
Permanence and durability of commercial prints —

Part 1: Definition of use profiles and guiding principles for specifications

Permanence et durabilité des impressions commerciales —

*Partie 1: Définition des profils d'utilisation et des principes directeurs
pour les spécifications*



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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.

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 ISO documents 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).

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. 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).

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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 42, *Photography*.

A list of all parts in the ISO/TS 21139 series can be found on the ISO website.

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.

Introduction

This Technical Specification ISO/TS 21139 (all parts) defines use profiles and test methods for permanence and durability testing of printed matter for use in the context of commercial applications, which resemble a wide range of product and usage classes (see e.g. ISO/TR 19300). Product classes included are commercial production prints (flyers, brochures), transactional and stationary prints, signage, newspapers and periodical prints, book printing as well as packaging printing. These commercial prints often contain combinations of text, pictorial images and/or artwork. Prints for non-commercial use, including prints used and displayed in consumer home environments and prints exhibited or stored in museum context, are outside the scope of this document.

A use profile describes typical environmental and other stresses characteristic for the conditions under which a printed sheet or object is typically used. Also certain (implicit) expectations for retained print properties under these conditions may be connected to a particular use profile. These need to be explicated and linked to observed failure modes and assessed as measureable changes of image parameters, including the various dimensions of image quality and physical integrity of the print.

For permanence testing either single or combined stress factors are applied in accelerated laboratory tests that aim to simulate the degradation observed in field use. ISO/TS 21139 (all parts) defines test methods that are appropriate to simulate exposure in use profiles of printed matter in a variety of uses. Furthermore, requirements for reporting of permanence test results are given as guidance for translation of test results into use profile performance, also addressing limitations of “year calculations” due to restrictions of accelerated testing and variability in actual display conditions.

In the context of service life testing of identification cards defined in ISO 24789-1 and ISO 24789-2, a matrix of stresses and evaluations has been defined to simulate various application profiles of such plastic cards. ISO/TS 21139 (all parts) may be developed in an analogous way in a future revision.

Permanence and durability of commercial prints —

Part 1:

Definition of use profiles and guiding principles for specifications

1 Scope

This document defines use profiles for commercial prints in terms of typical environmental stress factors and any mechanical and chemical stress factors to be considered additionally in their application.

Methods and principles defined in this document apply to the various product classes of “commercial prints” that, following the terminology of ISO/TS 19300, include commercial production prints (flyers, brochures), transactional and stationary prints, signage, newspapers and periodical prints, book printing as well as packaging printing. These commercial prints often contain combinations of text, pictorial images and/or artwork. Prints for non-commercial use, including prints use and display in consumer home environments and prints exhibited or stored in museum context, are outside the scope of this document.

For each use profile a set of suitable accelerated test methods for the leading environmental and/or mechanical or chemical stress factors is defined for representative testing. Guidance is given for translation of test results into suitable image permanence performance claims considering the variability of actual use in comparison to reference use profiles.

The test methods and guiding principle described in this document apply to both, analogue and digitally printed matter, and the corresponding test targets from the ISO 12647 series are used. Methods and principles apply to both colour and monochrome prints.

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 5-4, *Photography and graphic technology — Density measurements — Part 4: Geometric conditions for reflection density*

ISO 2836, *Graphic technology — Prints and printing inks — Assessment of resistance of prints to various agents*

ISO 5626, *Paper — Determination of folding endurance*

ISO 12647-7, *Graphic technology — Process control for the production of halftone colour separations, proof and production prints — Part 7: Proofing processes working directly from digital data*

ISO 12647-8, *Graphic technology — Process control for the production of half-tone colour separations, proof and production prints — Part 8: Validation print processes working directly from digital data*

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

ISO 18930, *Imaging materials — Pictorial colour reflection prints — Methods for evaluating image stability under outdoor conditions*

ISO 18936, *Imaging materials — Processed colour photographs — Methods for measuring thermal stability*

ISO 18937, *Imaging materials — Photographic reflection prints — Methods for measuring indoor light stability*

ISO 18941, *Imaging materials — Colour reflection prints — Test method for ozone gas fading stability*

ISO 18946, *Imaging materials — Reflection colour photographic prints — Method for testing humidity fastness*

ISO 18947, *Imaging materials — Photographic reflection prints — Determination of abrasion resistance of photographic images*

ISO 18948, *Imaging materials — Photo books — Test methods for permanence and durability*

IEC 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 + 12 h cycle)*

IEC 60068-2-38, *Environmental testing — Part 2-38: Tests — Test Z/AD: Composite temperature/humidity cyclic test*

3 Terms and definitions

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

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

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

3.1 application profile

set of parameters that, in total, define the conditions of use specified for an application

[SOURCE: ISO 24789-1:2012, 3.1.2]

3.2 use profile

total set of environmental, mechanical and/or chemical conditions to which a printed product is subject to during a particular use

3.3 stress factor

element of the environmental, mechanical and/or chemical conditions to which a printed product is exposed

Note 1 to entry: A particular combination of stress factors defines a particular use case and material degradation results from the complex interaction between the processes triggered by the presence of stress factors.

Note 2 to entry: Leading environmental stress factor include light, heat, humidity, and air pollution. Examples of mechanical stress factors are scratching, abrasion, bending, flexing, folding, tearing, and pressure. Example of a chemical stress factor is the contact to a liquid, including water, solvent, sweat, oils and detergents.

3.4 test target

set of colour patches or line elements based on which a change in image quality attributes can be evaluated

EXAMPLE The print control strips described in ISO 12647-8.