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BSI Standards Publication

Permanence and durability of commercial prints

Part 22: Backlit display in indoor or shaded outdoor conditions — Light stability

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National foreword

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Permanence and durability of commercial prints —

Part 22:

Backlit display in indoor or shaded outdoor conditions — Light stability

Permanence et durabilité des impressions commerciales —

*Partie 22: Écran rétroéclairé en intérieur ou en extérieur ombragé —
Stabilité de la lumière*



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Foreword

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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 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).

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For an explanation of 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 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 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

Backlit display of prints is a market segment in context of commerce (advertisement, brand shops) and information (maps, directories). This use profile has specific spectral irradiance and environmental conditions which are different from e.g. general indoor or in-window display (ISO/TS 21139-21).

Backlit display applies with prints on transparent or translucent foils and/or prints on a textile. The document focusses on LED-based backlit units and on the other hand provides information on fluorescent-based backlit units for reference. These backlit displays may be installed indoor or in shaded outdoor conditions, for examples backlit display units in shelters and patios. Backlit displays which are subject to solar radiative heating or precipitation, introducing extensive temperature cycling, are excluded.

Prints on backlit display may fade or otherwise change in appearance due to various environmental stresses, including light, heat, humidity, atmospheric pollutants, or biological attack, and the combination of these factors. One of the most critical degradations is light fading caused by intense irradiation from the backlit unit as well as illumination from the viewing environment, which may represent various levels of intensity and degrees of spectral irradiance, depending on the installation site in a building, near to a window or in a shaded outdoor condition. The factors determining the exposure doses from either frontside or backside are introduced, and the severity of the actual spectral irradiance is expressed as a ratio to the standardized exposure condition "general indoor" as defined by ISO 18937-2.

The lighting design of the backlit display unit may cause inhomogeneity of the backside exposure of the print, which may in turn introduce inhomogeneous patterns of colour fading or discoloration leading to enhanced visibility of degradation (an example is illustrated in [Annex B](#)). The test method described in this document does not include the assessment of the impact from inhomogeneity of the backside exposure.

This document provides information about the test conditions for colour fading and discoloration applicable for the different types of display materials, including transparent or translucent films, fabrics as well as paper-based reflection prints. Furthermore, the document gives guidance for estimation of an equivalent exposure dose for the intended time of display, acknowledging the limitations of such generic extrapolations. The display use profile applies for digital and analogue prints.

This test method does not address the adverse effects of exposure to atmospheric pollutants, including ozone, and is also limited to the evaluation of colour changes and therefore does not require specific methods for the evaluation of physical properties, including changes of tensile strength, cockling etc. In the case that backlit materials are constructed from laminates, the aforementioned factors are of less importance.

The general concepts for the exposure characterization of prints on a backlit display provided in this document may also be considered in museum context with details defined by ISO/TS 18950.

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Permanence and durability of commercial prints —

Part 22:

Backlit display in indoor or shaded outdoor conditions — Light stability

1 Scope

This document describes the test methods for light stability measurements of prints on transparent or translucent foils, sheets and paper or printed on a textile, which are displayed on backlit units installed in indoor or in shaded outdoor conditions, which are protected against direct precipitation and radiative heating. Installations of backlit display units in outdoor areas without shading, which are exposed to direct weathering and/or radiative heating, are excluded.

This document is applicable to the various product classes of “commercial prints” that are suitable for backlit display. These commercial prints often contain combinations of text, pictorial images and/or artwork.

This document provides guidelines for colour measurements, data analysis and also provides guidance for translation of test results into suitable image permanence performance claims considering the variability of backlit designs and environmental conditions.

This document is applicable to both analogue and digitally printed matter. 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 18937-1, *Imaging materials — Methods for measuring indoor light stability of photographic prints — Part 1: General guidance and requirements*

ISO 18937-2, *Imaging materials — Methods for measuring indoor light stability of photographic prints — Part 2: Xenon-arc lamp exposure*

ISO/PAS 18940-1, *Imaging materials — Image permanence specification of reflection photographic prints for indoor applications — Part 1: Test methods*

ISO/TS 21139-1, *Permanence and durability of commercial prints — Part 1: Definition of use profiles and guiding principles for specifications*

ISO/TS 21139-21, *Permanence and durability of commercial prints — Part 21: In-window display — Light and ozone stability*

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 <https://www.iso.org/obp>