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Indian Standard

TEXTILES — TESTS FOR COLOUR FASTNESS

PART A04  METHOD FOR THE INSTRUMENTAL ASSESSMENT OF THE
DEGREE OF STAINING OF ADJACENT FABRICS

ICS 677.016.47 : 620.191.73.05

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 2006

Price Group 2
NATIONAL FOREWORD

This Indian Standard (Part A04) which is identical with ISO 105-A04 : 1989 'Textiles — Tests for colour fastness — Part A04 : Method for the instrumental assessment of the degree of staining of adjacent fabrics' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Chemical Methods of Test Sectional Committee and approval of the Textile Division Council.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their places are listed below along with their degree of equivalence for the editions indicated:

<table>
<thead>
<tr>
<th>International Standard</th>
<th>Corresponding Indian Standard</th>
<th>Degree of Equivalence</th>
</tr>
</thead>
</table>

The composition of Technical Committee responsible for the preparation of this standard is given in National Annex A.

In reporting the results of a test or analysis made in accordance with this standard, if the final value observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'.

Indian Standard

TEXTILES — TESTS FOR COLOUR FASTNESS

PART A04 METHOD FOR THE INSTRUMENTAL ASSESSMENT OF THE DEGREE OF STAINING OF ADJACENT FABRICS

1 Scope

This part of ISO 105 specifies an instrumental method for assessing the degree of staining of adjacent fabrics in any fastness test, as an alternative to the visual method.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 105. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 105 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.


3 Principle

The colour of an adjacent fabric which has been subjected to a fastness test in contact with the fabric under test and that of a specimen of the adjacent fabric which has been subjected to the fastness test in the absence of the fabric under test are measured. The colour difference between them is calculated in CIELAB units and converted to a staining-scale rating by means of a simple equation.

4 Apparatus

Spectrometer or colorimeter, capable of measuring the colour of a specimen of the size of one stripe in a multifibre adjacent fabric (see ISO 105-F10) and which irradiates the specimen with light resembling that of standard illuminant D65 or standard illuminant C.

5 Test specimen

Mount the adjacent fabric which has been subjected to a fastness test, together with a specimen of the adjacent fabric which has been subjected to the fastness test in the absence of the fabric under test, on non-optically-brightened white card stock.

6 Procedure

6.1 Measure the colour of the piece of adjacent fabric which has been subjected to the fastness test in the absence of the fabric under test.

6.2 Measure the colour of the adjacent fabric which has been subjected to the fastness test as part of a composite specimen. If the staining is uneven, several measurements shall be made and the arithmetic mean value employed in the calculations. If the instrument permits different viewing geometries to be used, the preferred method is to include the specular component.

6.3 Calculate the colour difference \( \Delta L_{\text{CIELAB}} \) and the magnitude of the lightness difference \( \Delta L_{\text{CIELAB}} \) between the adjacent fabrics, as described in 6.1 and 6.2, to two places of decimals. Either of two CIE instrument geometries may be used.
a) sphere (d/0°), specular included;
b) 0°/45° or 45°/0°

Calculations shall be performed using the CIE 10° observer and illuminant D65, with the 2° observer and illuminant C being a permitted alternative.

6.4 Calculate, to two places of decimals, the grey-scale difference $\Delta F_{GB}$ equivalent to $\Delta F_{CIELAB}$ using the following equation:

$$\Delta F_{GB} = \Delta F_{CIELAB} - 0.4 \sqrt{(\Delta L^2 + \Delta C^2 + \Delta H^2)}$$

6.5 Calculate, to two places of decimals, the staining-scale rating (SSR) using one of the following equations:

Ratings 1 to 4  \hspace{1cm} SSR = 6.1 - 1.45 \ln (\Delta F_{GB})

If SSR is greater than 4, recalculate using the following equation:

Ratings 4 to 5  \hspace{1cm} SSR = 5 - 0.23 \Delta F_{GB}

6.6 Determine from Table 1 the staining-scale rating to be reported.

<table>
<thead>
<tr>
<th>Calculated SSR</th>
<th>Reported SSR</th>
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<tr>
<td>5.00 to 4.75</td>
<td>5</td>
</tr>
<tr>
<td>4.74 to 4.25</td>
<td>4.5</td>
</tr>
<tr>
<td>4.24 to 3.75</td>
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<td>3.74 to 3.25</td>
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<td>2.24 to 1.75</td>
<td>2</td>
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<td>1.74 to 1.25</td>
<td>1.2</td>
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<tr>
<td>&lt; 1.25</td>
<td>1</td>
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</tbody>
</table>

7 Test report

Include the staining-scale rating (instrumental) from Table 1 and a reference to this part of ISO 105 in the test report of the colour fastness test concerned.
## NATIONAL ANNEX A

*(National Foreword)*

### COMMITTEE COMPOSITION

Chemical Methods of Test Sectional Committee, TX 05

<table>
<thead>
<tr>
<th>Organization</th>
<th>Representative(s)</th>
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</thead>
<tbody>
<tr>
<td>Textiles Committee, Mumbai</td>
<td>Dr G. S. NADIGER <em>(Chairman)</em></td>
</tr>
<tr>
<td>Bapuji Institute of Engineering &amp; Technology, Davangere</td>
<td>Dr E. VISWANATHAN (Alternate)</td>
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<td>Central Institute for Research on Cotton Technology, Mumbai</td>
<td>Dr H. L. VUJYKUMAR</td>
</tr>
<tr>
<td>Central Pollution Control Board, Delhi</td>
<td>Dr K. MURUGESH BABU <em>(Alternate)</em></td>
</tr>
<tr>
<td>Clariant India Ltd, Mumbai</td>
<td>Dr (Ms) C. R. RAJE</td>
</tr>
<tr>
<td>Directorate of Standardization (Production &amp; Supplies), New Delhi</td>
<td>Dr R. H. BALASUBRAMANYAN <em>(Alternate)</em></td>
</tr>
<tr>
<td>In personal capacity (2 Siddhi Vinayak Cooperative Group Housing Society, Swatentreya Veer Savarkar Marg, Prabhadevi, Dadar, Mumbai)</td>
<td>Dr M. Q. ANSARI</td>
</tr>
<tr>
<td>Indian Institute of Carpet Technology, Bhadohi</td>
<td>Shri AJAY AGGARWAL <em>(Alternate)</em></td>
</tr>
<tr>
<td>Indian Jute Industries’ Research Association, Kolkata</td>
<td>Dr V. G. NAVAK</td>
</tr>
<tr>
<td>Jaya Shree Textiles, Rishra</td>
<td>Lt-Col (Dr) R. SRIKANTH</td>
</tr>
<tr>
<td>L. N. Chemical Industries, Mumbai</td>
<td>Lt-Col B. MANJUNATH <em>(Alternate)</em></td>
</tr>
<tr>
<td>Maniklal Verma Textile Institute, Bhiwara</td>
<td>Shri M. D. DIXIT</td>
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<tr>
<td>Man-Made Textile Research Association, Surat</td>
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<td>Ministry of Defence (DGQA), Kanpur</td>
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<td>Office of the Textile Commissioner, Mumbai</td>
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<td>Premier Colorscan Instruments Pvt Ltd, Thane</td>
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<td>Rajasthan Spinning and Weaving Mills Ltd, Noida</td>
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<td>Reliance Industries Ltd, New Delhi</td>
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<td>SNDT Women’s University, Mumbai</td>
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<td>Textiles &amp; Engineering Institute, Ichalkaranji</td>
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<td>The Bombay Millowner’s Association, Mumbai</td>
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</tbody>
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Organization

The Bombay Textile Research Association, Mumbai
The South India Textile Research Association, Coimbatore
The Synthetics & Art Silk Mills’ Research Association, Mumbai
University Department of Chemical Technology, Mumbai
Veeramata Jeejabai Technological Institute, Mumbai
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SHRI ANIL KUMAR
Joint Director (Textiles), BIS
Bureau of Indian Standards

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Amendments Issued Since Publication

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