

INTERNATIONAL  
STANDARD

**ISO**  
**105-B08**

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**Textiles — Tests for colour fastness —**

**Part B08:**

Quality control of blue wool reference  
materials 1 to 7

*Textiles — Essais de solidité des teintures —*

*Partie B08: Maîtrise de la qualité des matériaux de référence 1 à 7 de laine  
teinte en bleu*



Reference number  
ISO 105-B08:1995(E)

## 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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 105-B08 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 1, *Tests for coloured textiles and colorants*.

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.

Annexes A and B of this part of ISO 105 are for information only.

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# Textiles — Tests for colour fastness —

## Part B08:

### Quality control of blue wool reference materials 1 to 7

#### 1 Scope

This part of ISO 105 describes a method for carrying out quality control of production batches of the blue wool reference materials 1 to 7 which are to be used in the appropriate parts of ISO 105-B series of test methods for colour fastness to light.

The method specifies one procedure for instrumental assessment of the evenness of dyeing and two procedures for assessing the fading characteristics of the reference materials, one of which uses visual assessment techniques and the other instrumental assessment.

The characteristics of the reference material(s) under test then are compared with the characteristics of master reference material(s).

The method is applicable to all dyed wool fabrics intended for use as reference materials 1 to 7 (see ISO 105-B01:1994, subclause 4.1.1).

#### NOTES

1 This method is not suitable for blue wool reference 8, since the time required to fade to grey scale 4 and grey scale 3 contrasts would be inordinately long. An alternative method is under consideration for application to blue wool reference 8.

2 The method given is based on ISO 105-B02, which is considered internationally to be the most widely employed method for testing colour fastness to light and to be representative of all methods where the use of blue wool references is specified.

3 Information on levels of acceptance and storage conditions is given in annexes A and B respectively.

#### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 105. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 105 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 105-A01:1994, *Textiles — Tests for colour fastness — Part A01: General principles of testing.*

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

ISO 105-B01:1994, *Textiles — Tests for colour fastness — Part B01: Colour fastness to light: Daylight.*

ISO 105-B02:1994, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test.*

ISO 105-J03:1995<sup>1)</sup>, *Textiles — Tests for colour fastness — Part J03: Calculation of colour differences.*

1) To be published.

### 3 Principle

Specimens from the reference material under test are examined as follows:

- a) spectrophotometric assessment of the evenness of dyeing;
- b) visual assessment of the fading characteristics in comparison with the appropriate master reference material (see 4.7);
- c) spectrophotometric assessment of the fading characteristics.

### 4 Apparatus

**4.1 Spectrophotometer**, capable of measuring reflectance values over the visible wavelength range 400 nm to 700 nm of samples of a size relevant to the test method (see 6.2.1).

**4.2 Computer and associated software**, capable of calculating colour differences in accordance with the conditions specified in 6.1.2 and 6.2.2.

**4.3 Fading apparatus**, containing a xenon arc light source capable of operating under conditions specified in ISO 105-B02:1994, subclause 4.2.1.

**4.4 Opaque cover**, of cardboard or other thin opaque material (see ISO 105-B02:1994, subclause 4.2.2).

**4.5 Black-panel thermometer** (see ISO 105-B02:1994, subclause 4.2.3.1).

NOTE 4 Black-panel thermometers are available from the manufacturers of fading apparatus.

**4.6 Humidity test control** (see ISO 105-B02:1994, subclause 4.1.3).

NOTE 5 For information on the sources of supply of humidity test controls, see ISO 105-A01:1994, clause 8, note 1.

**4.7 Master reference material**, appropriate to the material under test.

Sets of master reference materials are held in several countries for reference.

**4.8 Grey scale for assessing change in colour**, in accordance with ISO 105-A02.

NOTE 6 For information on the sources of supply of grey scales for assessing change in colour, see ISO 105-A01:1994, clause 8, note 1.

**4.9 Colour-matching cabinet**, equipped with illumination approximating natural daylight.

NOTE 7 Other types of illumination should not be used.

### 5 Preparation of test specimens

Prepare three specimens from each dyed piece of blue wool reference material under test. These specimens shall be approximately 300 mm in length across the full width of the material and shall be taken from the head end (H), the middle (M) and the tail end (T) of the piece.

### 6 Procedure

#### 6.1 Evenness of dyeing

**6.1.1** Fold the specimen under test as many times as necessary to form an opaque mass (at least four thicknesses are recommended) and mount it wrinkle-free in the spectrophotometer sample holder. Each of the three specimens shall be tested at the following three positions:

- a) in the centre (C);
- b) at a distance of 150 mm from the left-hand selvedge (L);
- c) at a distance of 150 mm from the right-hand selvedge (R).

**6.1.2** Adjust the spectrophotometer to large aperture and the light beam to include the specular component and, if optional, the ultraviolet component, using illuminant  $D_{65}$  and  $10^\circ$  observer.

NOTE 8 If these measurement conditions are unobtainable, report the measurement conditions used [see 7 e)].

**6.1.3** Measure and record the reflectance values at the appropriate wavelengths. Take four readings for each measurement, rotating the specimen through  $90^\circ$  between readings, and use the mean of these four readings for the value of the measurement to be used in the calculations in 6.1.4.

**6.1.4** Calculate the colour differences  $\Delta E_{cmc}$  determining evenness of dyeing using the CMC ( $l:c$ ) colour difference formula (see ISO 105-J03) with lightness ( $l$ ) set equal to 2 and chroma ( $c$ ) set equal to 1, i.e. CMC 2:1. Colour differences at the following positions shall be calculated:

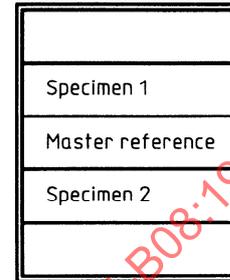
HC vs. HR	MC vs. MR	TC vs. TR
HC vs. HL	MC vs. ML	TC vs. TL
HC vs. MC	MC vs. TC	TC vs. HC

**6.2 Fading characteristics**

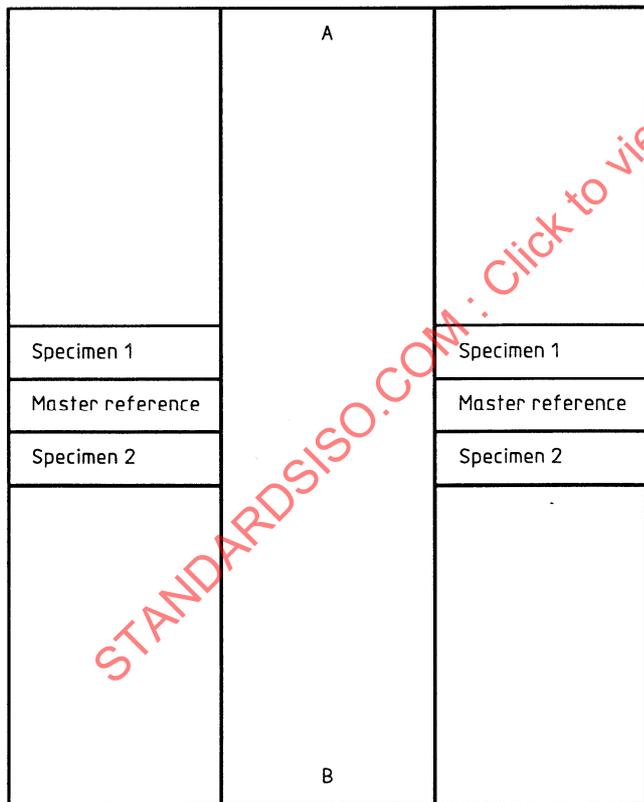
**6.2.1 Mounting of specimens**

Mount two specimens from the middle portion (M) (see clause 5) of the reference material under test immediately above and below a specimen of the appropriate master reference material (4.7) mounted

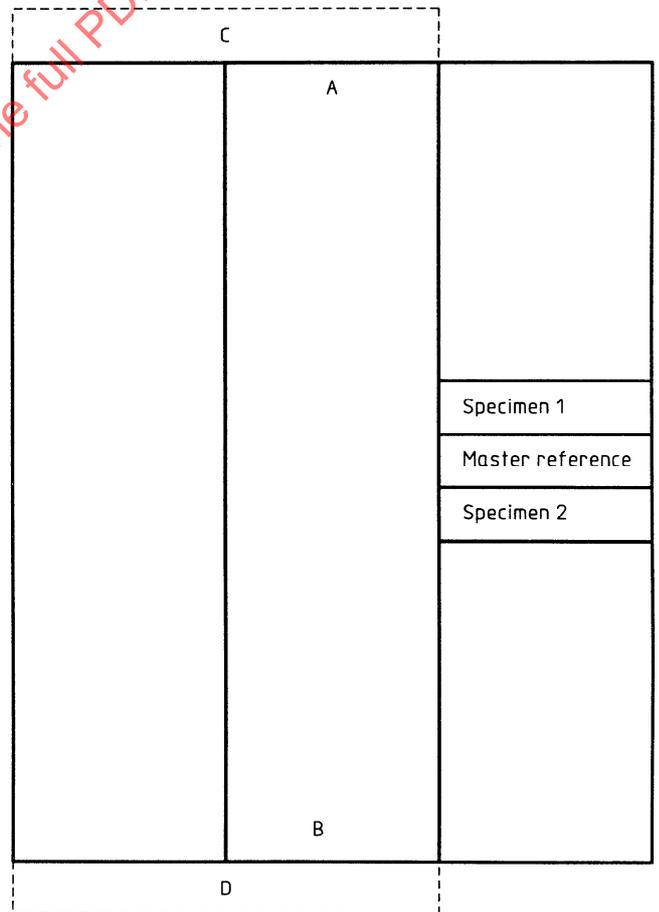
in the centre of the exposure card (see figure 1). The specimens shall have the dimensions specified in ISO 105-B02:1994, subclauses 5.1 and 5.3. Mask the centre third of the mounted specimens with an opaque cover (4.4) AB, as shown in figure 2 a).



**Figure 1 — Mounting of specimens**



a)



b)

AB: opaque cover  
 CD: second cover

**Figure 2 — Masking of specimens**

### 6.2.2 Exposure of specimens

Set the fading apparatus (4.3) to normal conditions of black-panel temperature and effective humidity as specified in ISO 105-B02:1994, subclause 6.2 a), using the procedure specified in ISO 105-B02:1994, subclause 7.1, and the humidity test control (4.6).

Expose the mounted specimens in the fading apparatus until a contrast between the exposed and unexposed areas of the master reference material is observed which is equivalent to step 4 on the grey scale for assessing change in colour (4.8). This assessment shall be made visually by an experienced assessor using a colour-matching cabinet (4.9).

At this point, mask the left-hand third of the specimen by a further opaque cover CD, as shown in figure 2 b). Continue the exposure until a contrast between the unexposed (centre) portion and the exposed (right-hand) portion of the master reference material is observed which is equivalent to step 3 on the grey scale. At this point terminate the exposure.

NOTE 9 For visual assessment during the exposure period, it is sufficient for only one assessor to decide when to add the second cover and when to terminate exposure.

### 6.2.3 Visual assessment of fading characteristics

A minimum of three experienced assessors shall each make visual assessments on two separate days. Using a colour-matching cabinet (4.9), assess the colour change of the faded areas of the specimens under test in comparison with the unfaded area of the same specimen with the aid of the grey scale (4.8).

Repeat the assessment for the master reference materials.

### 6.2.4 Spectrophotometric assessment of fading characteristics

Adjust the spectrophotometer to small aperture and the light beam to include the specular component and, if optional, the ultraviolet component, using illuminant D<sub>65</sub> and 10° observer.

NOTE 10 If these measurement conditions are unobtainable, report the measurement conditions used [see clause 7 e)].

Measure and record the reflectance values, at the appropriate wavelengths, at all three levels of exposure of the two specimens and of the master reference materials on the exposure card.

Calculate the colour differences  $\Delta E_{cmc}$  using the CMC (*l:c*) colour difference formula (see ISO 105-J03) with both lightness (*l*) and chroma (*c*) set to 1 (i.e. CMC 1:1), comparing the unexposed specimen with the exposed portion at grey scale 4 (GS 4) fade and with the exposed portion at grey scale 3 (GS 3) fade for each of the three specimens tested.

## 7 Test report

The test report shall include the following information:

- the number and year of publication of this part of ISO 105, i.e. ISO 105-B08:1995;
- all details necessary for complete identification of the sample(s) tested;
- if required, the manufacturer's name and model reference of the fading apparatus used;
- if required, the supplier's name and model reference of the spectrophotometer used;
- the conditions of spectrophotometric measurement used, if different from those specified in 6.1.2 and 6.2.4;
- the calculated results of the check for evenness of dyeing (see 6.1.4);
- the ratings for visually assessed colour change for each exposure level (GS 4 and GS 3) for both the master reference material and the reference material under test (see 6.2.3);
- the calculated colour differences for each exposure level (GS 4 and GS 3) for both master reference material and the reference material under test (see 6.2.4).

NOTE 11 See annex A for levels of acceptance of results reported in f), g) and h).

## Annex A (informative)

### Levels of acceptance

#### A.1 General

Criteria are suggested in A.2 to A.4 by which the suitability of a test fabric for use as a blue wool reference material can be adjudged.

#### A.2 Evenness of dyeing

The  $\Delta E_{cmc}$  values reported under 6.1.4 should not exceed 0,5, although it is recognized that minor variations in lightness and hue from batch to batch can occur which are not detrimental to the fading characteristics.

#### A.3 Visual assessment of fading

The average value of the results (see 6.2.3) should be regarded as the principal arbiter of fading characteristics.

Samples which are assessed at grey scale ratings identical to those of the master reference material should be considered as acceptable.

Samples which are assessed at more than one-half of a grey scale rating different from the master reference material should be considered as unacceptable.

Samples which are assessed at one-half of a grey scale rating different from the master reference material should be considered as borderline. In these cases, and in cases where there is a measure of disagreement among the assessors, the results of the spectrophotometric assessment of fading should be taken into consideration.

#### A.4 Spectrophotometric assessment of fading

Compare the colour difference of the unexposed portion of the master reference material against its GS 4 fade in turn with the colour differences of the unexposed portions of the specimens against their respective GS 4 fades. Repeat for the respective GS 3 fades. The sample should be considered unacceptable if any of these comparisons is greater than 0,5.

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## **Annex B**

(informative)

### **Storage conditions**

It is recommended that blue wool references be stored in a cool, dry, dark place free from chemical or other types of fumes. Under such conditions these materials will not deteriorate for a number of years.

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