

## Colour Fastness of Leather in Respect of Staining Raw Crepe Rubber

### 1 Purpose and Scope

- 1.1 By colour fastness in respect of staining raw crepe rubber is meant the transfer of colour from leather to raw crepe rubber.
- 1.2 This method is valid for leather of all kinds at all stages of processing.

### 2 Principle

- 2.1 The side under test of the leather specimen is cemented to raw crepe rubber using a white pigmented raw rubber solution (rubber cement) and the composite specimen is exposed to heat under pressure in an appropriate apparatus. The transfer of the colour from the leather to the raw crepe rubber is assessed with the Grey Scale for assessing Staining.
- 2.2 If the leather has been finished, the test may be carried out with the finish intact or broken. In the latter case, this must be stated in the report.

### 3 Apparatus and Reagents

- 3.1 Apparatus in which the composite specimen can be subjected to a uniform pressure of 0.30 kg/cm<sup>2</sup> (see Section 7.1).
- 3.2 Oven, maintained at a temperature of  $50 \pm 2$  °C.
- 3.3 Pale raw crepe rubber sheets, 2-3 mm thick (measured with a standard gauge, see Section 7.6) and flat on at least one side, cut into pieces 50 mm x 30 mm (see Section 7.2.1).
- 3.4 Aluminium foil laminated to white paper, total thickness about 0.1 mm and cut into pieces 50 mm x 15 mm. Suitable is, for instance, a white Kraft paper, 60 g/m<sup>2</sup>, coated with aluminium foil, 0.01 mm thick (see Section 7.2.1).
- 3.5 White pigmented raw rubber solution (rubber cement):
  - 3.5.1 White pigmented raw rubber:
    - 80 parts by weight pale raw crepe rubber and
    - 20 parts by weight titanium dioxide (anatase) pigment, calendered to a homogeneous, moderately soft, and lightly sticky mass, sealed into a polyethylene bag for storage (see Section 7.2.2).
  - 3.5.2 Tetrachloroethylene, CCl<sub>2</sub>:CCl<sub>2</sub> (perchloroethylene), stabilised, 99% pure, boiling point 119-121 °C;  $d_4^{20}$  1.622 g/ml.
  - 3.5.3 Petroleum ether, boiling point 80-110 °C, residue-free;  $d_4^{20}$  0.71-0.72 g/ml.
  - 3.5.4 White pigmented raw rubber solution (see Section 7.2.3):
    - 22 parts by weight white pigmented raw rubber (see Section 3.5.1), dissolved in a mixture of:
      - 30 parts by weight tetrachloroethylene (see Section 3.5.2), and
      - 39 parts by weight petroleum ether (see Section 3.5.3).
- 3.6 Fine-grained abrasive paper (grade 180) (see Sections 7.2.1 and 7.3).
- 3.7 Grey Scale for assessing Staining (see Section 7.6).

## 4 Specimen

- 4.1 Specimen: leather piece, 50 mm x 30 mm. When testing with the finish broken, rough the finish with abrasive paper (see Section 7.3).
- 4.2 The side of the specimen under test and the flat side of the same sized piece of pale raw crepe rubber is painted fully and uniformly with the rubber cement (see Section 7.4). After 15 min, absorbent leathers, such as suedes, are painted again with the rubber cement. After evaporation of the solvent, an opaque film must be clearly discernible on the leather.
- 4.3 15 min after the last application of rubber cement to the leather, press the paper-free side of the laminated aluminium foil (Section 3.4) on to the leather surface in such a way that one half, 15 mm x 50 mm, of the specimen is covered (Fig 1).
- 4.4 Paint again the whole of the exposed upper surface, ie, half leather and half laminated aluminium foil, with rubber cement and air off at room temperature for 1 h. Bring together the prepared surfaces of the specimen and of the raw crepe rubber and firmly press the composite specimen by hand between two polyethylene sheets (see Fig 2 and Section 7.5).

## 5 Procedure

- 5.1 Place the composite specimen between two glass plates of the test apparatus and load it in the apparatus with 4.5 kg (corresponding to a pressure of 0.30 kg/cm<sup>2</sup> on the leather surface). When several composite specimens are being tested simultaneously, take care that each is placed centrally between two plates so that pressure is exerted evenly on it. The loading weight must be preheated in the oven for at least 1 h.
- 5.2 The loaded apparatus is placed in the oven at 50 ± 2 °C for 16 h.
- 5.3 After completion of the heat treatment, the composite specimens are removed from the apparatus and they are allowed to cool at room temperature.
- 5.4 Immediately the composite specimens have cooled (they are not separated into their components), the staining of the raw crepe rubber is assessed with the Grey Scale by comparison of the contrast between that half of the raw crepe rubber piece in direct contact with the leather and the other half (unstained) which was protected from direct contact with the leather by the laminated aluminium foil. With specimens of excellent fastness to staining raw crepe rubber, there is no contrast between the half of the raw crepe rubber piece in direct contact with the leather and the other half protected from direct contact with the leather by aluminium foil (Fig 3). With specimens not fast to staining raw crepe rubber, the half of the raw crepe rubber surface examined which has been in direct contact with the leather is more or less strongly stained (Fig 4). With specimens of very poor fastness to staining raw crepe rubber, colour may occasionally migrate so readily as to reach that half of the crepe rubber piece which had been protected from direct contact with the leather by aluminium foil and so may reduce the contrast between the two halves, leading to a false assessment (Fig 5). Where the protected half of the crepe rubber is stained by colour originating in the leather, the assessment is carried out on the contrast between the unprotected half of the crepe rubber and a fresh piece of crepe rubber, 50 mm x 30 mm, the flat side of which has been placed on a piece of white card of equal size and has been heated in the oven at 50 ± 2 °C for 15 min, which has practically the same effect on crepe rubber as a period of 15 h. If this procedure has had to be adopted, a statement to this effect must be included in the report, Section 6.5.

## 6 Report

This should comprise:

- 6.1 Description of the type of leather.
- 6.2 A statement as to the side of the leather tested.
- 6.3 Reference to the present method.
- 6.4 A note, if the test was carried out with the finish broken, stating the manner in which the finish was broken (see Section 7.3.1).
- 6.5 Details of any deviations, such as, the use of a different procedure (see Section 5.4) or of different adhesives (see Section 7.4.4).
- 6.6 Numerical rating for the staining of the raw crepe rubber, describing the hue of staining where this differs from that of the leather.

## 7 Notes

- 7.1 The recommended apparatus is the "Hydrotest" which consists of a stainless steel frame, into which fits precisely a piston, 4.5 kg in weight and 115 mm x 60 mm in cross-section, and glass plates of the same area and about 1.5 mm thick. Supplier: Chemiecolor AG, CH-8802 Kilchberg ZH, Switzerland. Any other apparatus may be used, provided it gives the same results, eg, the "Perspirometer" of the American Association of Textile Chemists and Colorists.
- 7.2
  - 7.2.1 Pale raw crepe rubber, aluminium foil-paper laminate, white pigmented raw rubber solution, and abrasive paper can be obtained from the Eidgenössische Materialprüfungs- und Versuchsanstalt, Hauptabteilung C, Unterstrasse 11, CH-9001 St Gallen, Switzerland.
  - 7.2.2 White pigmented raw rubber, packed in lots of 22 g for the preparation of 100 g rubber, is available in lieu of the rubber solution.
  - 7.2.3 The preparation rubber cement must be started at least two days before a test. For 100 g rubber cement, it is convenient to place the solvents into a 200 ml wide-necked flask with tightly fitting screw closure, followed by the white pigmented raw rubber. The flask is then agitated mechanically through being slowly rotated until a homogeneous solution of medium viscosity is obtained. If the solution has stood for some time it is agitated again before use with a glass rod or mechanically.
- 7.3
  - 7.3.1 For breaking the finish a piece of leather, 60 mm x about 80 mm, is loaded uniformly on the back with 1.0 kg on an area of 60 mm x 60 mm and the side bearing the finish moved ten times 100 mm to and fro on fine-grained abrasive paper (grade 180). The roughened area of the leather is then cut into one or two specimens of 50 mm x 30 mm. Leathers bearing a very heavy finish may need additional abrasion in order to partially expose the substrate. If such additional abrasion has been used, this must be stated in the report, Section 6.4.
  - 7.3.2 With some experience the finish can also be broken by hand with the same effect using the same abrasive paper.
  - 7.3.3 After breaking the finish, the treated surface is brushed thoroughly.
- 7.4
  - 7.4.1 For painting the side of the specimen under test and the flat side of the piece of raw crepe rubber with rubber cement, a small glue brush, as used in offices, is convenient. Before use, extract the whole

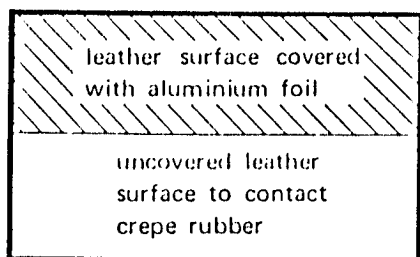


Fig 1

Appearance of specimen when viewed from above after it has been half-covered with laminated aluminium foil.

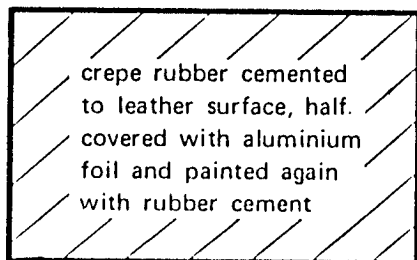


Fig 2

Appearance of composite specimen when viewed from above after specimen has been half-covered with laminated aluminium foil and then completely covered with crepe rubber.

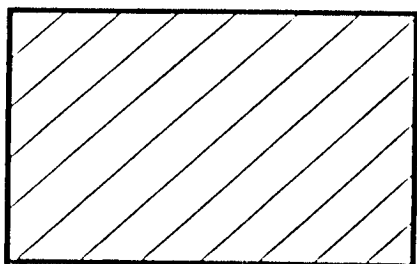


Fig 3

Appearance of composite specimen when viewed from above after completion of procedure: specimen of excellent fastness.

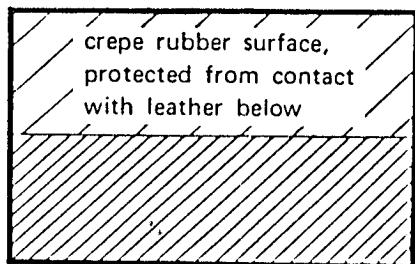


Fig 4

Appearance of composite specimen when viewed from above after completion of procedure: specimen not fast.

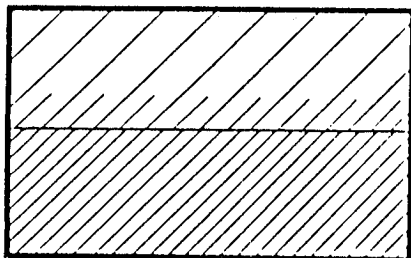


Fig 5

Appearance of composite specimen when viewed from above after completion of procedure: colour originating in the leather has migrated into the protected half of the crepe rubber.

brush, if the handle is lacquered, with dichloromethane. Dichloromethane is also suitable for cleaning brushes after use.

- 7.4.2 When several leathers are to be tested simultaneously, separate brushes should be used for each. This is particularly important for leathers which already colour the rubber cement during its application.
- 7.4.3 When brushing on the rubber cement, a thin glass rod or an opened paper clip is used to hold down one corner of the specimen or the piece of crepe rubber on to the supporting surface (eg, plate glass or white card).
- 7.4.4 Should adhesives be used other than the white pigmented raw rubber solution specified, this should be specially mentioned in the report, Section 6.5, stating the adhesive and the solvent or solvents.
- 7.5
  - 7.5.1 The application of the rubber cement is intended not only to give intimate contact between the specimen and the piece of crepe rubber, which is not completely smooth, but also to prevent the colour of the leather surface to be seen directly through the crepe rubber, since this would interfere with the assessment.
  - 7.5.2 The piece of crepe rubber must not be placed on the specimen until the solvent has evaporated from the last application of rubber cement (minimum waiting time 1 h), because otherwise solvent may be trapped in the joint and may then affect the staining.
- 7.6 See:
  - (a) *General Principle of Colour Fastness Testing of Leather*, IUF 120.
  - (b) *Grey Scale for assessing Staining*, IUF 132.
  - (c) *Colour Fastness of Leather in respect of Staining Plasticised Poly(vinyl chloride)*, IUF 442.
  - (d) *Measurement of Thickness*, IUP 4.