



SLOVENSKI STANDARD

SIST EN 20105-B02:1996

01-maj-1996

Tekstilije - Preskušanje barvne obstojnosti - Del B02: Preskušanje barvne obstojnosti na umetni svetlobi (preskus s ksesmononsko svetilko)

Textiles - Tests for colour fastness - Part B02: Colour fastness to artificial light (Xenon arc fading lamp test) (ISO 105-B02:1988)

Textilien - Farbechtheitsprüfung - Teil B02: Lichteinheit mit künstlichem Licht (Xenonbogenlicht) (ISO 105-B02:1988)

Textiles - Essais de solidité des teintures - Partie B02: Solidité des teintures a la lumiere artificielle (Lampe a arc au xénon) (ISO 105-B02:1988)

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ICS:

59.080.01 Tekstilije na splošno Textiles in general

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EUROPEAN STANDARD

EN 20105-B02:1992

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Descriptors: Textiles, dyeing, dyes, dyeing tests, colour fastness, artificial light tests, arc lamps, xenon lamps

English version

**Textiles - Tests for colour fastness - Part B02:
Colour fastness to artificial light (Xenon arc fading
lamp test) (ISO 105-B02:1988)**

Textile - Essai de solidité des teintures -
Partie B02: Solidité des teintures à la lumière
artificielle (Lampe à arc au xénon)(ISO
105-B02:1988)

Textilien - Farbechtheitsprüfung - Teil B02:
Lichtechtheit mit künstlichem Licht
(Xenonbogenlicht) (ISO 105-B02:1988)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard is the endorsement of ISO 105-B02. Endorsement of ISO 105-B02 was recommended by the Technical Committee (CEN/TC 248) "Textiles and textile products" under whose competence this European Standard will henceforth fall.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 1993, and conflicting national standards shall be withdrawn at the latest by May 1993.

The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Endorsement notice

The text of the International Standard ISO 105-B02:1988 was approved by CEN as a European Standard without any modification.

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INTERNATIONAL STANDARD

ISO
105-B02

Third edition
1988-05-01



INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Textiles — Tests for colour fastness —

Part B02:

Colour fastness to artificial light: Xenon arc fading lamp test

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Textiles — Essais de solidité des teintures —

Partie B02: Solidité des teintures à la lumière artificielle: Lampe à arc au xénon

SIST EN 20105-B02:1996

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 105-B02 was prepared by Technical Committee ISO/TC 38, *Textiles*.

This third edition cancels and replaces the second edition (included in ISO 105-B: 1984), of which it constitutes a technical revision.

ISO 105 was previously published in thirteen "parts", each designated by a letter (e.g. "Part A"), with publication dates between 1978 and 1985. Each part contained a series of "sections", each designated by the respective part letter and by a two-digit serial number (e.g. "Section A01"). These sections are now being republished as separate documents, themselves designated "parts" but retaining their earlier alphanumeric designations. A complete list of these parts is given in ISO 105-A01.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Textiles — Tests for colour fastness —

Part B02:

Colour fastness to artificial light: Xenon arc fading lamp test

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1 Scope and field of application (standards.iteh.ai) 3 Principle

1.1 This part of ISO 105 specifies a method intended for determining the resistance of the colour of textiles of all kinds and in all forms to the action of an artificial light source representative of natural daylight (D_{65}). The method is also applicable to white (bleached or optically brightened) textiles.

1.2 If there is a possibility of the sample being photochromic, then the test for photochromism shall be applied additionally (see ISO 105-B05).

1.3 This method employs two sets of Blue Wool References. The results from the two sets of references may not be identical.

NOTE — General information on colour fastness to light is given in annex C.

2 References

ISO 105, *Textiles — Tests for colour fastness —*

Part A01: General principles of testing.

Part A02: Grey scale for assessing change in colour.

Part B01: Colour fastness to light: Daylight.

Part B05: Detection and assessment of photochromism.

CIE Publication No. 51, *Method for assessing the quality of daylight simulators for colorimetry.*

A specimen of the textile is exposed to artificial light under prescribed conditions, along with Blue Wool References. There are two different sets of Blue Wool References which are not interchangeable. The colour fastness is assessed by comparing the change in colour of the specimen with that of the references used.

For white (bleached or optically brightened) textiles the fastness is assessed by comparing the change of whiteness of the specimen with that of the references used.

4 Reference materials and apparatus

4.1 Reference materials

Two sets of Blue Wool References may be used. The two sets of references are not interchangeable.

4.1.1 References 1 to 8

Blue Wool References developed and produced in Europe are identified by the numerical designation 1 to 8. These references are blue wool cloths dyed with the dyes listed in the table. They range from 1 (very low light fastness) to 8 (very high light fastness) so that each higher numbered reference is approximately twice as fast as the preceding one.

Table — Dyes for Blue Wool References 1 to 8

Reference	Dye — Colour Index designation ¹⁾
1	CI Acid Blue 104
2	CI Acid Blue 109
3	CI Acid Blue 83
4	CI Acid Blue 121
5	CI Acid Blue 47
6	CI Acid Blue 23
7	CI Solubilized Vat Blue 5
8	CI Solubilized Vat Blue 8

1) *The Colour Index* (Third edition) is published by the Society of Dyers and Colourists, P.O. Box 244, Perkin House, 82 Grattan Road, Bradford BD1 2JB, West Yorks., United Kingdom, and by the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, North Carolina 27709, USA.

4.1.2 References L2 to L9

Blue Wool References developed and produced in America are identified by the letter L followed by the numerical designation 2 to 9. These eight references are specially prepared by blending varying proportions of wool dyed with CI Mordant Blue 1 (Colour Index, Third edition, 43830) and wool dyed with CI Solubilized Vat Blue 8 (Colour Index, Third edition, 73801), so that each higher numbered reference is approximately twice as fast as the preceding reference.

The relationship shown in figures 1 and 2 between the two sets of Blue Wool References is a numerical rather than a performance relationship.

4.1.3 Humidity test control

The humidity test control is a red azoic dyed cotton cloth (see 9.3).

4.2 Apparatus

4.2.1 Xenon arc lamp apparatus, either air-cooled or water-cooled.

The specimens and the references are exposed in one of the two types of apparatus (see 4.2.1.1 and 4.2.1.2). The variation of the light intensity over the area covered by the specimens and references shall not exceed $\pm 10\%$ of the mean.

The distance from the surface of the specimen and that of the references to the lamp shall be the same.

4.2.1.1 Air-cooled xenon arc lamp apparatus (see annex A), consisting of the following elements:

a) Light source, in a well ventilated exposure chamber.

The light source is a xenon arc lamp of correlated colour temperature 5 500 to 6 500 K.

b) **Light filter**, placed between the light source and the specimens and references so that the ultra-violet spectrum is steadily reduced. The transmission of the glass used shall be at least 90 % between 380 and 750 nm, falling to 0 % between 310 and 320 nm.

c) **Heat filter**. The spectrum of the xenon arc contains an appreciable amount of infra-red radiation which shall be minimized by heat filters (see 9.1, A.1.1 and A.2.2).

d) **Exposure conditions**. (The light fastness ratings mentioned below are obtained with the Blue Wool References 1 to 8 only):

1) Normal conditions (temperate zone): moderate effective humidity (see 9.3); light fastness of the humidity test control: 5; maximum black panel temperature: 45 °C (see 9.2).

2) Extreme conditions: For testing sensitivity of specimens to different humidity during irradiation, the following extreme conditions are useful:

— low effective humidity; light fastness of the humidity test control: 6 to 7; maximum black panel temperature: 60 °C (see 9.2);

— high effective humidity; light fastness of the humidity test control: 3; maximum black panel temperature: 40 °C (see 9.2).

4.2.1.2 Water-cooled xenon arc lamp apparatus (see annex B), consisting of the following elements:

a) Light source, in a well ventilated exposure chamber.

Light sources are long-life xenon arc lamps of various sizes depending on the size of the apparatus (see B.1.1 and B.2.1).

b) **Light filter**. Inner and outer filter glass containing and directing the flow of cooling water. An inner filter of Pyrex (borosilicate) glass and an outer filter of clear (soda-lime) glass are used so that the irradiation at the specimen has a lower spectral cut-off at approximately that of window glass (see B.1.2).

c) **Heat filter**. Distilled or deionized water circulating through the lamp assembly between the inner and outer filter glass, cooled by passing through a heat-exchange unit (see B.1.4).

d) **Exposure conditions**. Black panel temperature 63 ± 1 °C (see 9.2), controlled by continuous operation of the blower with thermostatic control of the temperature of a constant volume of air, whose relative humidity is increased by adding moisture to the air as it passes through the conditioning chamber by means of an electrically operated atomizer; the controls of the apparatus are adjusted so that the relative humidity of the air in the test chamber is $(30 \pm 5)\%$.

Effective humidity: low.

Light fastness of the humidity test control: 6-7.

4.2.2 **Opaque cardboard**, or other thin opaque material, for example thin sheet aluminium or cardboard covered with aluminium foil.

4.2.3 Black panel thermometer (see 9.2).

4.2.4 Grey scale for assessing change in colour (see clause 2).

4.2.5 Colour matching lamp, complying with CIE Publication No. 51, for assessment of the change in whiteness.

5 Test specimens

Depending on the number of specimens to be tested and on the shape and dimensions of the specimen holders supplied with the apparatus, the size of the specimen may vary.

5.1 In apparatus of the air-cooled type, usually an area of the textile not less than 4,5 cm × 1 cm is used when several periods of exposure are made side by side on the same specimen, which is the preferred practice. The specimen may be a strip of cloth, yarns wound close together on a card or laid parallel and fastened on a card, or a mat of fibres combed and compressed to give a uniform surface and fastened on a card. Each exposed and unexposed area shall be not less than 10 mm × 8 mm.

5.2 To facilitate handling, the specimen or specimens to be tested and the similar strips of the references may be mounted on one or more cards as indicated in figure 1 or figure 2.

5.3 In apparatus of the water-cooled type, specimen holders are fitted to take specimens of approximately 7 cm × 12 cm. When desired, specimens of different sizes to fit alternative sizes of specimen holder may be used. The covers shall make close contact with the surface of the unexposed areas of the specimens and the references in order to give a sharp line of demarcation between exposed and unexposed areas but shall not compress the specimen unnecessarily. References shall be exposed on a white cardboard backing. Specimens may also be mounted on white cardboard if desired.

5.4 The specimens to be tested and the Blue Wool References shall be of equal size and shape in order to avoid errors in an assessment due to overrating the visual contrast between exposed and unexposed parts on a larger pattern as against narrower references (see 7.4).

5.5 When testing pile fabrics, the references shall be arranged in such a way that they are the same distance from the light source as the surface of the pile fabrics. This can be achieved for example by using pieces of cardboard as underlay. Note that covers for the unexposed portions shall avoid surface compression.

6 Procedure

6.1 Adjustment of the humidity conditions (see 4.2.1.1 and 4.2.1.2)

6.1.1 Check that the apparatus is in good running order and that it is equipped with a clean xenon burner tube. (Follow the manufacturer's directions and see A.1.3, B.1.1, B.1.2, B.1.3 and B.1.4.)

6.1.2 Place a portion of the humidity test control of an area not less than 4,5 cm × 1 cm, together with the light fastness references, on to a card, if possible in the middle area of the sample holder (see 5.2).

6.1.3 Place the filled specimen holders on the specimen rack of the apparatus with the holders supported both top and bottom, and in proper vertical alignment. Completely fill all remaining spaces in the specimen rack with holders containing white cardboard.

6.1.4 Operate the apparatus with the light on continuously until a test is completed unless the lamp requires cleaning, or the burner, outer filter or inner filter requires changing because they have reached the maximum number of hours of recommended usage.

6.1.5 Proceed to expose the partially covered strip of the humidity test control and the references simultaneously until a contrast between the exposed and unexposed portions equal to grade 4 on the grey scale is produced on the humidity test control.

6.1.6 Assess the light fastness of the humidity test control at this stage and, if necessary, adjust the controls on the apparatus to give the selected exposure conditions. Check daily and when necessary re-adjust the controls to maintain the specified black panel temperature and humidity [see 4.2.1.1 d) and 4.2.1.2 d)].

6.2 Exposure methods

Expose the specimen (or group of specimens) and the references simultaneously, under the desired conditions, in such a manner and for such a time as is necessary to evaluate fully the light fastness of each specimen relative to that of the references, by progressively covering both the specimens and the exposed references during the test (either by method 1 or by method 2).

6.2.1 Method 1

6.2.1.1 This method is considered most exact and should be used in cases of dispute over the numerical rating. The basic feature is the control of the exposure period by inspection of the *specimen* and therefore only one set of references is required for each specimen under test.

6.2.1.2 Arrange the specimen to be tested and the references as shown in figure 1 with an opaque cover AB across the middle one-third of the specimen and references. Expose to the xenon arc light under the conditions enumerated in 4.2.1.1 or 4.2.1.2. Follow the effect of light by removing the cover and inspecting the specimen frequently. When a change can be perceived equal to grey scale 4-5, note the number of the references showing a similar change. (This is preliminary assessment of light fastness.) At this stage attention should be given to the possibility of photochromism (see ISO 105-B05).

For all specimens except for white (bleached or optically brightened) specimens, continue the procedure as described in 6.2.1.3 to 6.2.1.5. For optically brightened textiles, continue with the procedure as described in 6.2.1.6.