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Footwear — Test methods for uppers, linings and insocks — Colour fastness to rubbing

Chaussures — Méthodes d'essai des tiges, des doublures et des garnitures intérieures — Stabilité de la couleur au frottement

Reference number
ISO 17700:2004(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 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 17700 was prepared by the European Committee for Standardization as EN 13516:2001. This International Standard includes corrigendum EN 13516:2001/AC:2003 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.

Throughout the text of this document, read “...this European Standard...” to mean “...this International Standard...”.

1 Scope

1.1 This standard specifies two test methods (method A and method B) for assessing the degree of damage (marring) and transfer of a material's surface colour during mild dry or wet abrasion. The methods are applicable to all footwear uppers, linings and insocks irrespective of the material, in order to assess suitability for end use.

1.2 This standard also specifies a method (method C) for determining the likelihood of colour bleeding from materials and components such as sewing threads and shoe laces due to the action of water and artificial perspiration solutions, in order to assess suitability for end use.

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 (ISO 105-A01:1994).*

EN 20105-A02, *Textiles - Tests for colour fastness - Part A02: Grey scale for assessing change in colour (ISO 105-A02:1993).*

EN 20105-A03, *Textiles - Tests for colour fastness - Part A03: Grey scale for assessing staining (ISO 105-A03:1993).*

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987).*

ISO 105-F10, *Textiles - Tests for colour fastness - Part F10: Specification for adjacent fabric: Multifibre.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1
colour fastness to rubbing
resistance of a material to damage (marring) and transfer of the materials surface colour during mild dry or wet abrasion

3.2
perspiration fastness
resistance of a material to colour bleed when exposed to an artificial perspiration solution

3.3
thick leather
leather with a thickness greater than 2 mm

4 Apparatus and material

The following apparatus and material shall be used:

4.1 Method A

4.1.1 Test machine with the following:

4.1.1.1 Flat horizontal metal platform of minimum dimensions 80 mm × 25 mm.

4.1.1.2 Means of moving the platform in a direction parallel to its 80 mm edges through distance of 35 mm ± 2 mm and back again at a rate of 40 cycles/min ± 2 cycles/min.

4.1.1.3 Pair of clamps positioned at the ends of the platform at 90° to the 80 mm edges and which are designed to clamp the test specimen against the platform. The clamp faces shall be a minimum distance of 80 mm apart.

4.1.1.4 Means of moving the clamps apart so that the test specimen is extended linearly by an amount adjustable up to 20 %.

4.1.1.5 Rubbing finger with a flat horizontal lower surface capable of holding a square felt pad (4.1.2). For machines with a platform wider than 25 mm the relative position of the rubbing finger shall be adjustable across the width of the platform.

4.1.1.6 Means of holding a square felt pad (4.1.2) on the lower surface of the finger.

4.1.1.7 Means of applying a downward force of 4,9 N $\pm$ 0,1 N and 9,8 N ± 0,2 N to the rubbing finger.

4.1.1.8 Means of counting the number of cycles traversed by the platform.

4.1.2 Square pads of scoured pure wool felt with the following requirements:

4.1.2.1 Sides of length 15 mm ± 1 mm.

4.1.2.2 Mass per unit area of 1750 g/m^2 ± 100 g/m^2 and thickness 5,5 mm ± 0,5 mm when measured using a dial gauge exerting a downward pressure of 49 kPa $\pm$ 5 kPa on a measuring foot diameter of 10 mm $\pm$ 1 mm.

4.1.2.3 The pH of an aqueous extract, made by shaking 5 g of ground felt in 100 ml of distilled or deionized water complying with EN ISO 3696 in a polyethylene bottle and leaving for 2 h, between 6 and 7.

4.1.3 Grey scales for assessing change in colour and staining with half step ratings conforming to EN 20105-A02 and EN 20105-A03

4.1.4 Assessment cabinet with artificial lighting as specified in EN ISO 105-A01. Alternatively, the assessment can be carried out in daylight from the north, when the test is carried out in the northern hemisphere, or daylight from the south when testing in the southern hemisphere.

4.1.5 Distilled or de-mineralized water complying with grade 3 of EN ISO 3696.

4.1.6 Synthetic perspiration solution containing per litre of solution;

- Sodium chloride, 5,0 g per litre of solution.

- Ammonia solution, density 0,880 g/cm^3, 6,0 cm^3.

4.1.7 White spirit, general purpose reagent grade.

4.2 Method B

4.2.1 Test machine with the following:

4.2.1.1 Rigid horizontal platform (preferably metal) capable of clamping the test specimen.

4.2.1.2 Vertical rotating spindle capable of holding the circular felt pad.

4.2.1.3 Means of rotating the felt pad at a speed of 15,6 rad/s ± 0,5 rad/s[1)] .

4.2.1.4 Means of loading the rotating felt pad with a force of either 24,5 N ± 0,5 N and 7,1 N ± 0,2 N.

4.2.1.5 Means of counting the number of revolutions of the felt pad.

4.2.2 Circular pads of scoured pure wool felt with central holes, with the following requirements:

a) Outside diameter 25 mm ± 1 mm, bore diameter 3 mm ± 0,5 mm.

b) Thickness, to be measured by one of the following methods:

Thickness	Downward pressure/presser foot size	Specimen
6,5 ± 0,5	49 kPa ± 5 kPa/10 mm ± 1 mm	Cut pads or uncut sheet material
5,0 ± 0,5	2,0 kPa ± 0,2 kPa/19 mm ± 10 mm	Cut pads

c) Density 190 kg/m^3 ± 20 kg/m^3.

4.2.3 Grey scales for assessing the change in colour and degree of staining complying with EN 20105-A02 and EN 20105-A03 respectively.

4.2.4 Metal plate approximately 75 mm × 65 mm and thickness 5 mm with a hole diameter 25 mm through its centre for use in the wetting from the back with organic solvents test described in 6.2.2.6.

4.2.5 Polished aluminium disc (diameter approximately 50 mm and thickness approximately 12 mm) to help cool the test specimen in dry rub tests.

4.2.6 Balance, capable of weighing masses up to 5 g to an accuracy of 10 mg.

4.2.7 Assessment cabinet with artificial lighting as specified in EN ISO 105-A01. Alternatively, the assessment can be carried out in daylight from the north, when the test is carried out in the northern hemisphere, or daylight from the south when testing in the southern hemisphere.

4.2.8 Distilled or deionised water complying with grade 3 of EN ISO 3696 for the wet rub test described in 6.2.2.3.

4.2.9 Synthetic perspiration solution, for the perspiration rub test described in 6.2.2.4, consisting of:

- Sodium chloride, 5 g per litre of solution.
- Ammonia solution, density 0,880 g/cm^3, 6,0 cm^3.

4.2.10 White spirit for the spirit rub test described in 6.2.2.5.

4.2.11 Organic solvents (as used for solvent activated stiffeners) for the wetting from the back with organic solvents test described in 6.2.2.6.

1) 1 rad ≈ 0,16 rev.

4.3 Method C

4.3.1 Petri dish large enough to accommodate a glass plate (4.3.2) for each test specimen assembly.

4.3.2 Glass plate of length at least 110 mm and width at least 55 mm with a mass of 100 g ± 2 g for each test specimen assembly.

4.3.3 Rectangular pieces of multifibre fabric type DW as specified in ISO 105-F10 of dimensions 100 mm ± 5 mm × 50 mm ± 2 mm.

4.3.4 Oven maintained at a temperature of 37 °C ± 2 °C.

4.3.5 Grey scales for assessing change in colour and staining with half steps as described in EN 20105-A02 and EN 20105-A03.

4.3.6 Assessment cabinet with artificial lighting as specified in EN ISO 105-A01. Alternatively, the assessment can be carried out in daylight from the north, when the test is carried out in the northern hemisphere, or daylight from the south when testing in the southern hemisphere.

4.3.7 Balance capable of measuring mass up to 100 g to the nearest 0,1 g for testing yarns or loose fibres.

4.3.8 Distilled or de-mineralized water complying with grade 3 of EN ISO 3696.

4.3.9 Alkaline perspiration solution containing, per litre of solution;

- l-histidine monohydrochloride monohydrate: 5,00 g.
- Sodium chloride: 5,00 g.
- Disodium hydrogen orthophosphate dihydrate: 2,50 g.

After preparation, the solution is brought to pH 8 with 0,1 M sodium hydroxide solution.

Store the solution at 4 °C ± 1 °C. If the solution is more than one week old check its pH and adjust as necessary before use. Discard the solution if precipitated solids develop.

4.3.10 Acid perspiration solution containing, per litre of solution;

- l-histidine monohydrochloride monohydrate: 5,00 g.
- Sodium chloride: 5,00 g.
- Sodium dihydrogen orthophosphate dihydrate: 2,50 g.

After preparation, the solution is brought to pH 5,5 with 0,1 M sodium hydroxide solution.

Store the solution at 4 ºC ± 1 ºC. If the solution is more than one week old, check its pH and adjust as necessary before use. Discard the solution if precipitated solids develop.

5 Sampling and conditioning

5.1 Method A

5.1.1 Rectangular test specimens of sufficient size to be clamped firmly on the test platform (4.1.1.1) are required. The test specimens can be cut from the material in any direction. Typically test specimens shall be of minimum dimensions 100 mm × 25 mm.

For test machines that have test platforms of width 25 mm, separate test specimens are required for each number of rubs or test condition to be used.

For test machines that have wider test platforms and the ability to position the test finger (4.1.1.5) at different positions across the width of the platform, wider test specimens can be used so that separate rubbing tracks can be used side by side.

5.1.2 Place the test specimens in a conditioned atmosphere as specified in EN 12222 for 24 h prior to test.

NOTE Test specimens can be cut either from materials likely to be used in footwear or from made-up uppers or finished footwear.

5.2 Method B

5.2.1 Test specimens shall be of a sufficient size to allow them to be fixed firmly to the test platform. Typically, test specimens shall be either squares of 60 mm × 60 mm, or circles 60 mm diameter; alternatively a 60 mm wide strip can be used for several tests.

For materials cut test specimens from a range of positions across the full usable width and length of the sheet material. For a material with a woven structure this should prevent any two specimens containing the same warp or weft threads.

For shoe uppers avoid seams, perforations and other areas where a flat test specimen cannot be cut.

5.2.2 Place the test specimens in a conditioned atmosphere as specified in EN 12222 for 24 h prior to test.

5.3 Method C

5.3.1 Test specimens can be taken either from materials likely to be used for uppers or from made-up uppers or finished products.

5.3.2 Sheet material or specimens from shoe uppers:

5.3.2.1 Cut one rectangular test specimen 110 mm ± 10 mm × 55 mm ± 5 mm for each method of the test to be carried out. If insufficient material is available, cut several smaller test specimens which can be fitted together to produce a rectangle of this size.

5.3.2.2 If the material to be tested is patterned, cut sufficient additional specimens to ensure that all the colours of the pattern are in contact with all six sections of the multifibre fabric (see 4.3.3).

5.3.2.3 Make test specimen assemblies by placing pieces of multifibre fabric (see 4.3.3) in contact with the surfaces of the specimens to be tested so that this surface of the specimen is in contact with all six components of the multifibre fabric. If testing both surfaces of the test specimen, sandwich the test specimen between two pieces of multifibre fabric.

5.3.3 Yarn or loose fibre:

5.3.3.1 For each method of test to be carried out, lay out sufficient yarn or fibre to completely cover the surface of one piece of the multifibre fabric (see 4.3.3).

5.3.3.2 If more convenient the yarn or fibre may be cut into lengths, 100 mm ± 5 mm.

5.3.3.3 Place the yarn or fibre between two pieces of the multifibre fabric (see 4.3.3) so that approximately equal amounts of the yarn or fibre are in contact with each of the six components of the multifibre fabric. It is likely that the yarns or fibres will overlap one another to some extent and this should be kept to a minimum. Avoid creating areas of several thicknesses of yarn or fibre as this will lead to uneven pressure on the test specimen assembly during the test.

5.3.4 Retain a portion of the material to use as a reference for visually comparing any colour change of the test specimen.

6 Test method

6.1 Principle

6.1.1 Methods A and B

Regarding rub colour fastness, a test specimen of the material is rubbed by a dry or wet wool felt pad under a constant contact force: in method B, the felt pad is rotated against the surface of the materials whilst in method A the felt pad is rubbed back and forth across the surface of the material. The test is stopped after a predetermined number of cycles or revolutions and the damage to, or transfer of, colour is assessed subjectively using a geometric grey scale. Four versions of the test are described for each method:

- Dry rub.
- Wet rub.
- Perspiration rub.
- White spirit rub.

In addition for method B, a further test is described: Dry rub after wetting from the back with organic solvent.

6.1.2 Method C

A test specimen, in contact with a standard multifibre fabric, is soaked with one of the following:

- C.1 - Distilled or deionised water.
- C.2 - Alkaline solution of artificial perspiration.
- C.3 - Acid solution of artificial perspiration.

The test specimen assembly is then sandwiched between two glass surfaces under a 4,5 kg weight and stored in a warm environment for a set time. The specimen and the multifibre fabric are dried separately and the change in their colour is assessed using grey scales.

6.2 Procedure

6.2.1 Method A

6.2.1.1 General

All tests shall be repeated at least once to confirm the results and be conducted in a conditioned atmosphere as specified in EN 12222.

6.2.1.2 Dry rub test

a) Secure the test specimen onto the platform (4.1.1.1).

b) Move the clamps (4.1.1.3) apart to extend the test specimen by;

— Woven fabrics and thick leather (see 3.3), 5 %

— Standard footwear leather, 10 %

— Softee leather, 15 % - 20 %

c) Secure a new dry felt pad (4.1.2) onto the lower surface of the rubbing finger so that two of its edges are parallel to the direction of movement of the platform.

d) Bring the felt pad and the test specimen into contact and apply a force of:

- Suede, 4,9 N ± 0,1 N

- All other types of material, 9,8 N ± 0,2 N

e) Operate the test machine (4.1.1) until the platform has completed the required number of cycles. If the number of cycles has not been specified then stop the machine after 100 cycles. If necessary when using high numbers of cycles, take precautions to avoid thermal damage to the surface coating by stopping the machine at intervals and allowing the sample to cool.

f) Lift the felt pad clear of the test specimen surface and remove from the machine.

g) Remove the test specimen from the machine and clamp a fresh test specimen on the platform or, adjust the position of the rubbing finger so that the area to be rubbed by the pad is at least 5 mm from the edges of the test specimen and from the area previously rubbed. Repeat the procedure in c) to f) for this further test.

h) Repeat the procedure in g) for any additional number of cycles and the required duplicate tests.

i) Proceed to 6.2.1.6.

6.2.1.3 Wet rub test

a) Immerse the felt pads (4.1.2) in cool distilled water and bring to the boil, continue to boil for (60 ± 5) s, and allow to cool to room temperature. Remove the pads from the water immediately before use but reject any that are excessively swollen or soft. Pads shall not be kept in water for more than 24 h. Unused wet pads shall be discarded after 24 h and fresh wet pads prepared as necessary.

b) Adjust the amount of liquid in the pad by gently squeezing the excess from it so that when it is fixed to the finger and lowered onto the test piece a little liquid is squeezed out to form a rim round the pad.

c) Follow the procedure in 6.2.1.2 c) to 6.2.1.2 h) using the wet instead of dry pads.

d) Dry the felt pads and test specimen(s) for a minimum of 16 h according to the atmosphere specified in EN 12222, and proceed to 6.2.1.6.

6.2.1.4 Perspiration rub test

a) Wet the felt pads as described in section 6.2.1.3 a).

b) Gently squeeze the excess water from the felt pad and immediately immerse it in the synthetic perspiration solution (see 4.1.6) for 5 min.

c) Remove the felt pads from the perspiration solution, reject any that are excessively swollen.

d) Follow the procedure in 6.2.1.3 b) to 6.2.1.3 d).

6.2.1.5 White spirit rub test

a) Immerse a felt pad in white spirit (4.1.7) for 30 s ± 5 s. Reject any felt pads that are excessively swollen.

b) Follow the procedure in sections 6.2.1.3 b) to 6.2.1.3 d).

6.2.1.6 Assessment of results (all tests)

a) To make the assessment of colour transfer easier it is recommended that each pad is cut in half and is placed against half of an unused pad.

b) To make the assessment of colour degradation easier it is recommended that each test specimen is compared against a test specimen without degree of damage (marring).

c) Under artificial lighting conditions specified in EN ISO 105-A01, or north daylight, compare the contrast between tested and non-tested areas with the ratings on the relevant geometric grey scale (i.e. “Degree of staining” for colour transfer and “Change in colour” for marring). If the assessment falls between two ratings on the grey scale then quote the lowest number of the two grey scale ratings, i.e. the worst case.

d) In cases where the duplicate tests give different numerical grey scale ratings, the lower value of the two shall be taken as the result for that test.

6.2.2 Method B

6.2.2.1 General

All tests described in 6.2.2.2 to 6.2.2.6 shall be repeated at least once to confirm the results and be conducted in a conditioned atmosphere as specified in EN 12222.

6.2.2.2 Dry rub test

a) Secure the test specimen onto the horizontal platform of the test machine and configure the machine to operate with a fixed force of 24,5 N.

b) Secure a dry felt pad onto the spindle of the test machine.

c) Bring the felt pad and the test specimen into contact and run the machine for the required number of revolutions. If necessary, take precautions to avoid thermal damage (see A.3).

d) Lift the felt pad clear of the test specimen surface and remove from the machine.

e) Remove the test specimen from the machine and clamp a fresh test specimen on the platform. Repeat the procedure in 6.2.2.2 b) to 6.2.2.2 d) for this further test.

f) Repeat the procedure in 6.2.2.2 e) for any additional number of revolutions and the required duplicate tests.

g) Proceed to 6.2.2.7.

6.2.2.3 Wet rub test

a) Secure the test specimen onto the horizontal platform of the test machine and configure the machine to operate with a fixed force of 7,1 N.

b) Immerse the felt pads in boiling distilled or deionised water, continue to boil for 60 s, and allow to cool to room temperature. To facilitate more rapid cooling, the water may be decanted off and replaced with fresh distilled or deionised water.

c) Remove the pads from the water immediately before use but reject any that are excessively swollen or soft. Pads shall not be kept in water for more than 24 h. Unused wet pads shall be discarded after 24 h and fresh wet pads prepared as necessary.

d) Adjust the amount of liquid in the pad by gently squeezing the excess from it so that its mass lies between 2,9 g and 3,2 g.

e) Follow the procedure in 6.2.2.2 c) to 6.2.2.2 g) using the wet instead of dry pads.

f) Dry the felt pads and test specimens at 20 °C, and proceed to 6.2.2.7.

g) Lift the pad clear of the test specimen surface, dry the felt pad and test specimen (see A.2) and proceed to 6.2.2.7.

6.2.2.4 Perspiration rub test

a) Set up the test machine as described in 6.2.2.3 a) and wet the pad as described in 6.2.2.3 b).

b) Gently squeeze the excess water from the felt pad and immediately immerse it in the synthetic perspiration solution as described in 4.2.9 for 5 min. Remove the felt pads from the perspiration solution, reject any that are excessively swollen and proceed as in 6.2.2.3 d) to 6.2.2.3 g).

6.2.2.5 White spirit rub test

a) Set up the test machine as described in 6.2.2.3 a).

b) Immerse a felt pad in white spirit as described in 4.2.10 for 30 s. Reject any felt pads that are excessively swollen and proceed as in 6.2.2.3 d) to 6.2.2.3 g).

6.2.2.6 Dry rub test after wetting from the back with organic solvent

a) Place the plate, described in 4.2.4, on the test machine platform, fit a dry felt pad into the hole in the plate and wet it evenly with 2,5 cm^3 ± 0,1 cm^3 of the organic solvent described in 4.2.11.

b) Immediately secure the test specimen over the pad, and configure the machine to operate with a fixed force of 7,1 N. Secure a dry felt pad onto the spindle. Bring the felt pad into contact with the specimen and leave for 60 s ± 2 s. Run the machine for the required number of revolutions.

c) Proceed as in 6.2.2.2 d) to 6.2.2.2 g) with fresh solvent wetted pads beneath each test specimen following the procedure in 6.2.2.6 a) and 6.2.2.6 b).

6.2.2.7 Assessment of results (all tests)

Proceed as indicated in 6.2.1.6.

6.2.3 Method C

6.2.3.1 Centrally place each test specimen assembly in its own petri dish (see 4.3.1).

6.2.3.2 Cover each test specimen assembly with one of the following:

- Method C.1: Water (see 4.3.8).
- Method C.2: Alkaline perspiration solution (see 4.3.9).
- Method C.3: Acid perspiration solution (see 4.3.10).

6.2.3.3 Gently prod and scrape each test specimen assembly with the edge of a glass plate (see 4.3.2) so that they are fully wetted and any air bubbles are expelled.

6.2.3.4 Maintain the petri dishes, with the test specimen assemblies in place, for 30 min ± 2 min at the temperature specified in EN 12222.

6.2.3.5 Place a glass plate (see 4.3.2) centrally over each test specimen assembly and fully cover the glass plates with the appropriate reagent, see 5.3.3.

6.2.3.6 Maintain the petri dishes, with the test specimen assemblies and glass plates still in position, for 15 min ± 1 min at the temperature specified in EN 12222.

6.2.3.7 Pour off the water or artificial perspiration solution from each petri dish while holding the glass plate and test specimen assembly in place. Do not squeeze the test specimen assembly or remove the glass plate.

6.2.3.8 Place the petri dishes, with the test specimen assemblies and glass plates still in position, in the oven (see 4.3.4) for 4,0 h ± 0,1 h at 37 °C ± 2 °C.

6.2.3.9 Separate the test specimens and multifibre fabric and leave them to dry separately on a non absorbent surface at a temperature not exceeding 60 °C.

6.2.3.10 Place the pieces of tested multifibre fabric on a white background under the lighting conditions (see 4.3.6) and in accordance with EN ISO 105-A01 assess the staining of each of the six individual components of each piece of multifibre fabric by comparing the contrast between tested and non-tested fabrics with the ratings on the grey scale for assessing staining (see 4.3.5).

6.2.3.11 If required, assess the change in colour of each specimen surface tested by comparing the contrast between the specimen and the reference piece of material (see 5.3.4) with the ratings on the grey scale for colour change (see 4.3.5). Take care to compare equivalent surfaces of the two pieces of material.

6.2.3.12 If either of the assessments in 6.2.3.10 or 6.2.3.11 fall between two ratings on the grey scale then quote the lower numbered rating.

7 Test report

The test report shall include the following information:

7.1 Methods A and B

a) the degree of transfer and damage (marring) as the minimum numerical grey scale rating determined in 6.2.1.6 (method A) or 6.2.2.7 (method B);

b) a description of the specimen that was tested, including commercial references (style codes, etc.);

c) reference to the method of test;

d) the surface of the specimen that was tested;

e) the version of the test that was used (dry, wet, perspiration, white spirit);

f) the number of cycles or revolutions used;

g) date of testing;

h) any deviations from the test method.

7.2 Method C

a) The numerical grey scale ratings for the staining of each component of the multifibre fabric, as determined in 6.2.3.10;

b) if required the numerical grey scale ratings for the change in colour of each surface of the specimen tested, as determined in 6.2.3.11;

c) a description of the specimen that was tested, including commercial references (style codes, etc.);

d) reference to the method of test;

e) the surface of the specimen that was tested;

f) date of testing;

g) any deviations from this test method.

Annex A

(informative)

A.1 Summary of test conditions normally used for method B

Test method	Rubbing force N	Number of revolutions		Name of grey scales	
		Marring	Transfer	Marring	Transfer
Dry	24,5	256	128	Change in colour (see EN 20105-A02)	Degree of staining (see EN 20105-A03)
Wet	7,1	128	64		
Perspiration	7,1	–	–		
White spirit	7,1	–	–		
Wetting from back	7,1	–	–		

A.2 Drying of pads and test specimens

It is usually sufficient to leave the material for a minimum of 16 h to dry at standard room temperature but if speed is important then accelerated drying of the pads is allowed by placing them in an oven (maximum temperature 60 °C). However, leather samples should only be dried naturally at room temperature.

A.3 Avoiding thermal damage

For specimens with surface coatings which have low melting points or softening temperatures the machine should be stopped at regular intervals to avoid thermal damage. A polished aluminium disc as described in 4.2.5 should then be placed on the rubbed area of the specimen with the pad resting on it for 30 s to help remove heat from the pad and test specimen. A number of commercially available rub fastness testers have the facility to automatically rub the specimen for four revolutions and then lift the rotating pad for four revolutions, which helps to keep the specimen cool. A stream of cooling air is also directed onto the test specimen while the pad is lifted to assist cooling. In such cases it is important to ensure that the air supply is free of condensed water or oil droplets.

Bibliography

[1] EN 13400, *Footwear – Sampling location, preparation and duration of conditioning of samples and test pieces.*

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