INTERNATIONAL STANDARD

**ISO 105-X06**

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# Textiles — Tests for colour fastness —

# Part X06:
Colour fastness to soda boiling

*Textiles — Essais de solidité des teintures —*
*Partie X06: Solidité des teintures au débouillissage à l'air libre*


Reference number
ISO 105-X06:1994(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-X06 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 1, *Tests for coloured textiles and colorants*.

This fourth edition cancels and replaces the third edition (ISO 105-X06:1987), 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.



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# Textiles — Tests for colour fastness —

# Part X06:
Colour fastness to soda boiling

## 1 Scope

**1.1** 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 boiling dilute sodium carbonate solution. The method is mainly applicable to natural and regenerated cellulose materials.

**1.2** Two tests are provided: one with and the other without the addition of a reduction inhibitor.

## 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-A03:1993, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining.*

ISO 105-F:1985, *Textiles — Tests for colour fastness — Part F: Standard adjacent fabrics.*

## 3 Principle

A specimen of the textile between specified undyed cloths is rolled around a glass rod and treated with boiling sodium carbonate solution with and without the addition of a reduction inhibitor. The composite specimen is rinsed and dried. The change in colour of the specimen and the staining of the undyed cloths are assessed by comparison with the grey scales.

## 4 Apparatus and reagents

**4.1 Vessel equipped with water-cooled reflux condenser** of the finger type, to hold a cylindrical specimen 40 mm long in the boiling solution.

**4.2 Glass rod**, 5 mm to 8 mm in diameter.

**4.3 Desized undyed cotton fabric**, measuring 40 mm × 100 mm. (This material is *not* cotton adjacent fabric.)

**4.4 Single-fibre adjacent fabric**, complying with the relevant sections of F01 to F08 of ISO 105-F:1985, of the type under test (or if fibre or yarn is being tested, adjacent fabric made from the same kind of fibre).

**4.5 Sodium carbonate**, aqueous solution containing 10 g of anhydrous sodium carbonate per litre.

**4.6 Sodium carbonate**, aqueous solution containing 10 g of anyhdrous sodium carbonate and 4 g of sodium *m*-nitrobenzenesulfonate per litre.

**4.7 Test controls:** dyeings of CI Vat Red 1 (Colour Index, 3rd edition).

#### 4.7.1 Reduction

Make a paste of CI Vat Red 1 (Colour Index, 3rd edition) with 150 times its own mass of water, using an anionic wetting agent at the rate of 3 ml per gram of dye. Add 40 ml of sodium hydroxide solution (400 g/l) and 13 g of sodium dithionite per litre of dye-bath, and allow the dye to reduce for 15 min at 80 °C.

#### 4.7.2 Dyeing

Set the dye-bath at a liquor ratio of 25:1. To it add 2 ml to 3 ml of sodium hydroxide solution (400 g/l) and 1 g sodium dithionite per litre of bath, followed by the calculated amount of reduced dye. Start the dyeing at 30 °C, and apply heat for 15 min to bring the temperature to 60 °C. Continue dyeing at this temperature for 30 min.

Then oxidize the specimen in air, rinse in cold running tap-water, soap at the boil, rinse in grade 3 water (see ISO 105-A01:1994, 8.1), then in cold running tap-water, and dry.

**4.8 Grey scale for assessing change in colour**, complying with ISO 105-A02, and **grey scale for assessing staining,** complying with ISO 105-A03.

## 5 Test specimens

**5.1** Two composite test specimens, prepared as follows, are required for the tests with and without the addition of a reduction inhibitor.

**5.2** If the textile to be tested is fabric, place a specimen measuring 40 mm × 100 mm between one piece of undyed cotton fabric (4.3) and one piece of adjacent fabric (4.4) and sew along one of the shorter sides to form a composite specimen.

**5.3** If the textile to be tested is yarn, knit it into fabric and treat it as in 5.2 or form a layer of parallel lengths of it between the two pieces of undyed fabric (4.3 and 4.4), the amount of yarn taken being approximately equal to half the combined mass of the undyed fabrics. Sew along one of the shorter sides to hold the yarn in place and to form a composite specimen.

**5.4** If the textile to be tested is loose fibre, comb and compress an amount approximately equal to half the combined mass of the undyed fabric (4.3 and 4.4) into a sheet 40 mm × 100 mm. Place the sheet between the two undyed fabrics and sew along all four sides to hold the fibre in place and to form a composite specimen.

**5.5** Prepare two composite specimens of the test control (4.7) in the manner outlined for fabric in 5.2.

## 6 Procedure

**6.1** Carry out the operations described below in 6.2 to 6.4 with each composite test specimen and composite test-control specimen in parallel, in separate baths.

**6.2** Roll the composite specimen compactly around the glass rod to form a cylinder 40 mm long and tie it uniformly, but not tightly, with thread.

**6.3** Treat one composite specimen on the rod by boiling gently under reflux for 1 h in the sodium carbonate solution (4.5), at a liquor ratio of 30:1. Treat the other composite specimen in the same way and for the same time in boiling sodium carbonate solution containing sodium *m*-nitrobenzenesulfonate (4.6).

**6.4** Remove the composite specimens from the rod immediately and rinse for 10 min in cold, running tap-water. Open out the composite specimens (by breaking the stitching on all sides except one of the shorter sides, if necessary) and dry them by hanging in air at a temperature not exceeding 60 °C, with the three parts in contact only at the line of stitching.

**6.5** Assess the effect on the composite test-control specimens by comparison with the grey scales (4.8). The ratings of the test-control specimen after boiling with sodium *m*-nitrobenzenesulfonate should be

3-4 weaker, yellower, in respect of change in colour;

5 in respect of staining.

The ratings of the test-control specimen after boiling without sodium *m*-nitrobenzenesulfonate should be

2-3 weaker, yellower, in respect of change in colour;

2-3 in respect of staining.

If the test-control specimens do not yield these values, the test has not been carried out correctly, and the operations described in 6.1 to 6.4 inclusive should

be repeated with fresh composite test specimens and fresh composite test-control specimens.

**6.6** Assess the change in colour of the test specimen and the staining of the undyed cotton fabric (4.3) and the adjacent fabric (4.4) by comparison with the grey scales (4.8).

## 7 Test report

The test report shall include the following information:

a) the number and year of publication of this part of ISO 105, i.e. ISO 105-X06:1994;

b) all details necessary for the identification of the sample tested;

c) the numerical grey scale ratings for change in colour and the numerical grey scale ratings for staining of each kind of undyed fabric tested with sodium carbonate alone and with sodium carbonate and sodium *m*-nitrobenzenesulfonate reduction inhibitor.

When the two pieces of undyed fabric are identical and the two assessments of staining are different, report only the lower rating.

**ICS 59.080.10**

**Descriptors:** textiles, dyes, tests, boiling temperature tests, determination, colour fastness, sodium carbonate.

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