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International Standard



105/D

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**Textiles — Tests for colour fastness —  
Part D : Colour fastness to dry cleaning**

*Textiles — Essais de solidité des teintures — Partie D : Solidité des couleurs au nettoyage à sec*

Second edition — 1982-09-01

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**Descriptors** : textiles, dyes, tests, colour fastness, visual inspection, chemical tests, friction tests, dry cleaning, solvents.

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 105/D was developed by Technical Committee ISO/TC 38, *Textiles*.

NOTE — International Standard ISO 105 is presented in the form of parts. Each of these parts corresponds to a group and is split up into its different component sections. This form facilitates the replacement of existing sections by successive editions as necessary.

This part of ISO 105 cancels and replaces group D of ISO 105-1978.

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# Textiles — Tests for colour fastness —

## D01 Colour fastness to dry cleaning

### 1 Scope and field of application

**1.1** This method is intended for determining the resistance of the colour of textiles of all kinds and in all forms to dry cleaning.

**1.2** This method is not suitable for the evaluation of the durability of textile finishes, nor is it intended for use in evaluating the resistance of colours to spot and stain removal procedures used by the dry-cleaner (see 8.1 and 8.2).

### 2 Principle

A specimen of the textile in contact with a cotton fabric bag together with non-corrodible steel discs is agitated in perchloroethylene (see 8.2 and 8.3), then squeezed or centrifuged, and dried in hot air. The change in colour of the specimen is assessed with the grey scale for assessing change in colour. At the conclusion of the test, the coloration of the solvent is assessed by comparing the filtered solvent with unused solvent by transmitted light, by means of the grey scale for assessing staining.

### 3 References

ISO 105 :

Section A01, *General principles of testing.*

Section A02, *Grey scale for assessing change in colour.*

Section A03, *Grey scale for assessing staining.*

### 4 Apparatus and reagent

**4.1 Suitable mechanical device** (see 8.4) consisting of a water bath containing a rotatable shaft which supports, radially, glass or stainless steel containers (4.2), the bottom of the containers being  $45 \pm 10$  mm from the centre of the shaft.

The shaft/container assembly is rotated at a frequency of  $40 \pm 2 \text{ min}^{-1}$ . The temperature of the water bath is thermostatically controlled to maintain the test solvent at  $30 \pm 2$  °C.

**4.2 Glass or stainless steel containers**, of  $75 \pm 5$  mm diameter and  $125 \pm 10$  mm high, of  $550 \pm 50$  ml capacity, which shall be closed using solvent-resistant gaskets.

**4.3 Non-corrodible (stainless) steel discs**,  $30 \pm 2$  mm  $\times$   $3 \pm 0,5$  mm, smooth and free from rough edges, of mass  $20 \pm 2$  g.

**4.4 Undyed cotton "twill" cloth** of mass per unit area  $270 \pm 70$  g/m<sup>2</sup>, free from finishes and cut into samples  $12 \text{ cm} \times 12 \text{ cm}$ .

**4.5 Perchloroethylene**, which must be stored over anhydrous sodium carbonate to neutralize any hydrochloric acid formed.

**4.6 Grey scales for assessing change in colour and staining** (see clause 3).

**4.7 Glass tubes**, of diameter 25 mm.

### 5 Test specimen

**5.1** If the textile to be tested is fabric, use a specimen  $10 \text{ cm} \times 4 \text{ cm}$ .

**5.2** If the textile to be tested is yarn, knit it into a fabric and use a specimen  $10 \text{ cm} \times 4 \text{ cm}$  or make a wick of parallel lengths  $10 \text{ cm}$  long and about  $0,5 \text{ cm}$  in diameter, tied near both ends.

**5.3** If the textile to be tested is loose fibre, comb and compress enough of it to form a sheet  $10 \text{ cm} \times 4 \text{ cm}$ .

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## 6 Procedure

**6.1** Prepare a bag with inside dimensions of 10 cm × 10 cm using the undyed cotton twill cloth (4.4) by sewing together two squares of this cloth around three sides. Place the specimen and 12 steel discs (4.3) inside the bag. Close the bag by any convenient means.

**6.2** Place the bag containing the specimen and the steel discs in the container and add 200 ml of perchloroethylene at  $30 \pm 2$  °C. Treat the specimen for 30 min at  $30 \pm 2$  °C in the specified equipment (4.1).

**6.3** Remove the bag from the container, withdraw the specimen, place it between absorbent paper or cloth and squeeze or centrifuge to remove surplus solvent. Dry the specimen by hanging it in air at a temperature of  $60 \pm 5$  °C.

**6.4** Assess the change in colour of the specimen with the grey scale for assessing change in colour.

**6.5** At the conclusion of the test, filter the solvent remaining in the container through filter paper. By means of the grey scale for assessing staining, compare the colour of the filtered solvent with that of unused solvent, in the glass tube (4.7) placed in front of a white card, using transmitted light.

## 7 Test report

Report the numerical rating for the change in colour of the specimen and the numerical rating for staining of the solvent.

## 8 Notes

**8.1** This test covers colour fastness to dry cleaning only; commercial dry-cleaning practice normally involves other operations such as water spotting, solvent spotting, steam pressing, etc., for which other standard test methods are available if the full "dry cleanability" of the textile is to be assessed.

**8.2** The presence of absorbed water in either the fabric or dry-cleaning solution, or the presence of a detergent water in the dry-cleaning solution, has not been found to be a critical factor in assessing colour fastness. This test gives results which correlate satisfactorily with those obtained in commercial dry cleaning.

**8.3** Fastness to dry cleaning, without further qualification, means fastness to dry cleaning in perchloroethylene. However, if required, other solvents may be used and this should be indicated in the test report.

**8.4** Other mechanical devices may be used for the test, provided that the results are identical with those obtained by the apparatus described in 4.1.

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# Textiles — Tests for colour fastness —

## D02 Colour fastness to rubbing : Organic solvents

### 1 Scope and field of application

This method is intended for determining the resistance of the colour of textiles of all kinds and in all forms, except loose fibre, to the combined action of rubbing and of organic solvents used in spot-cleaning, i.e. localized "spotting" carried out by hand.

### 2 Principle

A specimen of the textile is rubbed with rubbing cotton cloth impregnated with solvent. The change in colour of the specimen and the staining of the rubbing cotton cloth are assessed with the grey scales.

### 3 References

ISO 105 :

Section A01, *General principles of testing.*

Section A02, *Grey scale for assessing change in colour.*

Section A03, *Grey scale for assessing staining.*

### 4 Apparatus and reagents

**4.1 Suitable testing device** for determining the colour fastness to rubbing with organic solvents. Such a device has to be equipped with a finger of 1,6 cm diameter moving to and fro in a straight line along a track 10 cm on the specimen, with a downward force of 9 N (see 8.2 and 8.3).

**4.2 Rubbing cotton cloth**, desized, bleached, free from finishes and cut into squares 5 cm × 5 cm.

**4.3 Grating** of stainless steel wire of 1 mm diameter and a width of mesh of about 20 mm.

### 4.4 Solvents :

perchloroethylene;

white spirit (Solvent F) (or other petroleum hydrocarbon).

### 4.5 Grey scales for assessing change in colour and staining (see clause 3).

### 5 Test specimen

**5.1** If the textile to be tested is fabric, use two specimens at least 14 cm × 5 cm (for each of the solvents). One specimen of each pair should have the long direction parallel to the warp yarns, the other parallel to the weft yarns.

**5.2** If the textile to be tested is yarn, knit it into a fabric to provide specimens at least 14 cm × 5 cm, or form a layer of parallel lengths by wrapping it lengthways on a glass plate of suitable dimensions.

### 6 Procedure

**6.1** Wet the rubbing cotton cloth (4.2) by placing it on the grating (4.3) and dropping levelly onto it its own mass of appropriate solvent.

**6.2** Place the rubbing cotton cloth soaked with solvent at the end of the finger of the apparatus and rub it to and fro in a straight line, along a track 10 cm long on the specimen, 10 times in 10 s, with a downward force on the finger of 9 N.

Test warp and weft directions separately for each of the solvents.

**6.3** Dry the rubbing cotton cloth by hanging it in air at a temperature not exceeding 60 °C.

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**6.4** Assess the change in colour of the specimen and the staining (see 8.1) of the rubbing cotton cloth with the grey scales.

## 7 Test report

Report the solvent used, the numerical ratings for change in colour of the test specimens and for staining of the rubbing cotton cloths, for the direction (warp or weft) showing heavier staining.

## 8 Notes

**8.1** It is necessary to eliminate dyed fibres pulled out during rubbing and retained on the surface of the rubbing cotton cloth; consider only the coloration due to staining by the dyestuffs.

**8.2** A suitable apparatus is the Crockmeter, described in the *Technical Manual of the American Association of Textile Chemists and Colorists*. Test Method 8-1972 (Vol. 50, 1974, p. 112). Other devices can be used, provided that the same results are obtained as with the apparatus described in 4.1.

**8.3** The finger of the apparatus can be replaced by a moving hollow tube ending in a grill at its base. A plug of cotton is placed in this tube. The outside of the grill is covered with a sample of wool flannel.

With apparatus modified in this way, it is no longer necessary to immerse the rubbing cotton cloth in the solvent (see 6.1); the dry rubbing cotton cloth is placed on the wool flannel at the end of the tube and 3 ml of the solvent are dropped on to the plug of cotton on the inside of the hollow tube. Then proceed as described, starting from the second paragraph of 6.2.

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