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BSI Standards Publication

Information technology — Test methods for machine readable travel documents (MRTD) and associated devices

Part 1: Physical test methods for passport books (durability)

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National foreword

This British Standard is the UK implementation of ISO/IEC 18745-1:2014.

The UK participation in its preparation was entrusted to Technical Committee IST/17, Cards and personal identification.

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This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL STANDARD

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2014-03-01

Information technology — Test methods for machine readable travel documents (MRTD) and associated devices —

Part 1: Physical test methods for passport books (durability)

Technologies de l'information — Méthodes d'essais pour documents de voyage lisibles par machine et dispositifs associés —

Partie 1: Méthodes d'essais physiques pour livrets de passeport (durabilité)

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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.

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.

ISO/IEC 18745-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

ISO/IEC 18745 consists of the following parts, under the general title *Information technology — Test methods for machine readable travel documents (MRTD) and associated devices —*

— *Part 1: Physical test methods for passport books (durability)*

— *Part 2: Test methods for the contactless interface*

— *Part 3: Test methods for the LDS and security protocols*

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0 Introduction

0.1 General

ICAO Doc 9303 provides the basic functional specification for Machine Readable Travel Documents (MRTDs) and, together with the Supplement, which is published from time to time, describes all relevant properties of MRTDs. Machine Readable Passports (MRPs) are a subset of all MRTDs. The publication of the Part 1 of the 6th edition of Doc 9303 introduces the contactless integrated circuit to the MRP. Such a passport containing a contactless integrated circuit is commonly referred to as an e-Passport.

This part of ISO/IEC 18745 provides a set of instructions for prototype evaluation of Machine Readable Passports (MRPs) which may incorporate contactless integrated circuits. Prototype evaluation is an instrument to establish the ability in principle of a specific type of document to fulfil the requirements of use. The procedure of prototype evaluation, therefore, is also referred to as "Type Evaluation".

This document is a companion to ICAO Doc 9303. It specifies the minimum criteria to be achieved in order to meet ICAO's expectations for durability of fully personalized MRPs. Therefore, by its existence, and endorsement by ICAO, this document implicitly defines additional requirements for passports above and beyond Doc 9303. Some of the tests described herein are also intended to serve as an instrument for the assessment of the ageing behaviour of the MRP and its components.

This part of ISO/IEC 18745 updates and replaces document "Technical Report – Durability Of Machine Readable Passports – Version 3.2 – Date 2006-08-30" published by ICAO (International Civil Aviation Organization).

0.2 Future Considerations

Where technologies or combinations of technologies are to be applied in a MRP, which are not covered by the test methods described below, it is recommended to define such test methods based on available methods described in ISO/IEC or any other accepted international standard organization in cooperation with the suppliers of such technologies.

Today, there is no stable state of the art regarding the correlation between stress and ageing, neither for previously existing nor for oncoming types of MRP. The tests that can be described at the present stage may contribute to improve such knowledge but need to be considered preliminary. It is important to notice that ultimately, reliable and predictably useful correlations can only be achieved by continuously comparing the ageing behaviour of documents in real use to the predictions made. Such predictions are based on assumptions that, in particular if novel and unusual technologies and components are used, are in many cases unproven and preliminary in nature.

It is one of the aims of this standard to help in the task of establishing sound correlations. This is done by providing tools for executing tests with comparable results for a multitude of acting parties. Comparable results are a prerequisite to encourage the execution of field surveys in quality related research and their use for a continuous improvement not only of this standard but also of the quality of MRPs on a global basis.

0.3 Other Uses for this Document

The tests defined in this document may also be appropriate for other forms of MRTD, however, they may require modification before use.

Where applicable, tests may be used to evaluate characteristics of non-personalized MRPs or materials used to make MRPs.

Type Evaluation is usually a one-time exercise in the life cycle of a specific type of document. However the same test procedures may be useful for the proper definition of quality assurance procedures during the regular production of MRTDs. In the framework of the contractual relationship between a manufacturer and his customer(s) it is common practice to establish an expected quality level for the MRTDs in the delivery contract, and also to specify acceptance criteria for individual deliveries in

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executing the contract. On the other hand, it is good practice to leave it with the manufacturer to decide on the production quality measures to assure this quality level.

This International Standard has been carefully designed to provide the user with a set of tools for evaluating MRPs, whether it be Prototype Evaluation, Delivery Acceptance, or any other purpose.

0.4 Terminology

For ICAO, keywords are SHALL, which means mandatory, and SHOULD, which is optional but is considered best practices.

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INTERNATIONAL STANDARD ISO/IEC 18745-1:2014(E)

Information technology — Test methods for machine readable travel documents (MRTD) and associated devices —

Part 1: Physical test methods for passport books (durability)

1 Scope

This part of ISO/IEC 18745 provides a set of instructions for prototype evaluation of Machine Readable Passports (MRPs) which may incorporate contactless integrated circuits. Prototype evaluation is an instrument to establish the ability in principle of a specific type of document to fulfil the requirements of use. It supplies a structured approach to evaluate Machine Readable Passports by:

— defining reproducible stress methods to submit the document(s) under evaluation to specific stress or environmental conditions;

— defining reproducible evaluation methods to measure numerical values for specific document properties;

— defining test sequences that specify the order in which stress methods and evaluation methods are to be performed;

— defining test plans to link specific user requirements to test sequences and related parameters.

It specifies the minimum criteria to be achieved in order to meet ICAO's expectations for durability of fully personalized MRPs.

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 105-A02:1993, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 105-B02, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test*

ISO 105-E04, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration*

ISO 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2439:2008, *Flexible cellular polymeric materials — Determination of hardness (indentation technique)*

ISO/IEC 7810, *Identification cards — Physical characteristics*

ISO/IEC 7810:2003/Amd.1:2009, *Identification cards — Physical characteristics — Amendment 1: Criteria for cards containing integrated circuits*

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ISO/IEC 7816-1, *Identification cards — Integrated circuit cards — Part 1: Cards with contacts — Physical characteristics*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 9352:2012, *Plastics — Determination of resistance to wear by abrasive wheels*

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

ISO/IEC 10373-6, *Identification cards — Test methods — Part 6: Proximity cards*

ISO/IEC 10373-6:2001/Amd.7:2010, *Identification cards — Test methods — Part 6: Proximity cards — Amendment 7: Test methods for ePassport*

ISO 12040:1997, *Graphic technology — Prints and printing inks — Assessment of light fastness using filtered xenon arc light*

ISO 12757-1:1998, *Ball point pens and refills — Part 1: General use*

ISO 12757-2:1998, *Ball point pens and refills — Part 2: Documentary use (DOC)*

ASTM E 832 - 81 (Reapproved 2003), *Standard Specification for Laboratory Filter Papers*

ICAO Doc 9303, Part 1, 6th edition, 2006, *Machine Readable Travel Documents*[1)]

ICAO *Supplement to Doc 9303*[2)] as published from time to time

3 Terms and definitions

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

3.1
chip sheet
sheet containing a chip

3.2
constant
fixed values that can be given to parameters (within methods) when defining a sequence or test plan

3.3
evaluation method
method to measure numerical values for specific document properties

3.4
evaluation result
all numerical values related to document properties measured upon performing a test sequence

3.5
method
instruction or set of instructions defining equipment and related tools and materials in an experimental setup, including general advice on their use in a specific test procedure.

3.6
page
any single side of an individual sheet of the MRP

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2) Published on the ICAO web site under http://www.icao.int/ .

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3.7
parameter
variable quantity within a test procedure that is not part of the instructions describing the procedure; in particular, experimental parameters that need to be controlled during the test sequence but whose values and/or tolerances are not explicitly defined in a specific stress or evaluation method or sequence

3.8
sheet
any structure having a free edge and an opposite edge attached to the spine making up the MRP including covers, datapage, visa pages, observation pages, and chip sheet

Note 1 to entry: Each sheet has 2 pages.

3.9
stress method
experimental setup and procedure that may or may not deteriorate or destroy the document under examination

3.10
test instruction
distinct piece of information required within the framework of test execution

3.11
test plan
list of test sequences and their specific test parameters and expected evaluation results

3.12
test procedure
set of instructions to be followed in order to obtain a test result

3.13
test sequence
test procedure that comprises a number of different methods in a defined order of execution

3.14
type evaluation
type approval
process of testing a design (type of documents produced while using a common material and component basis and the same manufacturing processes, including same production quality assurance process) to ensure it is compliant-in-principle with the specifications

4 Abbreviations

IC	Integrated Circuit
ICAO	International Civil Aviation Organization
MRP	Machine Readable Passport
MRTD	Machine Readable Travel Document
PCD	Proximity Coupling Device
PIC	Proximity Integrated Circuit (note, Doc 9303 uses CIC (contactless integrated circuit) and PIC interchangeably)

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5 Methodology

The systemic approach used in this document provides three structural levels to define a complete test specification for MRPs.

The first level deals with methods to exert defined stresses to documents and to evaluate the results of such stresses. The second level deals with predefined sequences of stresses and related evaluations using the methods defined in level 1. The third level specifies the lists of test sequences and the individual quantities of test specimens to be subject to each sequence. The purpose is to include in such lists all sequences that are considered necessary to achieve type approval for a specific type of MRP with specific lifetime and usage expectations. This is referred to as a test plan.

This approach provides flexibility in creating individual test plans appropriate for varying user requirements and MRP specifications without increasing the variety of basic testing methods beyond a strict minimum. It also allows the use of a parameterized method description; parameters, which may be explicitly specified on the sequence and/or test, plan level.

In this way this Test Specification provides the entire toolset for prototype evaluation of MRPs.

Table 1 — Hierarchical Approach for Test Methodology

Level	Subject	Description	Degree of variance	Clause
1	Stress methods	The purpose is to submit the document(s) under evaluation to specific stress or environmental conditions in a well-defined experimental setup that ensures reproducibility.	Parameters	8
1	Evaluation methods	The purpose is to measure numerical values for specific document properties using well-defined and reproducible experimental setups that may or may not deteriorate or destroy the document under examination.	Parameters	9
2	Test sequences	Sequence of use of the above methods in performing a complete test.	Constants and Parameters	10
3	Test plans	Scenarios which link the user requirements to specific test sequences and related parameters used for the tests on the one hand and to specific test results on the other.	Constants	11

Each sequence is composed of stress methods and evaluation methods executed in a specific order. A test plan is composed of one or more individual sequence(s) that is linked to a specific set of documents and user requirements. See Figure 1.

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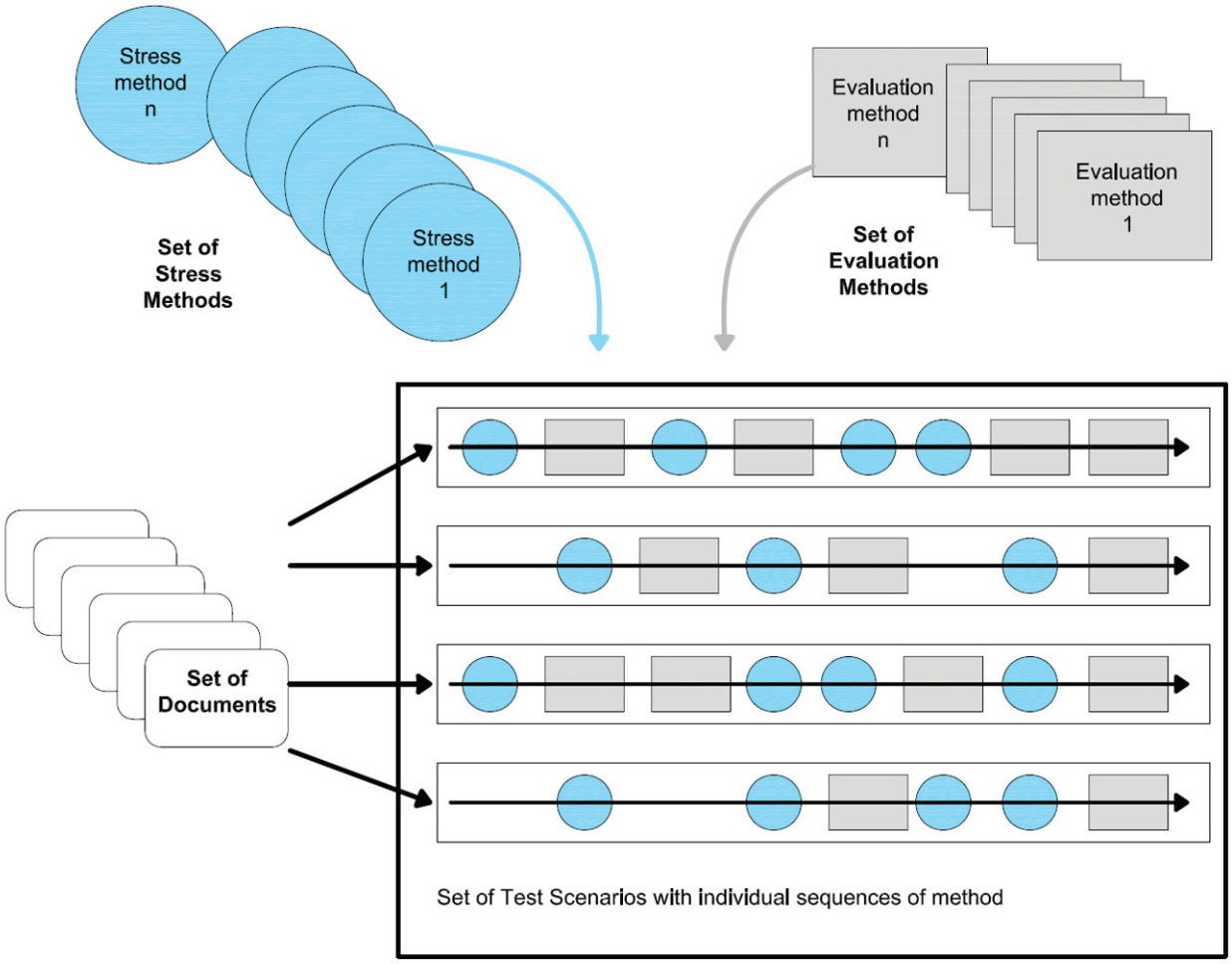

Figure 1 — Relationship between Methods, Sequences and Test Plans

6 Guidance to the Tester

6.1 Number of Samples

References are given to a single MRP. However, multiple MRP samples may be tested simultaneously depending on the size and construction of the test apparatus.

6.2 Preparation

Test samples shall be either finished MRPs or be prepared from finished MRPs having passed the entire production process including visual personalization with a dataset considered typical for the specific type of passport. Initialisation and personalization of the chip may be done in an arbitrary way as long as the chip is able to support the necessary tests within the intended test sequence.

MRPs shall be conditioned in accordance with 7.1 Default Environment.

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

6.3 Sampling

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

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processing. The samples used to prepare a set of test pieces shall be taken from the same batch of MRP base materials.

6.4 Storage

Any test samples or test pieces retained for reference shall be stored under the environmental conditions specified in 7.1 Default Environment.

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

7 Common Method Information

7.1 Default Environment

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

7.2 Climatic conditions

Climatic conditions defined in the test methods are the conditions within the chamber. The resulting temperature in the MRP is not specified or defined in the methods.

7.3 Tolerances

Unless otherwise specified, a tolerance of ± 5 % shall be applied to the quantity values given in this document.

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7.4 Default MRP holder

A structure for holding the MRP while maximizing air space around the MRP during testing shall have the general construction as shown in Figure 2 — MRP rack. There are no size or quantity limitations for the holder rack, any number of MRP positions may be used.

Dimensions in millimetres

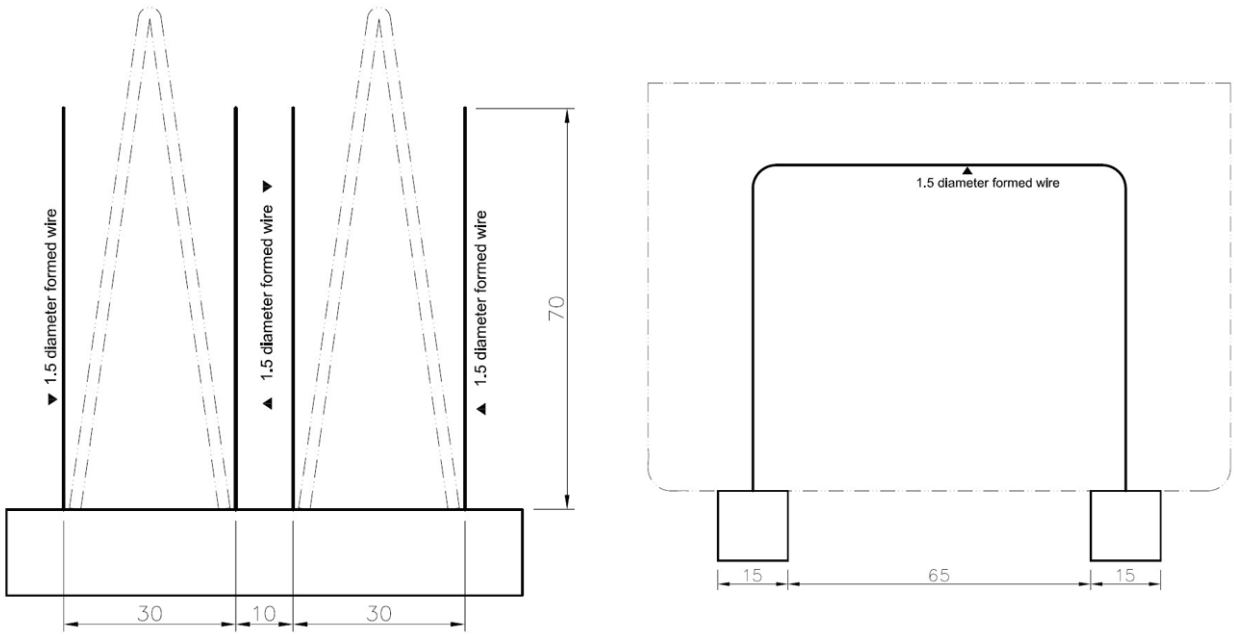

Figure 2 — MRP rack

8 Stress Methods

Stress methods are designed to apply reproducible stresses to the travel document. Methods that describe how to measure the effect of these stresses are given in Clause 9 Evaluation methods.

The fundamental philosophy behind all stress methods is to define conditions that mimic real daily use (as much as possible). In cases where the correlation between real life and the stress method is tenuous, every attempt has been made to define conditions that produce similar rates of deterioration.

8.1 Conditioning Stress Method

8.1.1 Introduction

The MRPs to be tested shall be conditioned to the test environment as described below.

8.1.2 Input Parameters

t = time of conditioning. If t is not specified, assume 24 hours.

8.1.3 Apparatus

— Default MRP holder.

8.1.4 Method

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— Remove MRP from any box and protective packaging.

— Place MRP in default MRP holder with spine up. MRP shall not be forced open but may open on its own. Minimum spacing between MRP and any other MRP shall be 10 mm in all directions.

— Expose MRP to a temperature of 23 °C ± 3 °C and relative humidity of 40 % RH to 60 % RH for at least time t.

8.2 Thermal Cycling Stress Method

8.2.1 Introduction

This stress method subjects the MRP to cycling between two temperature extremes. This stress simulates the thermal shock the MRP could experience due to thermal expansion and contraction of each MRP component. The test is conducted over a short period of time for each stress cycle.

8.2.2 Input Parameters

n = number of cycles

8.2.3 Apparatus

— Two climate controlled chambers. Where applicable, a single fast-response climate controlled chamber may be used in place of a second test chamber.

— Default MRP holder

8.2.4 Method

— Control of relative humidity in the climate chambers is not required for this test but the test chamber should be located in a test environment as defined in 7.1.

— Place in a climate controlled chamber at temperature of 77 °C ± 3 °C for 15 minutes.

— Transfer the MRP in the default MRP holder to a second climate controlled chamber held at a temperature of –32 °C ± 3 °C in less than 60 seconds (a transfer time of 15 seconds is recommended). The position of the MRP in the holder should not be modified during the transfer process.

— Subject the MRP to a temperature of –32 °C ± 3 °C for 15 minutes.

— Repeat the process for n cycles as depicted in Figure 3 — Thermal Cycling.

— At the end of the cycling process remove MRP and return to the default environment. Leave MRP in holder and condition according to 8.1.

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