is not required to pass through all the tests sequentially.

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/IEC 11695-2, *Identification cards — Optical memory cards — Holographic recording method — Part 2: Dimensions and location of accessible optical area*

ISO/IEC 11695-3, *Identification cards — Optical memory cards — Holographic recording method — Part 3: Optical properties and characteristics*

3 Terms and definitions

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

3.1
test method
method for testing characteristics of identification cards for the purpose of confirming their compliance with International Standards

3.2
testably functional
surviving the action of some potentially destructive influence to the extent that:

— any magnetic stripe present on the card shows a relationship between signal amplitudes before and after exposure that is in accordance with the base standard;

— any integrated circuit(s) present in the card continues to show an Answer to Reset response[1)] which conforms to the base standard;

— any contacts associated with any integrated circuit(s) present in the card continue to show electrical resistance and impedance which conform to the base standard;

— any optical memory present in the card continues to show optical characteristics which conform to the base standard

3.3
normal use
use as an identification card (see ISO/IEC 7810:2003, 4.1), involving equipment processes appropriate to the card technology and storage as a personal document between equipment processes

4 Default items applicable to the test methods

4.1 Test environment

Unless otherwise specified, testing shall take place in an environment of temperature 23 °C ± 3 °C (73 °F ± 5 °F) and of relative humidity 40 % to 60 %.

4.2 Pre-conditioning

Where pre-conditioning is required by the test method, the identification cards to be tested shall be conditioned to the test environment for a period of 24 h before testing.

4.3 Selection of test methods

Unless otherwise specified, the tests in this part of ISO/IEC 10373 shall be applied exclusively to optical memory cards using the holographic recording method, as defined in ISO/IEC 11693 and ISO/IEC 11695 (all parts).

4.4 Default tolerance

Unless otherwise specified, a default tolerance of ±5 % shall be applied to the quantity values given to specify the characteristics of the test equipment (e.g. linear dimensions) and the test method procedures (e.g. test equipment adjustments).

4.5 Total measurement uncertainty

The total measurement uncertainty for each quantity determined by these test methods shall be stated in the test report.

[1)] This part of ISO/IEC 10373 does not define any test to establish the complete functioning of integrated circuit cards. The test methods require only that the minimum functionality (testably functional) be verified. This may, in appropriate circumstances, be supplemented by further, application-specific functionality criteria which are not available in the general case.

5 Test methods

5.1 Location of accessible optical area and reference track

The purpose of this test is to measure the location of the accessible optical area and the reference track in the card. Refer to ISO/IEC 11695-2.

5.1.1 Procedure

Construct two perpendicular axes of reference x and y intersecting at O. Mark three reference points on the axes: points P2 and P3, measured 11,25 mm and 71,25 mm from O are marked on the x axis and point P1, 27,00 mm from O, on the y axis. Place the card to be tested, accessible optical area side up, on a flat hard surface. The card shall be held down by a load of 2,2 ± 0,2 N.

Apply force F_1 (1 N to 2 N) and F_2 (2 N to 4 N) so that the reference edge of the card touches points P2 and P3 and the right edge touches P1 (see Figure 1).

Measure dimensions X_a, X_b, Y, C and D with equipment having an accuracy of 0,05 mm.

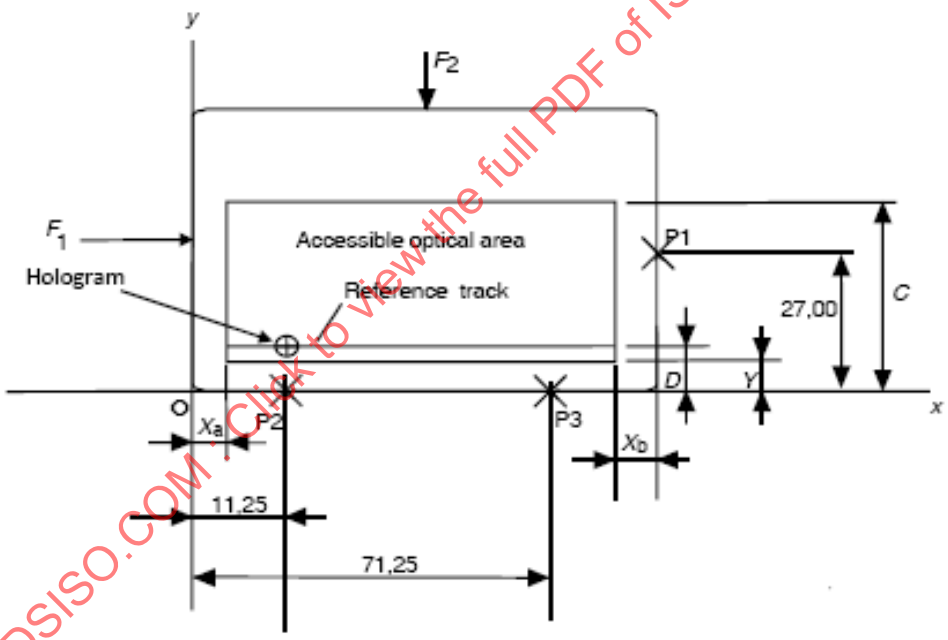

Figure 1 — Location of accessible optical area and reference track

5.1.2 Test report

The test report shall give the values of the dimensions measured.

5.2 Skew

The purpose of this test is to measure the skew of the reference track to the bottom edge of the optical memory card. Refer to ISO/IEC 11695-2.

5.2.1 Apparatus for skew measurement

The apparatus is shown in Figure 2. It comprises

— an xy stage with an xy position indicator, and

— an optical microscope.

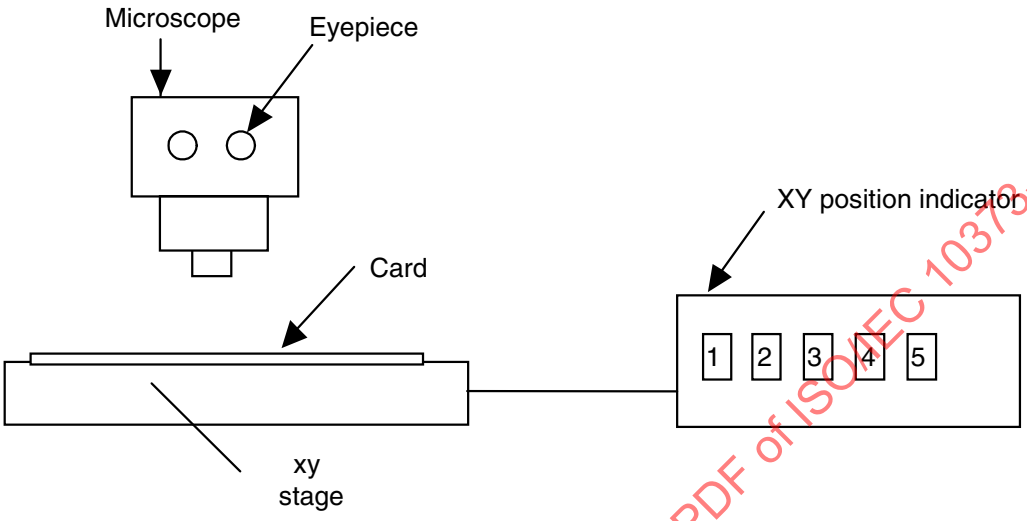

Figure 2 — Apparatus for the skew measurement

5.2.2 Procedure for skew measurement

Place the sample card to be tested, flat, accessible optical area side up, on the xy stage.

Look into the eyepiece of the microscope, move the xy stage so that the reference track on the left side of the card can be seen. (see Figure 3), and adjust the xy stage so that the xy cross-point in the eyepiece is on the reference track. Then record the xy coordinate value (X_0,Y_0).

Next, move the stage in the y direction so that the bottom edge of the card can be seen, adjust the stage and record the value (X_0,Y_2) similarly.

Then move the stage so that the reference track in the right part of the card can be seen, adjust the stage and record the coordinate value (X_1,Y_1). However the value of $|X_0-X_1|$ shall be not less than 60 mm.

Lastly move the stage in the y direction so that the bottom edge of the card can be seen, and record the value (X_1,Y_3) in the same way.

The skew, φ, is calculated by the following expression:

$$\varphi = \mathrm{ABS}[\arctan\{(Y_1-Y_0)/(X_1-X_0)\}-\arctan\{(Y_3-Y_2)/(X_1-X_0)\}]$$

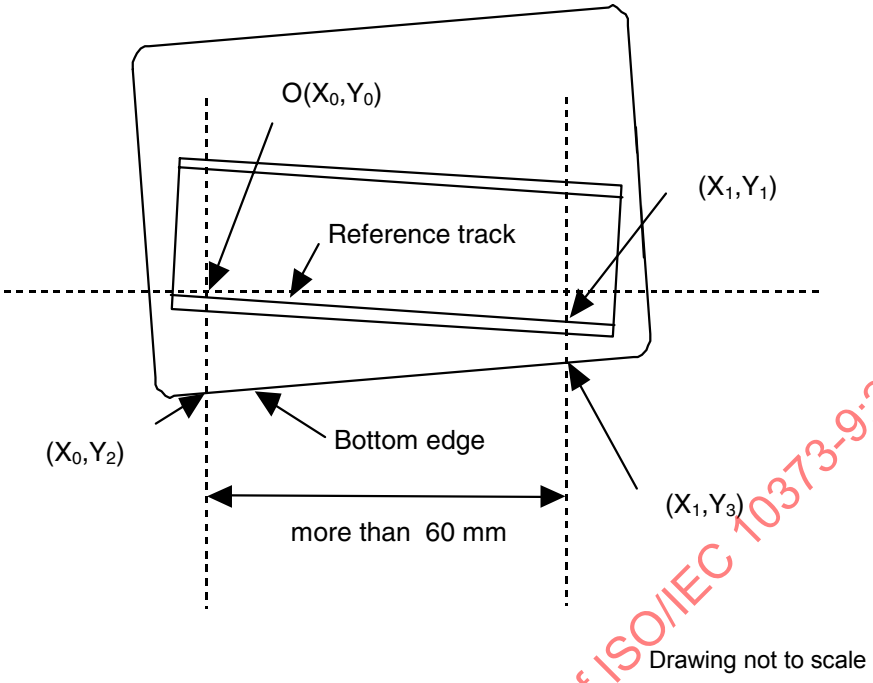

Figure 3 — Procedure for the skew measurement

5.2.3 Test report

The test report shall give the value of the angle measured.

5.3 Hologram size

The hologram size is not fixed, but shall be left to each industry user group to specify for those applications requiring interchange. Refer to ISO/IEC 11695-2.

5.3.1 Apparatus for hologram size measurement

The hologram size shall be measured with a microscope.

5.3.2 Procedure for hologram size measurement

The hologram size shall be measured using a microscope.

5.3.3 Test report

The test report shall give the hologram size measured.

5.4 Arrangement of multiple holograms

The optical area can contain data in form of one or more holograms. The location of the reference hologram is at location *X, Y* relative to the reference edges of the card, while additional holograms are arranged on the reference track or on tracks parallel to the reference track; see Figure 1 and Figure 4. Refer also to ISO/IEC 11695-2.

A minimum distance between the holograms has to be considered to avoid crosstalk from neighbouring holograms when reading out one hologram. The distance (d_x, d_y) depends on the size of holograms; refer to ISO/IEC 11695-2.

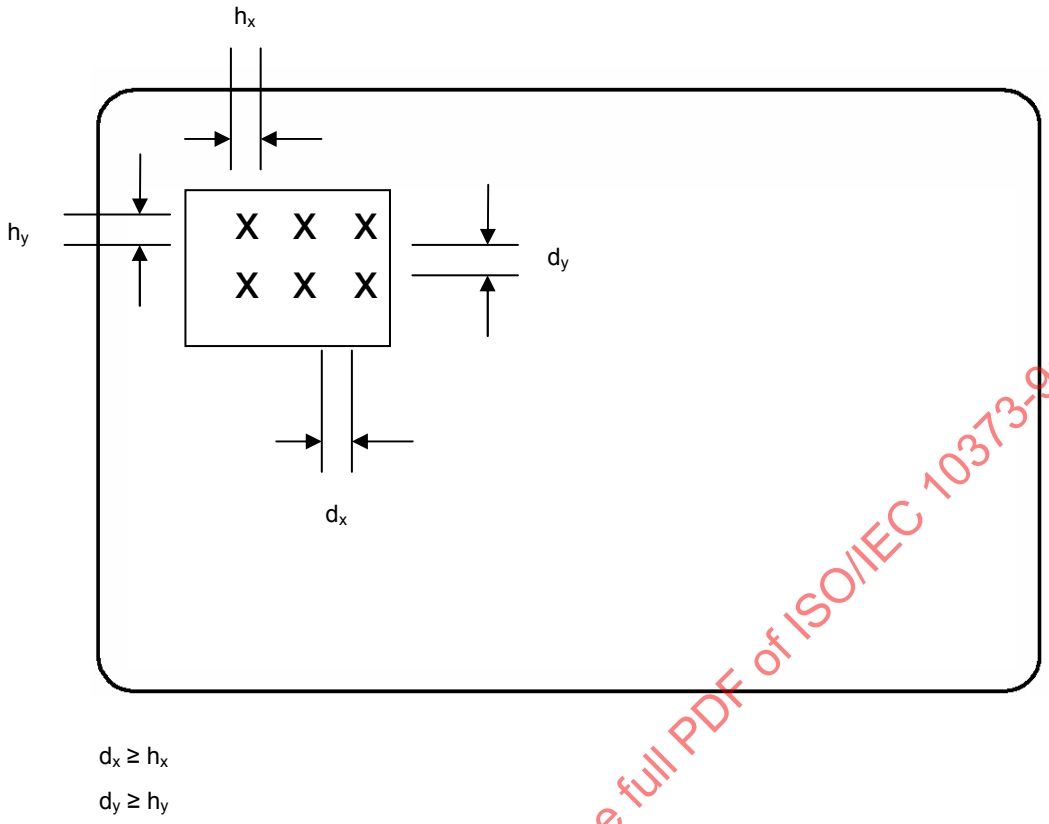

Figure 4 — Arrangement of multiple holograms

5.4.1 Apparatus for measuring the arrangement of multiple holograms

The location of the reference hologram size as well as the position relative to the reference hologram shall be measured with a microscope.

5.4.2 Procedure for measuring the arrangement of multiple holograms

For measuring the hologram size a microscope shall be used.

In a first step the position of the reference hologram is measured in relation to the reference edges.

In a second step the position and size of the corresponding holograms is measured.

5.4.3 Test report

The test report shall give the position of the reference hologram as well as the position of the other holograms relative to the reference hologram.

5.5 Optical properties of the media

For testing the holographic memory card, diffraction gratings recorded in the storage layer shall be measured in reference to ISO/IEC 11695-3.