

Fifth edition
2001-05-01

Corrected version
2002-06-01

**Textiles — Tests for colour fastness —
Part X12:
Colour fastness to rubbing**

Textiles — Essais de solidité des teintures —

Partie X12: Solidité des teintures au frottement
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Reference number
ISO 105-X12:2001(E)

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
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Printed 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 3.

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 part of ISO 105 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 105-X12 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-X12:1993), which has been technically revised.

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.

This corrected and reprinted version of ISO 105-X12:2001 incorporates the following corrections in subclause 6.2 on page 3.

The sequence of the rubbing cycle has been clarified. The text now indicates that the total number of cycles is 20:10 to and 10 fro as opposed to 20 than 10 to and fro.

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Textiles — Tests for colour fastness —

Part X12: Colour fastness to rubbing

1 Scope

This part of ISO 105 specifies a method for determining the resistance of the colour of textiles of all kinds, including textile floor coverings and other pile fabrics, to rubbing off and staining other materials.

The method is applicable to textiles made from all fibres in the form of yarn or fabric, including textile floor coverings, whether dyed or printed.

Two tests may be made, one with a dry rubbing cloth and one with a wet rubbing cloth.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 105. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 105 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

<https://standards.iteh.ai/catalog/standards/sist/877d92c5-fbfe-490c-8275-741f-7872-8/iso-105-x12-2001>
ISO 105-A01:1994, *Textiles — Tests for colour fastness — Part A01: General principles of testing.*

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

ISO 105-F09, *Textiles — Tests for colour fastness — Part F09: Specification for cotton rubbing cloth.*

ISO 105-X16, *Textiles — Tests for colour fastness — Part X16: Colour fastness to rubbing — Small areas.*

ISO 139, *Textiles — Standard atmospheres for conditioning and testing.*

3 Principle

Specimens of the textile are rubbed with a dry rubbing cloth and with a wet rubbing cloth. The machine provides two combinations of testing conditions through two alternative sizes of rubbing finger: one for pile fabrics; one for solid colour or large print fabrics.

4 Apparatus

4.1 Suitable testing device for determining the colour fastness to rubbing, using a reciprocating straight line rubbing motion and two alternative sizes of rubbing fingers.

4.1.1 For pile fabrics, including textile floor coverings: rubbing finger with a rectangular rubbing surface with the lead edge rounded measuring 19 mm × 25,4 mm (crock block).

The rubbing finger shall exert a downward force of $(9 \pm 0,2)$ N, moving to and fro in a straight line along a (104 ± 3) mm track.

NOTE 1 Difficulty may be experienced in making assessments of the degree of staining on the rubbing cloth when pile fabrics are tested using the $(16 \pm 0,1)$ mm diameter rubbing finger due to heavier staining occurring on the circumference of the stained area, i.e., haloing. The rubbing finger described in 4.1.1 will eliminate the haloing with many types of pile fabrics.

Even with the use of the crock block, difficulty may be experienced in assessing staining when fabrics with high pile are tested.

NOTE 2 A suitable apparatus for pile fabrics is described in *Journal of the Society of Dyers and Colourists*, **87** 1971, 155; **88** 1972, 259.

4.1.2 For other textiles: rubbing finger comprised of a cylinder of $(16 \pm 0,1)$ mm diameter moving to and fro in a straight line along a (104 ± 3) mm track on the specimen and exerting a downward force of $(9 \pm 0,2)$ N.

NOTE A suitable apparatus is described in the *Technical Manual of the American Association of Textile Chemists and Colorists*, Test Method 8, for 4.1.2, and Test Method 165 for 4.1.1. Other devices can be used, provided that the same results are obtained as with the apparatus described in clause 4. There is no known correlation of results between the two methods described.

4.2 Cotton rubbing cloth, desized, bleached, without finish, cut into 50 mm squares (± 2 mm) for the finger used in 4.1.2. For the finger described in 4.1.1, a 25 mm \times 100 mm ± 2 mm cloth is used. See ISO 105-F09.

4.3 Soft-back waterproof abrasive paper, or grating of stainless steel wire 1 mm in diameter and mesh width about 20 mm.

NOTE Attention should be paid to the characteristics of the grating or abrasive paper used to hold the specimen as they may leave an imprint through the textile which would cause a false rating to be made. The use of the abrasive paper may be preferred for testing textile fabrics.

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

Verification on the operation of the test and the apparatus shall be made routinely and the results kept in a log. Use an in-house or established rubbing specimen and conduct three (3) dry tests.

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5 Test specimens

5.1 If the textile to be tested is a fabric or textile floor covering, two pieces not less than 50 mm \times 140 mm are required for dry rubbing and two for wet rubbing. Additional specimens may be used when higher precision is needed. One specimen of each pair shall have the long direction parallel to the warp yarns, (or in the direction of manufacture), the other parallel to the weft (or filling yarns or at right angles to the direction of manufacture). An alternate method of cutting specimens is to cut the long dimension diagonally to warp and weft. If the pile lay of a carpet specimen is distinguishable, cut the specimen with the pile lay pointing in the long direction.

5.2 If the textile to be tested is yarn or thread, knit it into fabric to provide specimens at least 50 mm \times 140 mm or form a layer of parallel strands by wrapping it lengthways on a cardboard rectangle of suitable dimensions.

5.3 Before testing, condition the specimen and rubbing cloth for at least 4 h in an atmosphere of (20 ± 2) °C and (65 ± 2) % RH by laying each test specimen and each piece of rubbing cloth separately on a screen or perforated shelf. Some fabrics such as cotton or wool may require longer periods of conditioning.

5.4 For best results, testing should be conducted under standard atmosphere for testing textiles (see ISO 139).

6 Procedure

6.1 General

Fasten each test specimen by means of clamps to the baseboard of the testing device so that the long direction of the specimen follows the track of the device. Between the baseboard of the testing device and the specimen, place a piece of wire mesh or soft-back waterproof abrasive paper to help reduce movement of the specimen. Test the specimens prepared in clause 5 according to the procedures in 6.2 and 6.3.

When testing multi-coloured textiles, care should be taken to position the specimens in such a way that all colours of the design are rubbed in the test using the device described in 4.1.2. Alternatively, if the areas of colour are sufficiently large, more test specimens may be taken and the individual colours assessed separately. If the areas of colour are small and run together, a choice to test using a rotary device, as described in ISO 105-X16, is advised.

6.2 Dry rubbing

Place the conditioned rubbing cloth, (see 4.2 and 5.3), flat over the end of the finger with the weave parallel to the direction of rubbing finger. At a rate of one cycle per second, rub to and fro in a straight line 20 times, 10 times to and 10 times fro, along a track (104 ± 3) mm long on the dry specimen, with downward force of $(9 \pm 0,2)$ N (see 4.1.1 and 4.1.2). Remove test square and condition as in 5.3 above. Remove any extraneous fibrous material that might interfere with the rating.

6.3 Wet rubbing

Establish a technique for preparing rubbing cloth by weighing a conditioned piece of cloth, then thoroughly soak in distilled water and reweigh to ensure take-up of 95 % to 100 %. Follow the instructions for rubbing in 6.2.

NOTE As the level of soak of the rubbing cloth may dramatically affect ratings, other levels may be used. An example of a very commonly used level of soak is (65 ± 5) %.

6.4 Drying

Air dry the test cloth.

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7 Evaluation

7.1 Back each tested rubbing cloth with three layers of white rubbing cloth while evaluating.

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7.2 Assess the staining of the cotton rubbing cloths with the grey scale for staining (4.4) under suitable illumination (see clause 13 of ISO 105-A01:1994).

8 Test Report

The test report shall contain the following information:

- a) reference to this part of ISO 105; i.e., ISO 105-X12;
- b) which finger and force were used in the test;
- c) whether dry or wet rubbing was performed along with the percentage of soak;
- d) the time of conditioning of the specimens and rubbing cloth as well as the atmospheric conditions during testing;
- e) identification of the long direction of the specimen mounting, i.e., warp, weft or oblique;
- f) the numerical rating for staining for each test specimen.

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ICS 59.080.01

Price based on 3 pages