Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

Indian Standard

METHOD FOR
DETERMINATION OF
PILLING RESISTANCE OF FABRICS

Second Reprint FEBRUARY 2008
(Incorporating Amendment No. 1)

UDC 677.064 : 677.017.826

© Copyright 1998
BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110 002

November 1984
Indian Standard

METHOD FOR DETERMINATION OF PILLING RESISTANCE OF FABRICS

Physical Methods of Test Sectional Committee, TDC 1

Chairman

Dr V. Sundaram

Representing

Cotton Technological Research Laboratory (ICAR), Bombay

Members

Dr V. G. Munshi (Alternate to Dr V. Sundaram)

Agricultural Marketing Adviser to the Government of India

Dr B. L. Banerjee

Dr U. Mukhopadhyay (Alternate)

Shri A. T. Basak

Shri D. K. Nandy (Alternate)

Shri B. N. Basu

Shri C. Bhattacharya

Shri H. C. Bhatia (Alternate)

Shri R. Ghosh

Shri S. S. Bagga (Alternate)

Dr V. G. Kamath

Dr A. R. Mukherjee (Alternate)

Shrimati A. Kaplesh

Shri M. K. Muk

Shri P. C. Basu (Alternate)

Dr B. R. Manjunatha

Dr (Shrimati) G. R. Penumuni (Alternate)

Shri K. P. Ramakrishna Pillay

Shri M. RadhaKrishnan

Shri A. V. Ravindranathan (Alternate)

Directorate of Marketing & Inspection (Ministry of Agriculture), Faridabad

Indian Jute Industries’ Research Association, Calcutta

Directorate General of Supplies & Disposals (Inspection Wing), New Delhi

Office of the Jute Commissioner, Calcutta

Indian Petrochemicals Corporation Ltd, Vadodara

Ministry of Defence (R&D)

Nirlon Synthetic Fibres & Chemicals Ltd, Bombay

The Silk & Art Silk Mills’ Research Association, Bombay

Textiles Committee, Bombay

The South India Textile Research Association, Coimbatore

The Bombay Textile Research Association, Bombay

(Continued on page 2)

© Copyright 1996

BUREAU OF INDIAN STANDARDS

This publication is protected under the Indian Copyright Act (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.
(Continued from page 1)

Members

Shrimati G. P. Rane
Shri A. C. Shah
Shri D. S. Nadeabri (Alternate)
Dr G. S. Singh
Shri J. K. Banerjee (Alternate)
Shri T. N. Sonawalkar
Dr T. V. K. Srivastava
Shri S. P. Ghosal (Alternate)
Shri T. A. Subramanian
Shri M. G. Thanawala
Shri J. N. Vohra
Shri P. T. Banerji (Alternate)
Shri R. I. Midha,
Director (Tex)

Representing

Wool Research Association, Bombay
The National Rayon Corporation Ltd, Bombay
The Raymond Woollen Mills Limited, Thane
Central Silk Board, Bangalore
Office of the Textile Commissioner, Bombay
Ahmedabad Textile Industry’s Research Association, Ahmadabad
M. Best Cotton Rope Mfg Co, Bombay
Punjab State Hosiery and Knitwear Development Corporation Ltd, Chandigarh

Secretary

Shri D. R. Kohli
Senior Deputy Director (Tex), ISI

Ex-officio Member

Director General, ISI
Indian Standard

METHOD FOR
DETERMINATION OF
PILLING RESISTANCE OF FABRICS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 9 March 1984, after the draft finalized by the Physical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 Fabrics made from certain fibres and fibre blends may develop during the course of wear tufts of entangled fibres, attached to the surface of the cloth and looking like small pills. Although a number of methods have been developed for determining the pilling properties of fabrics, it is difficult to simulate the wear conditions by any single machine. Testing of this characteristic is important especially for fabrics meant for garments like sweaters, shirts, blouses, lingersies, trousers, suits and skirts.

0.3 This standard is based on the method of test popular in the industry.

1. SCOPE

1.1 This standard prescribes a method for determination of pilling resistance of fabrics by tumble type pilling tester. This method may not be suitable for fabrics containing fancy yarn like slub yarn, gimp yarn and fleece yarn.

2. PRINCIPLE

2.1 The fabric samples are mounted on rubber tubes and put in a cubical box revolving at a known speed for a fixed time. The samples are then removed and compared against standards.

3. SAMPLING

3.1 The samples for test shall be drawn as laid down in the material specification or as agreed to between the buyer and the seller. The samples drawn shall be representative of the lot.
4. ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

4.1 The samples shall be conditioned in the standard atmosphere at 65 ± 2 percent relative humidity and a temperature of 27 ± 2°C as laid down in IS : 6359-1971*. The test shall also be carried out in the standard atmosphere.

5. APPARATUS

5.1 Tumble Pilling Tester — having cubical boxes of 225 mm internal side length. The inner walls of the boxes shall be lined with 3 mm thick cork lining. The mass/cm² of the cork lining shall be 0·085 g. The boxes shall be capable of rotating at a constant speed of 60 rev/min about a horizontal axis passing through the centres of two opposite faces. The tester shall be provided with arrangements for stopping it after pre-determined number of revolutions.

Note — The cork lining shall be replaced only when it appears to be severely worn out or soiled.

5.2 Template for Cutting Specimens — See Fig. 1.

\[ \text{FIG. 1 TEMPLATE FOR TEST SPECIMENS}\]

5.3 Rubber Tubes — of 150 mm length, 32 mm outer diameter and 3·2 mm wall thickness, having Shore A hardness of 55 to 60 degrees.

5.4 Specimen Mounting Accessories — comprising jig, metal cylinder, etc, as shown in Fig. 3.

5.5 Photographic Rating Standards — A set of 5 photographs, 110 × 95 mm in size, numbered as 1 to 5 showing varying degrees of pilling from ‘very severe pilling’ to ‘no pilling’, as given in Appendix A.

6. PREPARATION OF TEST SPECIMENS

6.1 Place the fabric facing downwards on a plain surface and on it place the template (see Fig. 1) with its longer edges along the weft direction.

*Method for conditioning of textiles.
Draw lines with the help of a pencil around the edges and in the slits of the template. Then cut the fabric along the outer lines so that a sample measuring 125 × 500 mm is obtained.

6.2 Fold the sample with the face inwards until the longer edges touch each other and sew exactly along the inner pencil lines (see Fig. 2).

Note — This ensures that all specimens of one type of fabric have the same tension when finally mounted upon rubber tubes.

![Fig. 2 Specimen During Preparation](image)

6.3 Cut from the sewn sample 4 specimens along the length, each 125 mm long. Turn the specimens inside out so that the face side of the fabric is outside.

7. MOUNTING OF TEST SPECIMENS

7.1 Take a rubber tube (5.3) and the specimen mounting accessories (5.4). Place the rubber tube over the rods (see Fig. 3A) of the jig. Pull the tube around rod B (see Fig. 3B) and push the hollow metal cylinder with a tapered end plug (see Fig. 3C) over the folded rubber tube (see Fig. 3D). Push the fabric specimen over the metal cylinder (see Fig. 3E) and then withdraw the cylinder with a turning motion leaving the collapsed rubber tube surrounded by the test specimen (see Fig. 3F). Withdraw the rubber tube from the jig and allow it to recover to its original circular configuration with the fabric specimen wrapped around it under even tension (see Fig. 3G).

Note — To prevent fraying of cut ends of the specimen, cover the cut ends with adhesive transparent tape (12 mm wide), wound round the tube, overlapping the fabric on each end by about 6 mm.

7.2 Prepare at least 4 such test specimens.

8. PROCEDURE

8.1 Clean the boxes thoroughly. Place four mounted test specimens in each box and close the boxes. Set the machine for 18 000 revolutions. Start the machine and let it run till it automatically stops.
**Fig. 3 Specimen Mounting Procedure**

All dimensions in millimetres.
8.2 Take out the specimens and compare them with the photographic rating standards.

9. EVALUATION

9.1 Evaluate the test specimens against the photographic rating standards given in Appendix A in a well-lighted place avoiding glare and report the ratings separately for each specimen.

Note — Photographic rating standards show the following extents of pilling:

Rating 1  Very severe pilling
Rating 2  Severe pilling
Rating 3  Moderate pilling
Rating 4  Slight pilling
Rating 5  No pilling

In each case the specimen may or may not also become hairy, but any hairiness of the fabric is not, however, taken into account in the assessment. If the fabric becomes hairy, the letter H be added after the numerical value of its rating, such as 1 H or 2 H. Provision may also be made for rating the specimens as 1-2, 2-3, etc, according as the rating falls between 1 and 2, 2 and 3, etc.

10. REPORT

10.1 The report shall include the following information:

a) Type of fabric,
b) Number of specimens tested, and
c) Rating of each specimen.
APPENDIX A
( Clauses 5.5, 8.2 and 9.1 )

PHOTOGRAPHIC RATING STANDARDS FOR PILLING

RATING 1 VERY SEVERE PILLING
RATING 2    SEVERE PILLING
RATING 4  SLIGHT PILLING
RATING 5  NO PILLING
BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephone: 23230131, 23233375, 23239402  Fax: 91+011 23239399, 23239382
E - Mail : info@blos.in  website : http://www.blo.org.in

Central Laboratory:
Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010  Telephone: 277 0032

Regional Offices:
Central  : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002  23237617
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054  23378882
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022  260 9285
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113  2254 1984
†Western: Manakalaya, E9, MIDC, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093  2832 8285

Branch Offices:
‘Pushpak’, Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001  560 1348
Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE  839 4955
Commercial-cum-Office Complex, Opp. Dushera Maidan, Arera Colony, Bittan Market, BHOPAL 462018
62-63, Ganga Nagar, Unit VI, BHUBANESHWAR 751001  240 3139
5th Floor, Koval Towers, 44 Bala Sundaram Road, COIMBATORE 641018  221 0141
SCO 21, Sector 12, Faridabad 121007  229 2175
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001  286 1498
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, Aparna Sinha Path, GUVAHATI 781003  245 6508
5-Aug, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001  2320 1084
Prithvraj Road, Opposite Bharat Overseas Bank, C-Scheme, JAIPUR 302001  222 3282
11/418 B, Sarvodaya Nagar, KANPUR 208005  223 3012
Sethi Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001  261 6923

H. No. 15, Sector-3, PARWANOOR, Distt. Solan (H.P.) 173220  235 438
Plot No A-20-21, Institutional Area, Sector 62, Goutam Budh Nagar, NOIDA 201307  240 2206
Patliputra Industrial Estate, PATNA 800013  226 2808
Plot Nos. 657-660, Market Yard, Gultkdi, PUNE 411037  2427 4804
"Sahajanand House" 3rd Floor, Bhaktinagar Circle, 80 Feet Road, RAJKOT 360002  237 6251

T.C. No. 2/275 (1 & 2), Near Food Corporation of India, Kesavadasapuram-Ulloor Road, Kesavadasapuram, THIRUVANANTHAPURAM 695004  255 7914
1st Floor, Udyog Bhawan, VUDA, Siripuram Junction, VISHAKHAPATNAM-03  271 2833

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, KOLKATA 700072  2355 3243
†Sales Office (WRO) Plot No. E-9, MIDC, Rd No. 8, Behind Telephone Exchange, Andheri (East), Mumbai-400 093  2832 8295

Printed at Power Printers, New Delhi