
**Imaging materials — Methods for
measuring indoor light stability of
photographic prints —**

**Part 2:
Xenon-arc lamp exposure**

*Matériaux pour l'image — Méthodes de mesure de la stabilité de la
lumière en intérieur des épreuves photographiques —*

Partie 2: Exposition à une lampe à arc au xénon





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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 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*. This first edition of ISO 18937-2 cancels and replaces the second edition of ISO 18937:2020, which has been technically revised.

The main changes are as follows:

- This revision of the existing ISO 18937 separates the International Standard into three separate parts in a similar way to two other artificial exposure testing series, ISO 4892 (Plastics, in TC 61), and ISO 16474 (Paints and varnishes, in TC 35).

A list of all parts in the ISO 18937 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.

Imaging materials — Methods for measuring indoor light stability of photographic prints —

Part 2: Xenon-arc lamp exposure

1 Scope

This document describes test equipment and procedures for measuring the light stability of photographic prints when subjected to a filtered xenon-arc light source at specified levels of illuminance (irradiance), temperature and relative humidity. It is applicable to both colour and monochrome reflection prints, transparent films, or translucent films. It is also applicable to photographic prints in general, photobooks, or prints for backlit displays.

General indoor display conditions described herein are intended to simulate common use conditions found in houses, apartments and other dwelling places where indirect lighting due to filtering (through window glass) and shading is often the principal illumination causing displayed photographs to fade.

Simulated in-window display conditions are intended to simulate terrestrial daylight transmitted through standard architectural window glass (double glazing). A typical example of such display can be found when images are displayed in store windows, facing toward the outdoors, so that they can be viewed by people outside of the store^{[5][6]}.

NOTE It is recognized that in some instances, physical degradation such as support embrittlement, image layer cracking, or delamination of an image layer from its support, rather than the stability of the image itself, will determine the useful life of a print material.

General guidance is given in ISO 18937-1.

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

ISO 18913, *Imaging materials — Permanence — Vocabulary*

ISO 18937-1, *Imaging materials — Photographic reflection prints — Methods for measuring indoor light stability — Part 1: General guidance and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18913 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>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

A xenon arc lamp, fitted with filters, is used to simulate the relative spectral irradiance of various end-use conditions to simulate standardized indoor lighting conditions by their relative spectral irradiance in the ultraviolet (UV) and visible regions of the spectrum.

Depending on intended user or application cases, specimens are exposed to desired levels of light, heat, and relative humidity under controlled environmental conditions.

The exposure conditions are varied by selection of

- a) the light filter(s),
- b) the irradiance or illuminance level,
- c) the temperature during exposure to light,
- d) the relative humidity in the chamber during light and dark exposures,
- e) the relative duration of the light and dark periods.

The procedure includes measurements of the irradiance or illuminance and radiant exposure in the plane of the specimens.

5 Apparatus

5.1 Laboratory light source.

5.1.1 General

The light source shall comprise one or more quartz-jacketed xenon-arc lamps which emit radiation from below 270 nm in the ultraviolet through the visible spectrum and into the infrared. In order to simulate the end-use conditions, filters shall be used to remove short-wavelength UV radiation.

5.1.2 Optical filters.

Filters are used with the intention of reproducing as closely as possible different end-use lighting conditions^{[3][4]}. Special filtering of the xenon-arc lamp is used to achieve two specific lighting conditions applicable to this method.

The optical filters shall be placed at any position between the light source and the specimens to achieve the required spectral irradiance conditions. The filters can be placed near the light source or near the specimens, but the air gap between the specimens and the filter shall allow an unobstructed airflow between the filter and the specimens.

5.1.3 Irradiance uniformity.

The irradiance at any position in the area used for specimen exposure shall be at least 80 % of the maximum irradiance. Periodic repositioning of specimens when irradiance uniformity is between 80 % and 90 % is described in ISO 18937-1.

NOTE For some materials of high sensitivity to irradiance and temperature, periodic repositioning of specimens is recommended to ensure uniformity of exposures, even when the irradiance uniformity in the exposure area is within the limits where repositioning would not be required.

5.2 Test chamber.

The design of the test chamber may vary, but it shall be constructed from inert material. The test chamber shall provide control systems for irradiance, temperature and humidity.