
**Footwear — Test methods for uppers,
lining and insoles — Colour migration**

*Chaussures — Méthodes d'essai des tiges, de la doublure et des
garnitures intérieures — Migration de la couleur*

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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 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 17701 was prepared by CEN (as EN 13517:2001) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 216, *Footwear*, in parallel with its approval by the ISO member bodies.

For the purposes of international standardization, a list of corresponding International and European Standards for which equivalents are not given in EN 13517 has been added as Annex ZZ.

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 309 "Footwear", the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2002, and conflicting national standards shall be withdrawn at the latest by May 2002.

This European Standard is based on the IULTCS/IUF 442 method.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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EN 13517:2001 (E)

1 Scope

This European standard specifies a test method for determining the propensity of a material to cause discolouration of another material when stored in close contact. This method is applicable to all materials which are used in intimate contact, and to adhesives which are used to bond them.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12222, *Footwear - Standard atmospheres for conditioning and testing of footwear and components for footwear.*

EN ISO 105-A01, *Textiles - Tests for colour fastness - Part A01: General principles of testing.*

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

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

3 Term and definition

For the purposes of this European Standard, the following term and definition applies.

3.1

colour migration

discolouration caused by movement of colour from one material to another when stored

4 Apparatus and material

The following apparatus and material shall be used:

4.1 Two smooth glass plates at least 52 mm x 42 mm and mass 50 g $\pm$ 5 g.

4.2 Mass of sufficient size that when combined with the mass of the glass plate will exert a pressure of 5,2 kPa $\pm$ 0,5 kPa on the test specimen of area 2 000 mm² $\pm$ 180 mm² (normally a mass of 1 000 g $\pm$ 10 g).

4.3 Dark test environment at 60 °C $\pm$ 2 °C.

NOTE An oven that does not have a glass door or panel is suitable.

4.4 Grey scales with half step ratings for assessing change in colour and degree of staining complying with EN ISO 105-A02 and EN ISO 105-A03, respectively.

4.5 Clock capable of recording times to the nearest 1 min over a 4 h period.

4.6 Artificial lighting conditions as specified in EN ISO 105-A01 or north daylight.

5 Sampling and conditioning

5.1 Store the test materials in a conditioned standard atmosphere as specified in EN 12222 for a minimum of 24 h prior to testing.

5.2 Testing for colour migration between materials.

Cut either a rectangular test specimen of dimensions $50 \text{ mm} \pm 2 \text{ mm} \times 40 \text{ mm} \pm 2 \text{ mm}$ from the darker coloured of the two materials and one of dimensions $60 \text{ mm} \pm 2 \text{ mm} \times 50 \text{ mm} \pm 2 \text{ mm}$ from the lighter coloured of the two or, when testing for the effect of adhesives on a single material, cut one sample of dimensions $(50 \text{ mm} \pm 2 \text{ mm}) \times (40 \text{ mm} \pm 2 \text{ mm})$ or, when testing for the effect of an adhesive in a laminate, cut one sample of dimensions $(50 \text{ mm} \pm 2 \text{ mm}) \times (40 \text{ mm} \pm 2 \text{ mm})$ from each material to be laminated together.

If there are insufficient materials, smaller samples may be used and a proportionally lower mass than $1\,000 \text{ g} \pm 10 \text{ g}$ to maintain a contact pressure of $5,2 \text{ kPa} \pm 0,5 \text{ kPa}$.

5.3 Testing for the effect of adhesives.

5.3.1 Coat the centre of the surface to which the adhesive would be applied in production with the adhesive under test, so that the coating covers approximately 75% of the area of the test specimen. Use a quantity of adhesive that is judged to be representative of that to be used in production.

5.3.2 When testing for the effect of adhesives within a laminate where a wet bond is used in production, place the two materials together and press by hand to form a bonded assembly and allow the adhesive to dry at room temperature.

5.3.3 When testing for the effect of adhesives within a laminate where the bond is formed with dry adhesive films, join the two materials using a technique similar to that used in production.

5.4 Testing components such as solings.

5.4.1 Prepare by suitable means, a test specimen of uniform thickness from the soling or other component.

5.4.2 Cut a test specimen from the material and the second test material (5.2).

NOTE Specimens can be taken either from materials likely to be used for uppers or from made up uppers or finished footwear.

6 Test method

6.1 Principle

Either two dissimilar materials are placed in intimate contact or a single piece of material coated with a product such as an adhesive are placed between glass plates. The assembly is stored in the dark for a prescribed period at an elevated temperature. The test specimens are then examined for any discolouration compared to unexposed reference samples. Discolouration indicates that the materials are likely to discolour under normal service conditions.

6.2 Procedure

6.2.1 For assemblies of two materials not joined together with adhesive.

6.2.1.1 Place the larger of the two test specimens centrally on a glass plate (see 4.1) with its contact face uppermost.

6.2.1.2 Place the other test specimen with its contact face lowermost centrally on the first specimen.

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- 6.2.1.3** Place the remaining glass plate (see 4.1) centrally on top of the specimens.
- 6.2.2** For adhesive coated single materials and laminates, place the test specimen between the two glass plates.
- 6.2.3** Place the mass (see 4.2) symmetrically on the top glass plate (see 4.1).
- 6.2.4** Place the assembly (see 6.2.1 or 6.2.2) in the dark test environment at $60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ (see 4.3) and start the clock (see 4.5).
- 6.2.5** After $240\text{ min} \pm 5\text{ min}$ remove the assembly from the test environment.
- 6.2.6** For assemblies of two unjoined materials; separate the two materials and compare their contact faces to unexposed materials taking care to compare equivalent faces of the two specimens. Assess in accordance with 6.2.8.
- 6.2.7** For adhesive coated single materials and laminates, remove the test specimen and compare the face not coated with adhesive to unexposed material. Assess in accordance with 6.2.8.
- 6.2.8** Under artificial lighting conditions as specified in EN ISO 105-A01, or north daylight.
- 6.2.8.1** Assess any loss of colour by comparing the contrast in colour between tested and non-tested material with the ratings on the grey scale for assessing the change in colour.
- 6.2.8.2** Assess any transfer of colour by comparing the contrast in colour between tested and non-tested material with the ratings on the grey scale for assessing the staining.
- 6.2.8.3** In all cases assess the area showing the most marked contrast.
- 6.2.8.4** Record a description of the loss of colour or transfer of colour alongside the numerical ratings obtained in 6.2.8.1 and 6.2.8.2 in terms of colour, intensity and uniformity of the change.
- 6.2.9** Repeat the procedure from 6.2.1 but remove the assembly from the test environments after $24\text{ h} \pm 1\text{ h}$.
- 6.2.10** Repeat the procedure in 6.2.9 until either a loss of colour or transfer of colour worse than grey scale rating 2/3 has occurred, or a total exposure time of 7 days has been reached.

7 Test report

The test report shall include the following information:

- a) for each inspection carried out, a description of any loss of colour or transfer of colour of each test specimen as determined in 6.2.8 and the corresponding cumulative contact time;
- b) a description of the materials or samples that were tested, including commercial references (style codes etc.);
- c) reference to this method of test;
- d) date of testing;
- e) date of analysis;
- f) any deviations from this test method.