INTERNATIONAL STANDARD

ISO 105-X16

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Textiles — Tests for colour fastness —

Part X16: Colour fastness to rubbing — Small areas

Textiles — Essais de solidité des teintures —

Partie X16: Solidité des teintures au frottement — Petites surfaces

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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-X16 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 1, *Tests for coloured textiles and colorants*.

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.

Textiles — Tests for colour fastness —

Part X16:
Colour fastness to rubbing — Small areas

1 Scope

This part of ISO 105 specifies a method for determining the resistance of the colour of textiles to rubbing off and staining other materials where the singling out of areas smaller than possible to test with the apparatus described in ISO 105-X12 is required.

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.

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 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 method is specifically designed for small areas of printed or otherwise coloured fabric where the singling out of areas smaller than possible to test with the standard rubbing device found in method ISO 105-X12 is required.

4 Apparatus

4.1 Suitable testing devices for determining the colour fastness to rubbing, using an alternating rotary motion and a single test finger of $(25 \pm 0{,}1)$ mm diameter mounted on a vertical weighted rod that rotates $(405 \pm 3)^{\circ}$ with a downward force of $(11{,}1 \pm 0{,}5)$ N. Another device has a test finger of $(16 \pm 0{,}1)$ mm diameter with the same downward force.

NOTE A suitable apparatus is described in the *Technical Manual of the American Association of Textile Chemists and Colorists*, Test Method 116. Other devices can be used, provided that the same results are obtained as with the apparatus described in 4.1. There is no known correlation of results between the device used in this method and two methods described in ISO 105-X12.

4.2 Cotton rubbing cloth, desized, bleached, without finish, cut into 50 mm squares ($\pm$ 2mm) for the finger used in 4.1 (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.

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

5 Test specimens

5.1 If the textile to be tested is a fabric, specimens not less that 25 mm × 25 mm are required. Additional specimens may be used when higher precision is needed.

5.2 If the textile to be tested is yarn or thread, knit it into fabric to provide specimens at least 25 mm × 25 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

Tilt the upper half of the rotary vertical machine to open and expose the rotary crocking finger. Fasten the specimen at the point the vertical rod comes into contact with the base and place the rubbing square on the finger. Return the upper half of the machine back to the operating position with the rubbing cloth at the end of the shaft in contact with the test specimen. Apply weight to the vertical shaft to give $(11{,}1 \pm 0{,}5)$ N downward force.

6.2 Dry rubbing

Place the conditioned rubbing cloth (see 4.2 and 5.3), flat over the end of rubbing finger and turn the crank 20 turns producing 40 reciprocal turns of the vertical shaft. Turn the crank at a rate of one revolution per second. Remove the test square and condition.

6.3 Wet rubbing

Establish a technique for preparing the 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) % of the conditioned mass of a dry rubbing cloth.

6.4 Drying

Air dry the test cloth.

7 Evaluation

7.1 Remove any extraneous fibrous material that might interfere with the rating.

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

7.3 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).

NOTE Difficulty may be experienced in making assessments of the degree of staining on the rubbing cloth as the rotary device usually exhibits greater colour transfer near the edge of the tested circle than the centre.

8 Test Report

The test report shall contain the following information:

a) reference to this part of ISO 105; i.e. ISO 105-X16;

b) whether dry or wet rubbing was performed along with the percentage of soak;

c) the numerical rating for staining for each test specimen;

d) the time of conditioning of the specimens and rubbing cloth as well as the atmospheric conditions during testing.

Bibliography

[1] ISO 105-X12, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*.