INTERNATIONAL STANDARD

ISO 105-D01

Fifth edition
2010-05-01

Textiles — Tests for colour fastness —

Part D01: Colour fastness to drycleaning using perchloroethylene solvent

Textiles — Essais de solidité des coloris —

Partie D01: Solidité des coloris au nettoyage à sec au perchloréthylène

Reference number
ISO 105-D01:2010(E)

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Published in Switzerland

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.

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-D01 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-D01:1993), which has been technically revised and of which the title has been changed.

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 D01:
Colour fastness to drycleaning using perchloroethylene solvent

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 drycleaning using perchloroethylene solvent.

This method is neither suitable for the evaluation of the durability of textile finishes, nor is it intended for use in evaluating the resistance of colours to spot and stain removal procedures used by the drycleaner.

This test covers colour fastness to drycleaning only; commercial drycleaning practice normally involves other operations, such as water spotting, solvent spotting and steam pressing, etc., for which other standard test methods are available if the full response to drycleaning of a textile is to be assessed.

The presence of absorbed water in drycleaning solvent, or the presence of a detergent and water in a drycleaning solvent, are known to alter the colour fastness properties of some materials. This test requires the assessment of the material under test in a dry state, using solvent alone, within containers that do not contain water.

Fastness to drycleaning, without further qualification in this part of ISO 105, means fastness to drycleaning in perchloroethylene. However, if required, other solvents that are used for textile cleaning can be used.

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 fabric*

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*

3 Principle

A specimen of the textile in contact with a specified adjacent fabric or fabrics in a cotton fabric bag, together with non-corrodible steel discs, is agitated in perchloroethylene (see Clause 1), then squeezed or centrifuged, and dried in hot air. The change in colour of the specimen and the staining of the adjacent fabric or fabrics are assessed with reference to the original specimen, either with grey scales or instrumentally.

4 Safety

Perchloroethylene and other solvents may be injurious to human health. It is therefore important to follow guidelines for the safe use of solvents. It is recommended that testing be carried out in a well-ventilated area and that containers of solvent opened only within the confines of a fume cabinet or hood. It is also recommended that protective gloves and goggles worn, and that skin contact with solvents and inhalation of solvent fumes avoided. Guidelines for the safe disposal of solvents should be rigorously followed.

5 Reagents and materials

5.1 Perchloroethylene (otherwise known as tetrachloroethene or tetrachloroethylene) solvent, a general-purpose reagent shall be used, which shall be stored over anhydrous sodium carbonate to neutralize any hydrochloric acid formed.

5.2 Adjacent fabrics, in accordance with ISO 105-A01.

Either

5.2.1 Multifibre adjacent fabric, Type DW or Type TV, complying with ISO 105-F10.

Or

5.2.2 Two single-fibre adjacent fabrics, complying with the relevant parts: ISO 105-F01 to ISO 105-F07. One of the two adjacent fabrics shall be made of the textile to be tested or that predominating in the case of blends, and the second fabric shall be made of the fibre indicated second in order of predominance, or as otherwise specified.

5.2.3 Non-dyeable fabric (for example polypropylene), if required.

5.3 Cotton twill cloth, bleached, undyed, free of finishes, of mass per unit area (270 ± 70) g/m^2.

5.4 Non-corrodible (stainless) steel discs, (30 ± 2) mm diameter × (3 ± 0,5) mm height, smooth and free from rough edges, of mass (20 ± 2) g.

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

5.6 Grey scale for assessing staining, in accordance with ISO 105-A03.

6 Apparatus

6.1 **Suitable mechanical device**, consisting of a water bath and containing a rotating shaft which supports, radially, stainless steel containers with a diameter of (75 ± 5) mm and a height of (125 ± 10) mm, of capacity (550 ± 50) ml, the bottom of the containers being (45 ± 10) mm from the centre of the shaft. The containers shall be closed using solvent-resistant gaskets.

6.1.1 The shaft/container assembly is rotated at a frequency of (40 ± 2) min^{-1}. The temperature of the water bath is thermostatically controlled to maintain the test solvent at (30 ± 2) °C.

6.1.2 Other mechanical devices may be used for the tests, provided that it can be demonstrated that the results are identical with those obtained by the apparatus described in 6.1.

6.2 **Fume cabinet** or **hood**, with sufficient attributes to confine solvent vapour and thereby protect human health.

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

7 Test specimen

7.1 If the textile to be tested is fabric, follow the procedure in either 7.1.1 or 7.1.2.

7.1.1 Attach a specimen of (100 ± 2) mm × (40 ± 2) mm to a piece of the multifibre adjacent fabric (5.2.1), also measuring (100 ± 2) mm × (40 ± 2) mm, by sewing along one of the shorter edges, with the multifibre adjacent fabric next to the face side of the specimen.

7.1.2 Attach a specimen of (100 ± 2) mm × (40 ± 2) mm between the two single-fibre adjacent fabrics (5.2.2), also measuring (100 ± 2) mm × (40 ± 2) mm, by sewing along one of the shorter edges.

7.2 Yarn may be knitted into fabric form and tested as prepared in 7.1. 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 position it as described in either 7.2.1 or 7.2.2.

7.2.1 Place it between a (100 ± 2) mm × (40 ± 2) mm piece of the multifibre adjacent fabric (5.2.1) and a (100 ± 2) mm × (40 ± 2) mm piece of the non-dyeable fabric (5.2.3) and sew them along all four sides (see ISO 105-A01:2010: 10.3, *Preparation of composite specimens*).

7.2.2 Place it between a (100 ± 2) mm × (40 ± 2) mm piece of each of the two specified single-fibre fabrics (5.2.2) and sew along all four sides.

8 Procedure

8.1 Prepare the mechanical device (6.1) by allowing the water bath (see 6.1) to attain its working temperature of (30 ± 2) °C.

8.2 Prepare a bag with inside dimensions of 100 mm × 100 mm using the undyed cotton twill cloth (5.3) by sewing together two squares of this cloth around three sides. Place the composite specimen and 12 steel discs (5.4) inside the bag. Close the bag by any convenient means.

8.3 Remove the steel containers (see 6.1) from the mechanical device. Ensure that the interior of each container, including its lid and sealing gasket, are dry. This should be achieved by wiping each container's components with a dry cotton cloth.

8.4 Place the bag containing the composite specimen and the steel discs in the container.

8.5 Within the confines of the fume cabinet or hood (6.2), add to each steel container 200 ml of perchloroethylene solvent (5.1) at (30 ± 2) °C. If another solvent is used, this shall be stated in the test report.

8.6 Close the container and place it in the mechanical device (6.1). Once all the containers are placed in the mechanical device, commence rotation. Treat the composite specimen for 30 min at (30 ± 2) °C in the mechanical device.

8.7 Within the confines of the fume cabinet or hood (6.2), remove the bag from the container, withdraw the composite specimen, place it between white absorbent paper or cloth and squeeze or centrifuge to remove surplus solvent. Open out the composite specimen, in contact only at its line of stitching. Dry the specimen by hanging it in the air in the fume cabinet or hood at a temperature of (60 ± 5) °C.

8.8 Assess the change in colour of the specimen and the staining of the adjacent fabric with reference to the original specimen and the original adjacent fabric, respectively, using the grey scale for assessing change in colour (5.5), the grey scale for assessing staining (5.6), or instrumentally (see 6.3).

9 Test report

The test report shall include the following information:

a) the number and date of this part of ISO 105 (i.e. ISO 105-D01:2010);

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

c) the solvent used, if different from perchloroethylene;

d) the numerical grey scale rating and/or instrumental assessment for the change in colour of the test specimen;

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

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

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