इंटरनेट मानक

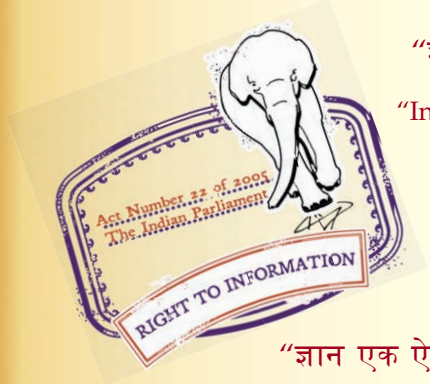
Disclosure to Promote the Right To Information

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.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 14293 (1995): Geotextiles - Method of test for trapezoid tearing strength [TXD 30: Geotextiles and Industrial Fabrics]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

IS 14293 : 1995
(Reaffirmed 2000)

भारतीय मानक

ज्योटैक्सटाइल — ट्रेपेजोयिड विदरण (टीयर) सामर्थ्य ज्ञात करने की पद्धति

Indian Standard

GEOTEXTILES — METHOD OF TEST FOR TRAPEZOID TEARING STRENGTH

UDC 677.07 : [624.13] : 677.017.424.28

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

November 1995

Price Group 2

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Geotextiles Sectional Committee had been approved by the Textile Division Council.

In the preparation of this standard assistance has been drawn from ASTM Designation : 4533-85 'Standard test method for trapezoid tear strength of geotextiles', issued by the American Society for Testing and Materials, USA.

In reporting the result 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

GEOTEXTILES — METHOD OF TEST FOR TRAPEZOID TEARING STRENGTH

1 SCOPE

1.1 This test method is used to measure the tearing strength of woven or non-woven geotextiles by the trapezoid method.

1.2 This test method may be used with constant-rate-of-traverse (CRT) or constant-rate-of-extension (CRE) type tension machines. However, there may be no overall correlation between the results obtained with the CRT machine and the CRE machine. Consequently, these two tension testers cannot be used interchangeably. In case of controversy, the CRE machine shall prevail.

2 REFERENCES

The following standards and special publication are necessary adjuncts to this standard:

IS No.	*Title*
SP 45 : 1988	Handbook on glossary of textile terms
6359 : 1971	Method of conditioning textiles
13321 (Part 1) : 1992	Glossary of terms for geosynthetics: Part 1 Terms used in materials and properties

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 13321 (Part 1) : 1992 shall apply.

4 PRINCIPLE

An outline of an isosceles trapezoid is marked on a rectangular specimen cut for the determination of tearing strength (*see* Fig. 1), and the non-parallel sides of the trapezoid marked on the specimen are clamped in parallel jaws of a tensile testing machine. The separation of the jaws is continuously increased so the tear propagates across the specimen. At the same time, the force developed is recorded. The tearing strength, which is the maximum value of the tearing force, is obtained from the autographic force-extension curve (*see* Fig. 2).

5 APPARATUS

5.1 **Tensile Testing Machine**, of the constant-rate-of-extension (CRE) or constant-rate-of-traverse (CRT) type with autographic recorder.

5.2 **Clamps**, of sufficient width to accommodate the full width of a test piece.

5.3 **Trapezoidal Template**—having the dimensions as shown in Fig. 1.

6 PREPARATION OF TEST SPECIMEN

6.1 For woven fabrics, take the specimens to be used for the measurement of the tearing strength of machine direction yarns from different sets of machine direction yarns and the specimens to be used for the measurement of the tearing strength of cross-machine direction yarns from different sets of cross-machine direction yarns and, when possible, from fabric woven from different bobbins. In case of non-woven fabrics take the specimens for the measurement of the machine direction tearing strength from different positions across the fabric and for the measurement of the cross-machine

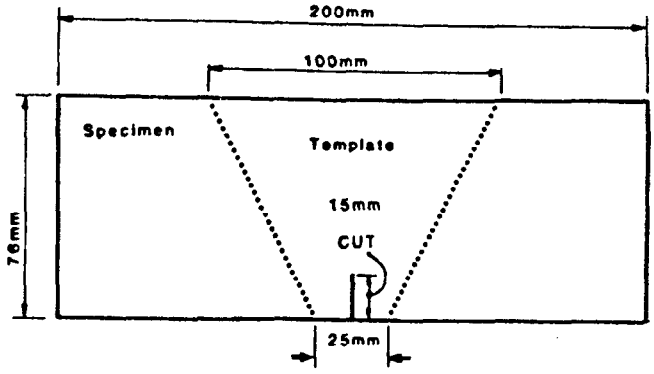
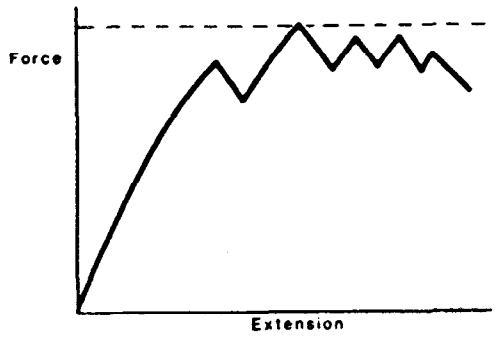
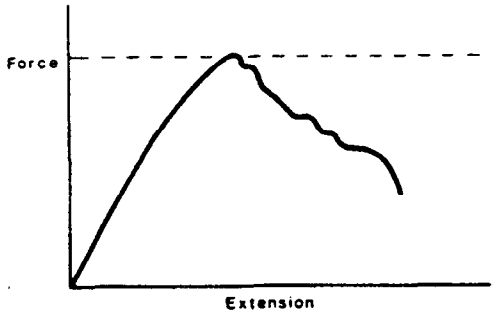


FIG. 1 TRAPEZOIDAL TEMPLATE FOR TRAPEZOID TEARING STRENGTH TEST



2A Fabric Exhibiting Several Maxima



2B Fabric Exhibiting Single Maximum

FIG. 2 TYPICAL TEARING FORCE-EXTENSION CURVES FOR INDIVIDUAL TEST SPECIMENS

direction tearing strength from different positions along the length of the fabric.

6.2 Cut rectangular specimens of 76 mm × 200 mm in such a way that no specimens are taken nearer the selvedge or edge of the fabric than 1/20th of the fabric width or, 150 mm whichever is smaller. Cut the specimens to be used for the measurement of the tearing strength in the machine direction (or warp yarns), with the longer dimension parallel to the machine direction (or warp yarns). Cut the specimens to be used for the measurement of the tearing strength in the cross-machine direction (or weft yarns) with the longer dimension parallel to the cross-machine direction (or weft yarns). Mark each specimen with an isosceles trapezoid template (*see* Fig. 1). Make a preliminary cut 15 mm long at the centre of the 25 mm edge, as shown in Fig. 1.

6.3 The number of specimens shall be as agreed to between the buyer and the seller subject to a minimum of 5 in each direction.

7 CONDITIONING

7.1 Bring the specimens to moisture equilibrium in the atmosphere for testing textiles as specified in IS 6359 : 1971.

7.2 Specimens to be tested in the wet condition shall be immersed in water maintained at a temperature of 27 ± 2°C. The time of immersion shall be sufficient to wet out the specimens thoroughly; this is indicated by no significant change in strength or elongation following a longer period of immersion, and shall be at least 2 minutes. To obtain thorough wetting, it may be necessary and advisable to add not more than 0.05 percent of a non-ionic neutral wetting agent to the water.

8 PROCEDURE

8.1 Test the conditioned specimens in the standard atmosphere for testing as defined in IS 6359 : 1971.

8.2 Test the thoroughly wet specimen in the normal machine setup within 2 minutes after removal from the water.

8.3 Set the distance between the clamps at the start of the test at 25 ± 1 mm. Select the load range of the testing machine such that the maximum load occurs between 15 and 85 percent of full-scale load. Set the machine to operate at a speed of 300 ± 10 mm/min.

8.4 Secure the test specimen in the machine, clamping along the non-parallel sides of the trapezoid so that the end edges of the clamps are in line with the 25 mm long side of the trapezoid, and the cut is halfway between the clamps. Hold the short edge tight and let the remaining fabric lie in folds.

8.5 Start the machine and record the tearing force on the autographic recorder. The tearing force may not increase to a simple maximum value, but may show several maxima and minima, as shown in Fig. 2A. Record the maximum force obtained in Newtons, as illustrated in Fig. 2A and 2B.

8.6 If a fabric slips in the jaws or if 25 percent or more of the specimens break at a point within 5 mm of the edge of the jaw, then (a) the jaws may be padded; (b) the fabric may be coated under the jaw face area; or (c) the jaw face may be modified. If any of the modifications listed above are used, state the method of modification in the report.

8.7 If an individual test result deviates 25 percent or more from the average test result of a swatch, it shall be discarded and an additional specimen tested. Calculate the average excluding outlier values.

9 CALCULATION

Calculate separately the average of the maximum tearing strengths of the machine direction (or

warp) specimens and the average of the maximum tearing strengths of the cross-machine direction (or weft) specimens.

10 REPORT

The report shall include the following:

a) State that the tests were performed as directed in this test method. Describe the material(s) or product(s) sampled and the method of sampling used.

b) Report the following information for each sample:

1) Average of the maximum tearing strengths in Newtons for each direction,
2) Number of specimens tested for each direction,
3) Coefficient of variation of the observed tearing strength of individual specimens, if required, and
4) Condition of the specimens (dry or wet).

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'.

This Indian Standard has been developed from Doc: No. TX 29 (0164).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :		Telephone
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern	: 1/14 C. I.T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 84 99, 37 85 61 37 86 26, 37 86 62
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43 60 20 25
Southern	: C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	632 92 95, 632 78 58 632 78 91, 632 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. PATNA. THIRUVANANTHAPURAM.

Reprography Unit, BIS, New Delhi, India