

INTERNATIONAL
STANDARD

ISO
105-N01

Second edition
1993-10-01

Textiles — Tests for colour fastness —

Part N01:

Colour fastness to bleaching: Hypochlorite

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Textiles — Essais de solidité des teintures —

Partie N01: Solidité des teintures au blanchiment: Hypochlorite

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Reference number
ISO 105-N01:1993(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-N01 was prepared by Technical Committee ISO/TC 38, *Textiles*, Sub-Committee SC 1, *Tests for coloured textiles and colorants*.

This second edition cancels and replaces the first edition (included in ISO 105-N:1978), of which it constitutes a minor 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.

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International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Textiles — Tests for colour fastness —

Part N01:

Colour fastness to bleaching: Hypochlorite

1 Scope

This part of ISO 105 specifies a method for determining the resistance of the colour of textiles of all kinds and in all forms to the action of bleaching baths containing sodium or lithium hypochlorite in concentrations normally used in commercial bleaching. It is applicable mainly to natural and regenerated cellulose materials.

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-A01:1989, *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-C01:1989, *Textiles — Tests for colour fastness — Part C01: Colour fastness to washing: Test 1.*

3 Principle

A specimen of the textile is agitated in a solution of sodium or lithium hypochlorite, rinsed in water, agi-

tated in a hydrogen peroxide solution or sodium hydrogen sulfite solution, rinsed and dried. The change in colour is assessed with the grey scale.

4 Apparatus and reagents

4.1 Glass or glazed-porcelain container, which can be closed, for specimen and bleaching solution.

4.2 Hypochlorite solutions.

Use one of the two solutions specified in 4.2.1 and 4.2.2.

4.2.1 Sodium hypochlorite (NaOCl) solution, containing approximately 2 g of available chlorine per litre, buffered at $\text{pH } 11 \pm 0,2$ with 10 g of anhydrous sodium carbonate (Na_2CO_3) per litre, at a temperature of $20 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$.

To prepare this reagent, use commercially available sodium hypochlorite solution. This has the following composition:

- active chlorine: 140 g/l to 160 g/l;
- sodium chloride: (NaCl): 120 g/l to 170 g/l;
- sodium hydroxide: (NaOH): 20 g/l maximum;
- sodium carbonate (Na_2CO_3): 20 g/l maximum;
- iron (Fe): 0,01 g/l maximum.

Dilute 20,0 ml of the commercially available sodium hypochlorite solution to 1 litre with grade 3 water (4.6).

To 25 ml of this solution add excess potassium iodide (KI) and hydrochloric acid (HCl) and titrate the liberated iodine with a sodium thiosulfate solution, $c(\text{Na}_2\text{S}_2\text{O}_3) = 0,1 \text{ mol/l}$, using starch as indicator.

Let the volume of sodium thiosulfate solution required be $V \text{ ml}$.

For each litre of working solution at $\text{pH } 11 \pm 0,2$ use

14 $100/V \text{ ml}$ of the diluted sodium hypochlorite solution;

10 g of anhydrous sodium carbonate.

Dilute to 1 litre.

All sodium hypochlorite solutions should be prepared just prior to use.

4.2.2 Lithium hypochlorite (LiOCl) solution, containing approximately 2 g of available chlorine per litre, buffered at $\text{pH } 11 \pm 0,2$ with 10 g of anhydrous sodium carbonate (Na_2CO_3) per litre, at a temperature of $20 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$.

To prepare this reagent, use solid lithium hypochlorite, which contains approximately 300 g of LiOCl per kilogram. About 10 g of solid lithium hypochlorite dissolved in 1 litre of grade 3 water (4.6) yields a solution of the prescribed concentration of approximately 2 g of available chlorine per litre.

Prepare the lithium hypochlorite solution as described in 4.2.1 for sodium hypochlorite.

4.3 Hydrogen peroxide solution, containing 2,5 ml of hydrogen peroxide [$30 \text{ } \%$ (m/m) H_2O_2] per litre, or a solution containing 5 g of sodium hydrogen sulfite (NaHSO_3) per litre.

WARNING — Attention is drawn to the need for relevant safety precautions when using hydrogen peroxide.

4.4 Soap solution, containing 5 g of soap per litre (see ISO 105-C01:1989, subclause 4.3), for wetting out water-repellent fabrics.

4.5 Grey scale for assessing change in colour, complying with ISO 105-A02.

4.6 Grade 3 water (see ISO 105-A01:1989, subclause 8.2).

5 Test specimen

5.1 If the textile to be tested is fabric, use a specimen measuring 40 mm × 100 mm.

5.2 If the textile to be tested is yarn, knit it into fabric and use a piece measuring 40 mm × 100 mm, or wind it closely round a piece of thin, inert material measuring 40 mm × 100 mm to form a layer having the thickness of only one yarn.

5.3 If the textile to be tested is loose fibre, comb and compress enough of it to form a sheet measuring 40 mm × 100 mm; in order to support the fibres, sew the sheet on a piece of fabric which will not affect the action of the hypochlorite on the specimen.

6 Procedure

6.1 If the textile to be tested has a water-repellent finish, wet out the specimen thoroughly in the soap solution (4.4) at $25 \text{ }^\circ\text{C}$ to $30 \text{ }^\circ\text{C}$. Drain the specimen of excess liquor so that it retains approximately its dry mass of wetting-out solution, and immediately place the specimen, opened out, in the sodium or lithium hypochlorite solution (4.2) at $20 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$ at a liquor ratio of 50:1.

6.2 If the textile to be tested has no water-repellent finish, wet out the specimen in grade 3 water (4.6) at room temperature, remove the excess water (see 6.1) and place the test specimen, opened out, in the sodium or lithium hypochlorite solution (4.2) at $20 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$ at a liquor ratio of 50:1.

6.3 Close the container and allow the specimen to stand in the solution at $20 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$ for 60 min. Avoid exposure to direct sunlight.

6.4 Rinse the specimen thoroughly in cold, running tap-water, and then agitate it at room temperature for 10 min in one of the solutions specified in 4.3.

6.5 Rinse the specimen thoroughly in cold, running tap-water, remove the excess water and dry the specimen by hanging it in air at a temperature not exceeding $60 \text{ }^\circ\text{C}$.

6.6 Assess the change in colour of the specimen with the grey scale (4.5).

7 Test report

The test report shall include the following particulars:

- the number and date of publication of this part of ISO 105, i.e. ISO 105-N01:1993;
- all details necessary for the identification of the sample tested;
- the numerical rating for the change in colour of the specimen.

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UDC 677.016.47:677.027.264.1

Descriptors: textiles, dyes, tests, determination, colour fastness, bleaching, sodium hypochlorite.

Price based on 2 pages
