INTERNATIONAL STANDARD

ISO 105-E01

Fifth edition
2010-04-15

Textiles — Tests for colour fastness —

Part E01: Colour fastness to water

Textiles — Essais de solidité des coloris —

Partie E01: Solidité des coloris à l'eau

Reference number
ISO 105-E01:2010(E)

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Published in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 105-E01 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 1, *Tests for coloured textiles and colorants*.

This fifth edition cancels and replaces the fourth edition (ISO 105-E01:1994), of which Clause 2, Clause 4, and Table 1 have been technically revised and instrumental assessment added to the appropriate clauses. It also incorporates ISO 105-E01:1994/Cor.1:2002.

ISO 105 consists of many parts designated by a part letter and a two-digit serial number (e.g. A01), under the general title *Textiles — Tests for colour fastness*. A complete list of these parts is given in ISO 105-A01.

Textiles — Tests for colour fastness —

Part E01
Colour fastness to water

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 immersion in water.

2 Normative references

The following referenced documents are indispensable for the application 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 105-A01:2010, *Textiles — Tests for colour fastness — Part A01: General principles of testing*

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

ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

ISO 105-A04, *Textiles — Tests for colour fastness — Part A04: Method for the instrumental assessment of the degree of staining of adjacent fabrics*

ISO 105-A05, *Textiles — Tests for colour fastness — Part A05: Instrumental assessment of change in colour for determination of grey scale rating*

ISO 105-F01, *Textiles — Tests for colour fastness — Part F01: Specification for wool adjacent fabric*

ISO 105-F02, *Textiles — Tests for colour fastness — Part F02: Specification for cotton and viscose adjacent fabrics*

ISO 105-F03, *Textiles — Tests for colour fastness — Part F03: Specification for polyamide adjacent fabric*

ISO 105-F04, *Textiles — Tests for colour fastness — Part F04: Specification for polyester adjacent fabric*

ISO 105-F05, *Textiles — Tests for colour fastness — Part F05: Specification for acrylic adjacent fabric*

ISO 105-F06, *Textiles — Tests for colour fastness — Part F06: Specification for silk adjacent fabric*

ISO 105-F07, *Textiles — Tests for colour fastness — Part F07: Specification for secondary acetate adjacent fabric*

ISO 105-F10, *Textiles — Tests for colour fastness — Part F10: Specification for adjacent fabric: Multifibre*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Principle

A specimen of the textile in contact with either two single-fibre adjacent fabrics or a multifibre adjacent fabric is immersed in water, drained and placed between two plates under a specified pressure in a test device. The specimen and the adjacent fabric(s) are dried separately. The change in colour of the specimen and the staining of the adjacent fabric(s) are assessed by comparison with the grey scales or instrumentally.

4 Apparatus

4.1 Test device, consisting of a frame of stainless steel into which a weight-piece of mass approximately 5 kg and base of 60 mm × 115 mm is closely fitted, so that a pressure of 12,5 kPa can be applied on test specimens measuring (40 ± 2) mm × (100 ± 2) mm placed between glass or acrylic-resin plates measuring approximately 60 mm × 115 mm × 1,5 mm. The test device shall be constructed so that, if the weight-piece is removed during the test, the pressure of 12,5 kPa remains unchanged.

If the dimensions of the composite specimen differ from the size of (40 ± 2) mm × (100 ± 2) mm, the weight-piece used shall be such that a pressure of 12,5 kPa is applied to the specimen.

Other devices may be used provided that equivalent results are obtained.

4.2 Oven, maintained at (37 ± 2) °C.

4.3 Adjacent fabrics (see ISO 105-A01).

Either

4.3.1 A multifibre adjacent fabric complying with ISO 105-F10.

Or

4.3.2 Two single-fibre adjacent fabrics, complying with the relevant part of ISO 105-F01 to ISO 105-F07.

One of the adjacent fabrics shall be made of the same kind of fibre as that of the textile to be tested, or that predominating in the case of blends, and the second piece shall be made of the fibre indicated in Table 1 or, in the case of blends, of the kind of fibre second in order of predominance or as otherwise specified.

Table 1 — Single-fibre adjacent fabrics

If first piece is:	Second piece is to be:
Cotton	Wool
Wool	Cotton
Silk	Cotton
Viscose	Wool
Polyamide	Wool or cotton
Polyester	Wool or cotton
Acrylic	Wool or cotton

4.3.3 If required, a non-dyeable fabric (for example, polypropylene).

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

4.5 Grey scale for assessing staining, complying with ISO 105-A03.

4.6 Spectrophotometer or **colorimeter for assessing change in colour and staining**, complying with ISO 105-A04 and ISO 105-A05.

4.7 Analytical balance, accurate to ± 0,01 g (see ISO 105-A01).

5 Reagents

5.1 Grade 3 water, complying with ISO 3696.

6 Test specimen

6.1 If the textile to be tested is fabric, either

a) attach a specimen measuring (40 ± 2) mm × (100 ± 2) mm to a piece of the multifibre adjacent fabric (4.3.1), also measuring (40 ± 2) mm × (100 ± 2) mm, by sewing along one of the shorter sides, with the multifibre fabric next to the face of the specimen, or

b) attach a specimen measuring (40 ± 2) mm × (100 ± 2) mm between the two single-fibre adjacent fabrics (4.3.2), also measuring (40 ± 2) mm × (100 ± 2) mm, by sewing along one of the shorter sides.

6.2 Where yarn or loose fibre is to be tested, take a mass of the yarn or loose fibre approximately equal to one-half of the combined mass of the adjacent fabrics, and either

a) place it between a (40 ± 2) mm × (100 ± 2) mm piece of the multifibre fabric (4.3.1) and a (40 ± 2) mm × (100 ± 2) mm piece of the non-dyeable fabric (4.3.3) and sew them along all four sides (see ISO 105-A01:2010, 10.3, *Preparation of composite specimens*), or

b) place it between a (40 ± 2) mm × (100 ± 2) mm piece of each of the two specified single-fibre fabrics (4.3.2) and sew along all four sides.

7 Procedure

7.1 Weigh each composite specimen (see 4.7). Lay out a composite specimen smoothly in a flat-bottomed dish and cover with grade 3 water (5.1) at room temperature.

Thoroughly wet the composite specimen in this solution at a liquor ratio of 50:1, and allow it to remain in the solution at room temperature for 30 min. Press and move it from time to time to ensure good and uniform penetration of the liquor. Pour off the solution and wipe the excess liquor off the specimen between two glass rods. Weigh the composite specimen again to ensure that it weighs 2 to 2,5 times its original weight.

Place the composite specimen between the two glass or acrylic-resin plates (see 4.1), under a pressure of 12,5 kPa, and place in the test device (4.1), which has been preheated to the test temperature.

NOTE Up to ten test specimens, each separated from the next by one plate, can be tested in one test device simultaneously.

7.2 Place the test devices containing the composite specimen in the oven (4.2) for 4 h at (37 ± 2) °C, positioning them so that the test specimens are in the vertical position.

7.3 Open out the composite specimen (by breaking the stitching, except on one of the shorter sides, if necessary).

Specimens that show signs of drying should be discarded.

Dry the specimen by hanging it in air at a temperature not exceeding 60 °C, with the two or three parts in contact only at the line of stitching.

7.4 Assess the change in colour of each specimen and the staining of the adjacent fabric(s) with reference to the original specimen and adjacent fabric(s) by comparison with the grey scales (4.4 and 4.5) and/or instrumentally (see 4.6).

8 Test report

The test report shall include the following information:

a) a reference to this part of ISO 105 (ISO 105-E01:2010);

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

c) the numerical grey scale ratings and/or instrumental assessment for the change in colour of the specimen;

d) if single-fibre adjacent fabrics were used, the numerical grey scale rating and/or instrument assessment for staining of each kind of adjacent fabric used;

e) if a multifibre adjacent fabric was used, the numerical grey scale rating and/or instrument assessment for staining of each type of fibre in the multifibre adjacent fabric, and the type of multifibre adjacent fabric used;

f) any deviation, by agreement or otherwise, from the procedure specified.

Bibliography

[1] ISO 105-J01, *Textiles — Tests for colour fastness — Part J01: General principles for measurement of surface colour*

[2] ISO 105-J03, *Textiles — Tests for colour fastness — Part J03: Calculation of colour differences*

[3] AATCC TM 107, *Colorfastness to water*