



BSI Standards Publication

Adhesives for leather and footwear materials — Determination of colour change of white or bright coloured leather surfaces by migration

National foreword

This British Standard is the UK implementation of EN 12705:2011. It supersedes BS EN 12705:2000, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/52, Adhesives.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Adhesives for leather and footwear materials - Determination of colour change of white or bright coloured leather surfaces by migration

Adhésifs pour le cuir et les matériaux de chaussures -
Détermination du changement de couleur par migration des
surfaces de cuir blanc ou de couleurs claires

Klebstoffe für Leder und Schuhwerkstoffe - Bestimmung
der Farbänderung weißer oder hellfarbiger
Lederoberflächen durch Migration

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Foreword

This document (EN 12705:2011) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, 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of an identical text or by endorsement, at the latest by November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.

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1 Scope

This European Standard specifies a method to determine the colour change of white or bright coloured leather surfaces caused by adhesives and/or their basic constituents migrating from the reverse sides to their upper surfaces.

This change of colour may be caused either by the adhesive directly or by adhesive coatings on materials used in footwear manufacture, e.g. adhesive coated linings for ironing, toe-puffs, reinforcing tapes or bonded materials.

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.

EN 923:2005+A1:2008, *Adhesives — Terms and definitions*

EN 1067, *Adhesives — Examination and preparation of samples for testing*

EN 1244, *Adhesives — Determination of the colour and/or colour changes of adhesive coats under the influence of light*

EN ISO 15605, *Adhesives — Sampling (ISO 15605:2000)*

ISO 2602, *Statistical interpretation of test results — Estimation of the mean — Confidence interval*

CIE 15:2004, *Colorimetry*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923:2005+A1:2008 and the following apply.

3.1

leather

tanned animal skin, usually free of hair

3.2

colour

sensation perceived by the human eye

4 Principle

The bonding adhesive is coated on the reverse side of the leather under test and allowed to dry, to cool or to set for specified period of time.

The colour of the upper side of the leather is measured and the test specimen is stored under specified conditions. The colour of the test specimen is measured after storage.

5 Apparatus and materials

Ordinary laboratory apparatus and in particular:

5.1 Cutting knife, for cutting leather.

5.2 Coating device, to spread the adhesive to be used on the pieces of leather to be tested, capable of producing a flat surface coating with a measurable uniform thickness after drying, cooling or setting.

5.3 Analytical balance, with scale division of 0,001 g for weighing test pieces.

5.4 Glass plates, even and smooth at least 70 mm x 70 mm with a mass about 40 g for covering test specimens and reference leather pieces.

5.5 Release agent, non-staining, to prevent sticking of the test specimens to the glass plates.

5.6 Weights, with a mass $(1\ 000 \pm 10)$ g for loading test specimens.

5.7 Colorimeter, for measuring the colour of test specimens and reference leather pieces capable of converting the readings to the CIE colour scale values L^* , a^* and b^* and of calculating the CIELAB colour differences ΔL^* , Δa^* , Δb^* and ΔE^*_{ab} automatically in accordance with CIE 15:2004.

5.8 Oven, for storing loaded test specimens and reference leather pieces in the dark at a temperature of (60 ± 2) °C.

5.9 Light exposure apparatus, in accordance with EN 1244 containing a xenon arc lamp, a light filter, a heat filter, a temperature sensor and an irradiation-measuring device.

6 Leather

The leather to be tested shall have a uniform surface of the upper side and an even, uniform reverse side free from any contamination (e.g. adhesives, dust or release agents).

Identify the leather as fully as possible. Record type and name and/or designation of the leather, supplier, date of supply, colour, thickness and, if known, type of tanning, and the composition of a surface coat, if any.

7 Adhesive

Identify the adhesive used by name and/or designation, manufacturer, date of manufacture/supply and/or lot number, expiry date, main polymer, colour and viscosity in the test report. For two-part adhesives identify also the nature of the crosslinking agent and mixing ratio of the components.

8 Preparation of test specimens and reference leather pieces

Cut, using a cutting knife (5.1), from the leather to be tested, two rectangular pieces (200 ± 5) mm x (70 ± 5) mm.

Take a sample in accordance with EN ISO 15605 of the adhesive to be used and examine and prepare it in accordance with EN 1067.

Apply the adhesive within the limits given by the adhesive manufacturer on the reverse side of one of the leather pieces cut as above indicated and spread the adhesive by a coating device (5.2) so that it covers the full area. The dry coat shall have an equal thickness, a uniform surface structure and shall not contain any bubbles.

Allow the adhesive coat to dry, cool or set for the period of time specified by the adhesive manufacturer. If not specified use (30 ± 5) min at a controlled temperature of (23 ± 5) °C and a relative humidity of less than 70 %.

The adhesive used can be applied in accordance with the instructions of its manufacture by several coats (always after drying of the preceding coat) on the leather piece. Record the number of adhesive coats applied and the drying times in the test report.

Cut from the coated leather piece at least three pieces (test specimens) (50 ± 2) mm x (50 ± 2) mm and from the uncoated leather pieces, the same number of pieces (reference leather pieces) of the same dimensions.

Determine the mass of dried adhesive applied by weighing the test pieces, with and without adhesive, using the analytical balance (5.3) and record it.

9 Procedure

9.1 Colour measurement of test specimens and reference leather pieces

Standardise the colorimeter (5.7) to a white standard (standard illuminant D 65, standard observer 10°, geometry of measurement d/8°), before any measurement.

Determine all CIE L^* , a^* and b^* values of test specimens and reference leather pieces by the colorimeter in accordance with CIE 15:2004. Note all values measured in the test report.

9.2 Storage/exposure of test specimens and reference leather pieces

9.2.1 General

Depending on the type of leather to be tested and the adhesive used in practice colour changes of white or bright coloured leather surfaces caused by migration often appear accelerated under the influence of heat and/or light.

Taking into account this experience store the 3 test specimens prepared according to Clause 8 and the same number of reference pieces.

9.2.2 Storage 7 days at (60 ± 2) °C in the dark between glass plates

Measure the colour values of the test specimens and of the reference leather pieces before storage as specified in 9.1 and note the colour values in the test report.

Place the test specimens and the reference leather pieces between two-glass plates (5.4). If required, use a light coat of a non-staining release agent (5.5). Load these assemblies with a 1 000 g weight (5.6) and store them with the uncoated leather upper sides uppermost in an oven (5.8) controlled at (60 ± 2) °C, during 7 days.

Each day take the assemblies from the oven, remove the glass plates from the test specimens and the reference leather pieces, measure their colour values as specified in 9.1 and note them in the test report. Replace the glass plates and store them again in the oven.

Repeat this procedure until a colour change of ΔE_{ab}^* 0,5 or more appears or at least up to 7 days.

9.2.3 Exposure 7 days to light

Measure the colour values of the test specimens and of the reference leather pieces as specified in 9.1 and note them in the test report.

Mount the test specimens and the reference leather pieces in a holder of the exposure apparatus (5.9) and proceed in accordance with EN 1244.

Measure at daily intervals the colour values of the test specimens and of the reference leather pieces as specified in 9.1 and note them in the test report.

Continue with the exposure until a discoloration of ΔE_{ab}^* 0,5 or more appears or at least up to 7 days.

9.2.4 Other storage conditions

Others requirements, combined or sequential storage conditions (e.g. light exposure followed by storage at elevated temperature), may be chosen. Identify such conditions and record the results obtained in the test report.

10 Expression of results

Express the results by indicating the CIE colour scale values L^* , a^* and b^* of each test specimen and reference leather piece both unstored/unexposed and stored/exposed and the CIE colour differences ΔL^* , Δa^* , Δb^* and ΔE_{ab}^* of these values calculated by a colorimeter (5.7) in accordance with CIE 15:2004. All values shall represent the arithmetic mean in accordance with ISO 2602 of at least 5 readings.

Colour differences of ΔE_{ab}^* 0,5 or less have to be ignored as they are insignificant.

11 Test report

The test report shall include:

- a) a reference to this European Standard;
- b) a detailed description of the leather to be tested according to Clause 6 and of any surface treatment of the leather after the test;
- c) complete identification of the adhesive used according to Clause 7;
- d) mass of final total adhesive coat applied in grams, number of the adhesive coats, drying time(s), and, if used, name and/or designation of a release agent;
- e) description of the colorimeter used (type, manufacturer, calibration etc.), mode and conditions of the colour measurement (type of illumination and observer, geometry of measurement);
- f) if test specimens are exposed to light description of the light exposure apparatus (type, manufacturer, lamp, filter system) and of the conditions of the exposure (intensity of irradiation, surface temperature of the specimens), rotation rate of the carousel used in the test chamber;
- g) test results according to Clause 10;
- h) any modification to the procedure described, and any incident which may have affected the results;
- i) date of the test.

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