

Fastness to Acid of Dye Solutions

1 Purpose and Scope

- 1.1 By fastness to acid of dye solutions is meant their resistance to change in colour by the action of formic and sulphuric acid in aqueous solution.
- 1.2 This method is valid for all water-soluble leather dyes.

2 Principle

- 2.1 To the dye in aqueous solution of normal dyebath concentration (5 g dye/litre) is added severally an amount of formic and sulphuric acid, in the form of a dilute solution and calculated to equal the amount of dye present (see Sections 3.11 and 3.12). The change in colour is assessed by comparison with the unacidified dye solution.
- 2.2 For this purpose a drop of each dye solution is placed on filter paper and, after drying, the spots are assessed using the Grey Scale for assessing Change in Colour (see also Section 6.2).

3 Apparatus and Reagents

- 3.1 Erlenmeyer flask, 300 ml.
- 3.2 Watch glass, diameter about 50 mm, with hole.
- 3.3 Thermometer, 0-100 °C, 1 °C divisions.
- 3.4 Measuring cylinder, 250 ml, 2 ml divisions.
- 3.5 Three test tubes, diameter about 18 mm, about 180 mm long.
- 3.6 Pipette, 10 ml.
- 3.7 Three graduated pipettes, 1 ml, 0.05 ml divisions.
- 3.8 Three graduated pipettes or droppers to measure 0.1 ml (3 drops).
- 3.9 Filter paper, equivalent in quality and porosity to Schleicher and Schüll No 604 or Whatman No 4.
- 3.10 Frame over which filter paper can be stretched (see Section 6.1).
- 3.11 Formic acid solution, 100 g 100% HCOOH/litre.
- 3.12 Sulphuric acid solution, 100 g 100% H₂SO₄/litre.
- 3.13 Grey Scale for assessing Change in Colour (see Section 6.2).

4 Procedure

- 4.1 Dissolve 1.0 g dye in 200 ml distilled water, according to directions, where these are supplied.
- 4.2 In absence of directions for dissolving, pour 100 ml distilled water at room temperature over the dye contained in the Erlenmeyer flask, cover with watch glass, boil up, and boil gently for 2 minutes. Cool to 60 ± 2 °C. (See also Section 6.3.)
- 4.3 Place 10 ml (see Section 3.6) dye solution at 60 °C into each of three test tubes (Section 3.5), prewarmed to 60 °C.
- 4.4 To one of the test tubes containing dye solution, add 0.5 ml (Section 3.7) formic acid solution (Section 3.11), sulphuric acid solution (Section 3.12) and distilled water, respectively, and shake

briefly by hand.

- 4.5 Immediately after the addition of acid, allow 0.1 ml (Section 3.8) of each of the three dye solutions to drop from about 1 cm on to the stretched filter paper (Sections 3.9/3.10), so that three separate, but adjacent coloured areas are obtained.
- 4.6 After drying at room temperature, but not before two hours after spotting, assess the colour of the two spots from the acidified solutions in comparison with that from the unacidified solution, using the Grey Scale for assessing Change in Colour (see Section 6.2).
- 4.7 If any precipitation of the dye by formic or sulphuric acid is observed, the assessment for the stability of the dye solution to acid must also be given (see Section 6.4).

5 Report

This should comprise:

- 5.1 Name of the dye and Colour Index designation (see Section 6.5).
- 5.2 Reference to the present method.
- 5.3 Details of any deviations from the procedure, including special directions followed for dissolving the dye, if any.
- 5.4 The separate numerical ratings for the change in colour of the dye solutions acidified with formic acid and sulphuric acid, respectively.

6 Notes

- 6.1 Suitable is, for example, a wooden frame about 5 cm high, with an area of about 33 cm x 24 cm, which allows the filter paper to be cut to format A4 after removal from the frame.
- 6.2 See:
 - (a) *General Principle of Colour Fastness Testing of Leather, IUF 120.*
 - (b) *Grey Scale for assessing Change in Colour, IUF 131.*
- 6.3 Dyes which gelatinise or have poor solubility are to be tested at that temperature at which they are just in solution.
- 6.4 The filter papers spotted according to this procedure may be used simultaneously for determining the stability to acid of the dye solution (see IUF 203).
- 6.5 If there is no Colour Index designation, state dyeing and chemical class.