

British Standard

Testing coated fabrics

Part 14. Method 16. Methods for determination of colour fastness to wet and dry rubbing and determination of resistance to printwear

Essais des supports textiles revêtus

Partie 14. Méthode 16. Méthodes de détermination de la solidité des teintures au frottement à sec ou humide et détermination de la résistance à l'usure par impression

Prüfung beschichteter Gewebe

Teil 14. Verfahren 16. Bestimmung der Naß- und Trockenreibfestigkeit und Bestimmung der Reibfestigkeit von bedruckten beschichteten Geweben

IMPORTANT NOTE. It is recommended that this Part be read in conjunction with the information in Part 0 'Foreword and general introduction'.

Foreword

The methods of test described in this Part of BS 3424 are for determining the colour fastness of coated fabrics to wet and dry rubbing and for determining the resistance to wear of print superimposed on the surface of the coating polymer.

In each case the apparatus is similar to that described in section X12 of BS 1006 : 1978 and method 310B* of BS 2782 : 1970. The differences between the apparatus, materials and methods described in this Part of BS 3424 and in BS 1006 and BS 2782 are as follows.

In section X12 of BS 1006 : 1978, the frequency of operation of the apparatus is 1 Hz (i.e. 2 strokes per second; one outward and one return stroke) whereas the methods in this Part of BS 3424 and in method 310B of BS 2782 : 1970 employ a frequency of 0.25 Hz (i.e. 0.5 strokes per second).

In section X12 of BS 1006 : 1978 and in method 310B of BS 2782 : 1970, the downward force operating on the abrading finger is 9 N whereas the methods in this Part of BS 3424 employ a downward force on the abrading finger of 9.8 N in the case of colour fastness testing and 14.71 N in the case of printwear testing. The number of strokes to end point in section X12 of BS 1006 : 1978 is 20 whereas the number of strokes to end point in this Part of BS 3424 is 40 in the case of colour fastness testing and 1000 in the case of printwear testing.

The number of strokes to end point using method 310B of BS 2782 : 1970 is indeterminate.

In addition, the surface area of the base of the brass peg described in method 310B of BS 2782 : 1970 is considerably less than the 16 mm diameter specified in this Part of BS 3424 and in section X12 of BS 1006 : 1978.

These differences in apparatus and end point are considered necessary due to the need to operate the apparatus at a speed, namely 0.25 Hz and in such a manner, i.e. at 9.8 N downward force over a larger cross section of area, as will tend to reduce or eliminate frictional heating of thermoplastic coating polymers, thus avoiding the introduction of uncontrolled testing parameters likely to influence the test results.

The abradant described in this Part of BS 3424 is one which has been chosen, following interlaboratory trials, as providing test results compatible with, and only slightly more severe than the abradant described in method 310B of BS 2782 : 1970 and BS 5790 : Parts 1 and 2, providing a double thickness of abradant cloth is mounted over the peg. In addition, the abradant described in this Part of BS 3424 has the advantage of being commercially available in the long term and complies with section X12 of BS 1006 : 1978 and ISO 105 : 1978, published by the International Organization for Standardization (ISO). The abradant described in method 310B of BS 2782 : 1970 and BS 5790 is no longer available commercially.

*BS 2782, method 310B is currently under review and it is expected that the revision of this method of BS 2782, will, when completed, be renumbered as Method 826A.

This Part supersedes method 16 of BS 3424 : 1973.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

1 Scope

This Part of BS 3424 describes a method for determining the colour fastness of coated fabrics to wet and dry rubbing and a method for determining the resistance to printwear of coated fabrics having a line print superimposed over the coating polymer.

NOTE. The titles of the publications referred to in this standard are listed on the inside back page.

2 Method 16A. Determination of colour fastness to rubbing

2.1 Apparatus

NOTE. For information on the availability of the test arrangement (2.1.1) and abradant (2.1.2), apply to Enquiry Section (London), British Standards Institution, enclosing a stamped addressed envelope for reply.

2.1.1 *Test arrangement* (see figure 1), consisting of a platform carrying a smooth rigid plate (e.g. a piece of plate glass), B, and clamps, C and D, to hold the specimen securely in position over the rigid plate. A peg (see figure 2), A, having a circular base of 16 mm diameter is fixed to an arm which shall be pivoted at a distance of approximately 230 mm from the centre of the peg. The peg shall be fashioned from a material that is hard and unyielding and does not contaminate the abradant, particularly when the abradant is wet. Weight pieces can be

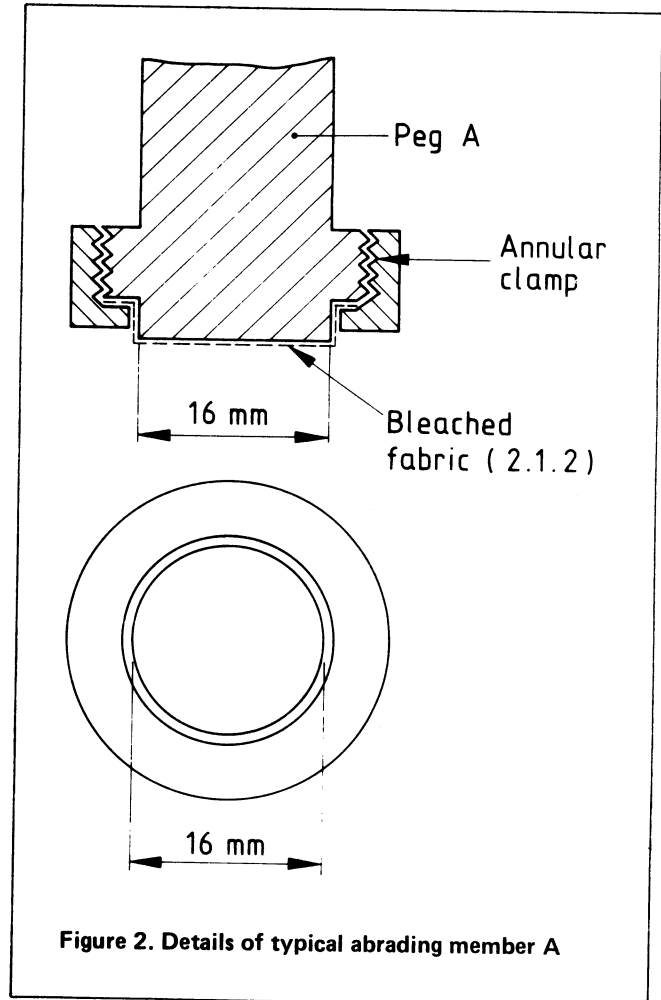


Figure 2. Details of typical abrading member A

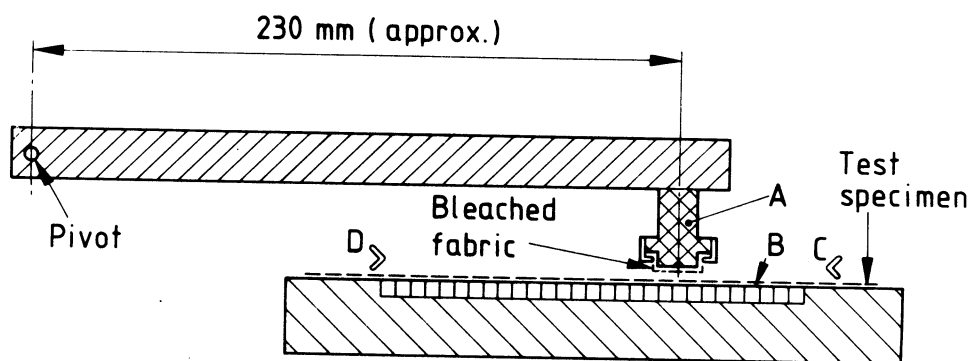


Figure 1. Test arrangement for determining fastness of colour to rubbing and printwear

applied to the peg so that a total force of 9.8 N is brought to bear along the normal to the upper face of the rigid plate, B. Means shall be provided for fixing the abrasant (2.1.2) to the base of the peg in such a manner that it does not wrinkle during the test. Means shall be provided for reciprocating the peg or platform in simple harmonic motion in a straight line over a stroke length of 100 mm at a frequency of 0.25 ± 0.033 Hz (i.e. 0.5 ± 0.067 strokes per second).

NOTE. If uneven wear of the test specimen and abrasant is to be avoided, it is important to ensure that the base of the peg and the surface of the rigid plate are parallel and that the periphery of the base edge of the peg contains no burrs. Parallelism of the surfaces can be ensured, after any necessary adjustments, by operating the apparatus with a suitable grade of emery cloth mounted in the test specimen position until the base of the peg is uniformly abraded.

2.1.2 Abrasant, consisting of cotton fabric, desized, scoured and bleached and free from fluorescent brightening agents, having a fluidity not greater than 8, a mass per unit area of 92.8 g/m^2 and a cloth construction of 40 ends per centimetre, 39 picks per centimetre, in plain weave, avoiding lumps or neps.

2.1.3 Grey scale for assessing staining, in accordance with section A03 of BS 1006.

2.1.4 Means for viewing, providing viewing conditions in accordance with BS 950.

2.2 Preparation of test specimens

Cut three pairs of specimens, each 230 mm × 50 mm, with their length parallel to the longitudinal direction, from positions evenly spaced over the area of the sample.

NOTE. Initially 12 pieces of abrasant cotton fabric may have to be cut to enable a double thickness of cotton cloth to be mounted on the peg(s) (see 2.4), but only the outermost layer coming into contact with the coated fabric specimen needs to be renewed at each test, and subsequent tests will require only six pieces.

2.3 Conditioning

Condition, in accordance with method 4 (i.e. Part 2 of BS 3424), the test specimens and sufficient abrasant (2.1.2), to enable a double layer of abrasant to be mounted on the peg for conducting three dry rub fastness tests.

2.4 Procedure

2.4.1 Mounting of test specimens. Select one test specimen from each of the three pairs and secure it over the rigid plate of the test arrangement (2.1.1) with the coated surface to be evaluated uppermost. Ensure that the test specimen will not be prone to wrinkling during the test by applying a slight strain to the specimen before securing the mounting grips. To do this with coated fabrics having a knitted base cloth it has been found necessary to stretch the test specimen by approximately 9 %.

2.4.2 Mounting of abrasant

2.4.2.1 Fastness to dry rubbing. Secure a fresh piece of the conditioned abrasant, with a backing of a second layer of the abrasant to the base of the peg (see figure 2).

2.4.2.2 Fastness to wet rubbing. Wet out a fresh piece of abrasant and a backing of a second layer of the abrasant by dropping evenly on to them approximately their own mass of water and secure to the base of the peg (see figure 2).

2.4.3 Operation (dry). Wipe the coated surface of the test specimen with a clean dry cloth to remove any surface dust. Lower the peg on to the test specimen and set the test arrangement in motion. Stop the test arrangement after 20 complete cycles (i.e. 40 strokes). Repeat the operation with one specimen from each of the two remaining pairs using a fresh piece of abrasant for each test.

2.4.4 Operation (wet). Repeat the operation described in 2.4.3 using the three remaining test specimens and a clean wetted piece of abrasant for each test.

2.4.5 Examination. Allow the wetted pieces of abrasant to dry at room temperature. Assess the staining of the abrasant using the grey scale for assessing staining (2.1.3) and the means for viewing (2.1.4).

2.4.6 Test report. Report the numerical rating for dry staining and for wet staining of the pieces of abrasant for each of the tests. If the results lie between two contrasts on the grey scale, give an intermediate assessment, e.g. '3-4'. If the pieces of abrasant are unstained report 'unstained'.

3 Method 16B. Determination of printwear

3.1 Apparatus

3.1.1 Test arrangement, as described in 2.1.1, except that additional weight pieces shall be added to the peg to enable the total downward force brought to bear on the rigid plate to be 14.71 N instead of 9.8 N.

3.1.2 Abrasant, as described in 2.1.2.

NOTE. Initially, four pieces of abrasant may have to be cut to enable a double thickness of cotton cloth to be mounted on the peg (see 2.4), but only the outermost layer coming into contact with the test specimen needs to be renewed at each test and subsequent tests will require only two pieces.

3.1.3 Grey scale for assessing change in colour in accordance with section A02 of BS 1006.

3.1.4 Means for viewing, as described in 2.1.4.

3.2 Preparation of test specimens

Cut two specimens, each 230 mm × 50 mm, one with its length parallel to the longitudinal direction of the sample and the other with its length parallel to the transverse direction.

3.3 Conditioning

Condition, in accordance with method 4 (i.e. Part 2 of BS 3424), the test specimens and sufficient pieces of abrasant to allow a double layer of abrasant to be mounted on the peg.

3.4 Procedure

3.4.1 Mounting of coated fabric specimens. Mount the test specimens in accordance with 2.4.1.

3.4.2 Mounting of bleached cotton abradant. Secure the bleached cotton fabric to the base of the peg in accordance with 2.4.2.1.

3.4.3 Operation. Wipe the coated surface of the test specimen with a clean dry cloth to remove any surface dust. Lower the peg on to the test specimen and set the test arrangement in motion. Stop the machine after 500 cycles (1000 strokes). Repeat the operation using the second test specimen and fresh piece of abradant.

3.4.4 Examination. Assess the degree of surface printwear on the coated fabric specimens using the grey scale for assessing change in colour (3.1.3) and the means for viewing (3.1.4). If one specimen exhibits greater printwear than the other, the worst result of the two shall be taken as the test result.

3.4.5 Test report. Report the numerical rating for change in shade between the abraded and unabraded portions of the test specimen. If the results lie between contrasts on any grey scale, give an intermediate assessment, e.g. '4-5'.

Publications referred to

- BS 950 Artificial daylight for the assessment of colour
- BS 1006 Methods of test for colour fastness of textiles and leather
- *BS 2782 Methods of testing plastics
- BS 3424 Testing coated fabrics
Part 2 Method 4 Conditioning and selection of test specimens
- *BS 5790 Coated fabrics for upholstery
Part 1 Specification for PVC coated knitted fabrics
Part 2 Specification for PVC coated woven fabrics
- *ISO 105 Textiles – Tests for colour fastness

*Referred to in foreword only.

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