INTERNATIONAL STANDARD

ISO 13750

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Textile floor coverings — Determination of resistance to staining by acid food colours

Revêtements de sol textiles — Détermination de la résistance au tachage par des colorants alimentaires acides

Reference number
ISO 13750:2000(E)

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Foreword

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

International Standard ISO 13750 was prepared by Technical Committee ISO/TC 219, *Floor coverings.*

Textile floor coverings — Determination of resistance to staining by acid food colours

1 Scope

This International Standard specifies the procedure for assessing textile floor coverings for resistance to staining by acid food colours. The apparent intensity of the stain will vary with the colour of the floor covering.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard 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-J01:1997, *Textiles — Tests for colour fastness — Part J01: General principles for measurement of surface colour.*

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

ISO 1957*, Machine-made textile floor coverings — Selection and cutting of specimens for physical tests.*

ISO 11379, *Textile floor coverings — Laboratory cleaning procedure using spray extraction.*

3 Principle

A test specimen of textile floor covering is stained under controlled conditions. After staining the test specimen is conditioned, then rinsed and assessed for residual stain.

4 Reagents

4.1 Standard dye, Colour Index (CI) Food Red 17 (FD & C Red 40).

4.2 Distilled or deionized water.

4.3 Citric acid, general laboratory grade.

5 Apparatus

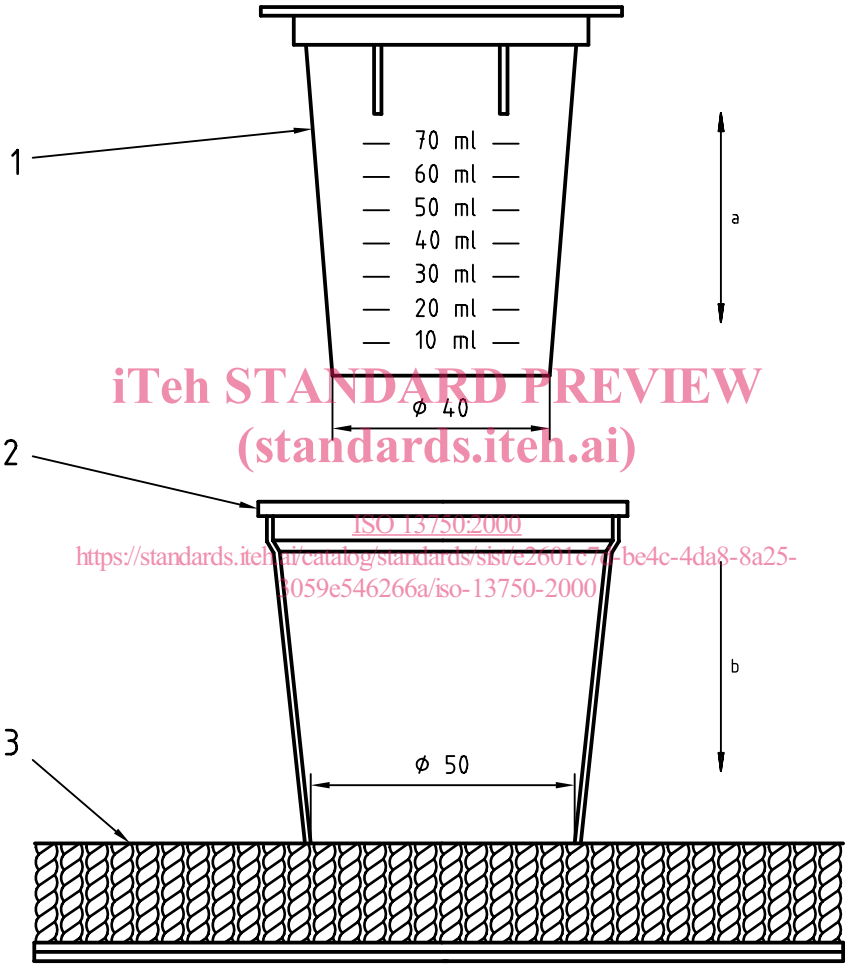
5.1 Staining ring and cup, comprising a 100 ml graduated cup and 50 mm diameter ring (see Figure 1)[1].

5.2 Reference stain scale, AATCC Red 40 stain scale with grades 1 (intense) to 10 (not visible)[1].

5.3 Colour difference measuring equipment, with a (50 ± 0,5) mm aperture, capable of measuring the colour of textile floor-coverings and expressing the results as ΔE (CIELAB system) in accordance with ISO 105-J01:1997 and appropriate software for converting the result into the corresponding stain scale grade.

5.4 Centrifugal extractor.

Dimensions in millimetres



Key

1 Cup
2 Ring
3 Test specimen

a Move up and down five times
b Press firmly

Figure 1 — Typical stain cup and ring

1) Staining ring and cup and staining scales made to this specification are available from AATCC, PO Box 12215, Research Triangle Park, NC 27709, USA. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of the product.

6 Atmosphere for conditioning and testing

Condition the test specimens in one of the standard atmospheres described in ISO 139 for a minimum of 24 h.

7 Sampling and preparation of test specimen

Textile floor coverings under test shall be sampled in accordance with ISO 1957. Cut test specimens at least 150 mm × 150 mm. Remove any extraneous surface materials by brushing or vacuum cleaning, using a vacuum cleaner specified in ISO 11379.

8 Staining procedure

8.1 Prepare the standard staining solution as follows.

Weigh out 100 mg ± 1 mg of the standard dye (4.1) and dissolve it in 1 000 ml ± 10 ml of distilled or deionized water (4.2) at 24 °C ± 3 °C.

Adjust the pH of this solution to 2,8 ± 0,1 using citric acid (4.3) (approximately 3,2 g). Check the pH with a pH meter calibrated using pH 3,0 and 4,0 buffer solutions. If the pH of the prepared staining solution is below 2,7, discard this solution and prepare a new one. The use of pH paper to measure acidity is not acceptable because of the lack of accuracy.

8.2 Place the test specimen on a clean, smooth, flat, horizontal, non-absorbent surface with the use surface uppermost.

8.3 Place the staining ring (5.1) in the centre of the test specimen. While pressing down on the ring, pour 20 ml of staining solution into the centre of the ring. Press the bottom of the stain cup through the ring into the use surface, moving it up and down five times to facilitate thorough wetting of the use surface from top to bottom. Do not rotate or twist the cup inside the ring since this may result in surface abrasion and damage to any fibre treatments. Carefully remove the staining ring and cup.

8.4 Leave the test specimen to age 24 h ± 4 h in the position specified in 8.2 in the standard atmosphere. Avoid any air draughts which could result in accelerated drying of the stained surface.

8.5 Remove excess staining agent by rinsing the test specimen with running water at 21 °C ± 6 °C until the rinse water is clear, which indicates removal of all unfixed red dye. Make sure to rinse the backing thoroughly to remove all red dye.

NOTE Water flow should be adequate to thoroughly rinse the test specimen, but variation in flow does not significantly affect the test result. There is no significant difference between results obtained using tap water or demineralized water.

8.6 Remove excess water by centrifugal extraction and allow the test specimen to dry under ambient conditions.

8.7 If residual staining agent wicks to the surface during drying, repeat steps 8.4 and 8.5.

NOTE This problem may occur with highly absorbent backings, such as foam.

9 Evaluation procedure

9.1 Reference stain scale method

9.1.1 Rotate the test specimen and/or gently brush the pile to produce the maximum display of visual stain. Place the AATCC Red 40 stain scale (5.2) over the test specimen with the stained area between the two reference columns and the non-stained portion (original) directly under the numbered, coloured film square.

9.1.2 Illuminate the surface with sky light or equivalent source of illumination of 538 lux or more. The light shall be incident upon the surface at 45° ± 5° and the direction of viewing 90° ± 5° to the plane of the sample surface. These angles of incident light and viewing are specified in order to minimize any gloss from the scale. If necessary, alter the angle of illumination within the above range to eliminate direct reflection of the incident light from the scale surface.

9.1.3 Compare the colour of the stained portion of the test specimen to that of the closest square of the stain scale and report the result as the corresponding AATCC Red 40 stain scale grade. The operator may interpolate to the nearest half grade in cases where the colour depth of the stained test specimen is between the steps of the scale.

9.2 Colour difference measuring equipment method

Using the colour difference measuring instrument (5.3), measure the colour of the unstained reference specimen and then measure the colour of the stain on the test specimen, ensuring that the measuring head is placed carefully in the centre of the stained area. Calculate the colour difference (ΔE) between original and stained specimens according to the following formula:

$$\Delta E = \sqrt{(L_o - L_s)^2 + (a_o - a_s)^2 + (b_o - b_s)^2}$$

where

L_o, a_o and b_o are the mean CIE colour co-ordinates of the original test specimen;

L_s, a_s and b_s are the mean CIE colour co-ordinates of the stained test specimen.

Convert the results to the corresponding reference stain scale grade by using the appropriate software.

10 Accuracy and precision

Three laboratory trials were conducted under the direction of AATCC in 1989 and 1990. The results of these trials indicate that the within-laboratory standard deviation is 0,5 stain grade units and the 95 % confidence interval is ± 1.

There were significant differences between laboratories related to the application of the staining agent, resulting in a total standard deviation of the method (including both the inter-laboratory and within-laboratory components) of 1 stain grade unit. Therefore the inter-laboratory 95 % confidence interval is ± 2.

No statement of accuracy can be made because the true stain value cannot be established by an independent method.

11 Test report

The test report shall include the following information:

a) reference to this International Standard, i.e. ISO 13750;

b) all information necessary to identify the textile floor covering;

c) the purpose of the test;

d) the method of evaluation;

e) the test results;

f) any deviations from this International Standard which might have affected the test results;

g) the date of the test.