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Identification cards — Card service life —

Part 2:
Methods of evaluation

Cartes d'identification — Durée de vie des cartes —

Partie 2: Méthodes d'évaluation

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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.

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 or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 24789-2:2011), which has been technically revised.

The main changes are as follows:

- all methods have been revised to bring them to the latest technical status;
- additional details are defined in the method ICM adhesion;
- plasticizer changed from DOP to DOTP;
- temperature humidity cycling method is replaced by temperature and exposure with humidity variation;
- temperature and humidity aging followed by peel strength is deleted;
- ID-card static stress method is added;
- temperature and humidity induced dye migration method is added;
- mechanical life cycle sequence for contactless cards is added into the informative Annex A.

A list of all parts in the ISO/IEC 24789 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

This document provides methods of evaluation of identification (ID) card service life. These methods of evaluation complement the application profiles and requirements defined in ISO/IEC 24789-1 which are intended to be used by card issuers, card manufacturers and card component suppliers to represent the comparative rigour of various ID card service life applications. They provide a means for ranking and comparing the main factors affecting ID card service life in a manner that is amenable to evaluation using the methods defined or referenced in this document.

NOTE For the convenience of certain users, non-SI equivalents are given for some quantity values where these are in common use in the ID card industry. These equivalents appear in parenthesis and are for information only.

Identification cards — Card service life —

Part 2:
Methods of evaluation

1 Scope

This document provides methods of evaluation for ID-1 identification card service life for the applications provided in ISO/IEC 24789-1.

The listed evaluation methods represent available tests, not mandatory tests. The selection of mandatory tests is listed in ISO/IEC 24789-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3664, *Graphic technology and photography — Viewing conditions*

ISO 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

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 7811-8, *Identification cards — Recording technique — Part 8: Magnetic stripe — Coercivity of 51,7 kA/m (650 Oe)*

ISO 9370, *Plastics — Instrumental determination of radiant exposure in weathering tests — General guidance and basic test method*

ISO/IEC 10373-1:2020, *Cards and security devices for personal identification — Test methods — Part 1: General characteristics*

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

ISO 13655, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*

ISO/IEC 14443-1, *Cards and security devices for personal identification — Contactless proximity objects — Part 1: Physical characteristics*

ISO/IEC 24789-1[1], *Identification cards — Card service life — Part 1: Application profiles and requirements*

IEC 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state*

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

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[1] Under preparation. Stage at the time of publication: ISO/IEC FDIS 24789-1.

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO/IEC 24789-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms and definitions

3.1.1
card fracture
crack or break in a card whose depth is at least one third of the card thickness

3.1.2
contactless integrated circuit card
card into which integrated circuit and coupling means have been placed, such that the communication to such integrated circuit is done in a contactless manner

3.2 Abbreviated terms

ATQA	Answer To reQuest, Type A
ATQB	Answer To reQuest, Type B
ATR	answer to reset
DICC	dual interface integrated circuit card, as defined in ISO/IEC 10373-1
DOTP	dioctyl terephthalate CAS 6422-86-2
IC	integrated circuit, as defined in ISO/IEC 7816-1
ICC	integrated circuit card, as defined in ISO/IEC 7810
ICM	integrated circuit model
PICC	proximity integrated circuit(s) card or object, as defined in the ISO/IEC 14443 series
PVC	polyvinyl chloride
RH	relative humidity
VICC	vicinity integrated circuit(s) card or object, as defined in the ISO/IEC 15693 series

4 Default items applicable to the evaluation methods

4.1 Test environment

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

4.2 Pre-conditioning

Pre-conditioning is mandatory for all test methods. The identification card shall be conditioned in the test environment for 16 h before testing.

4.3 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 (for example linear dimensions) and the test method procedures (for example test equipment adjustments).

4.4 Total measurement uncertainty

Total measurement uncertainty shall be reported with the results and is considered when judging conformity. The total measurement uncertainty should be less than 20 % of the permitted tolerance range. JCGM 100 provides guidance for determining and expressing the total measurement uncertainty.

5 Test methods

5.1 Surface abrasion

5.1.1 General

The test simulates mechanical abrasion of the card surface.

5.1.2 Apparatus

5.1.2.1 Abraser, with vacuum pick up or equivalent:

- abrasive wheels pair (TABER® CS-10F); 2)
- resurfacing disks (TABER® S-11);
- dry soft cloth, or soft brush, or both;
- hole punch or equivalent;
- 500 g total load per wheel (250 g additional – no counter weight wheels);
- clamping ring (outer retaining ring).

5.1.3 Procedure

Prepare test cards that possess all desired information and features.

Use the notch location as per Figure 1 if the area of interest falls in the wheel path. If the area of interest does not fall inside the wheel path in Figure 1 then:

- the card may be moved to a different location on the turntable, so the area of interest is in the wheel path;
- if only one card is tested, a place holder card shall be used to position the test card on the turntable so the area of interest is abraded with minimal wheel bouncing;
- notches / holes for mounting the cards on the turntable shall be made in one or both cards;
- location of wear pattern tested shall be noted on the test report.

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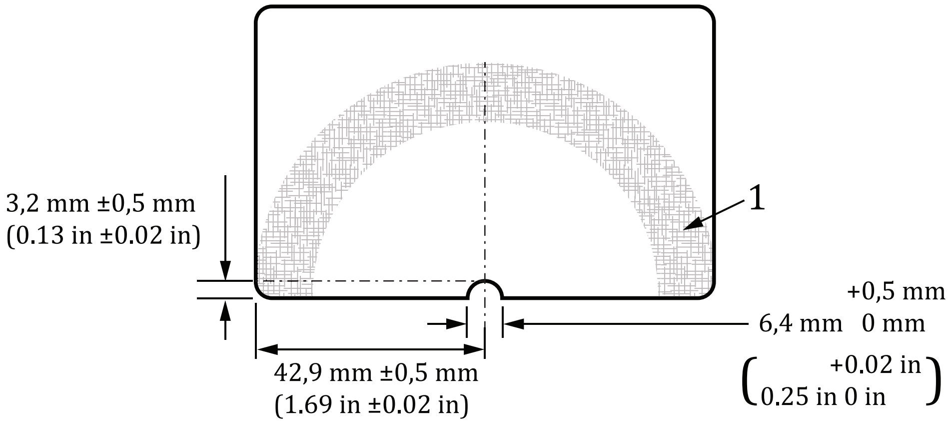
2) TABER® is a trade name of products supplied by TABER®. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO or IEC of the product named. Equivalent products may be used if they can be shown to lead to same result.

Dimensions in millimetres



Key

1 abrasive wheel path

Figure 1 — Test card notch location

Resurface the abrasive wheels for 50 cycles before testing begins. Remove all debris from the cards and turntable by cleaning with either a dry soft cloth or soft brush, or both. Avoid direct finger contact with the test cards and abrasion wheels. Replace the S-11 resurfacing disk after a maximum of 10 uses. Use the clamping ring when re-surfacing to avoid damage to vacuum nozzle from contact with the resurfacing disk.

Mount the cards on the turntable using the clamp plate and nut without a rubber pad. Place the abrasive wheels on the cards and lower the vacuum nozzle to 3 mm (0.12 in) above them.

Start the abraser and vacuum.

- The test shall be paused every 50 cycles. The cards shall be cleaned and examined for wear-through.
- Wear-through within 6 mm (0.25 in) of the card edge shall be excluded from the examination.
- The cards and turntable shall be cleaned with a vacuum and either a dry soft cloth or soft brush, or both. Avoid direct finger contact with the test cards and abrasion wheels.
- The abrasive wheels shall be resurfaced at the beginning of each test and again after every 250 cycles.
- The resurfacing is independent of specified cycles or stopping point.
- Stop the test after wear-through of the card feature is observed.
- Figure 2 illustrates 50 cycles before and at the stopping point for a heat transfer film, varnish or similar coating. This will also be the stopping point for dye printing underneath the heat transfer film.
- Figure 3 illustrates 50 cycles before and at the stopping point for resin-based text. Wear-through is defined as the point where any character is no longer legible.
- Figure 4 illustrates the stopping point for a resin based graphical element (e.g. logo, seal). Wear-through is defined as the point where the element is no longer completely intact or functional.
- The test may be stopped after reaching the limit value of the base standard: