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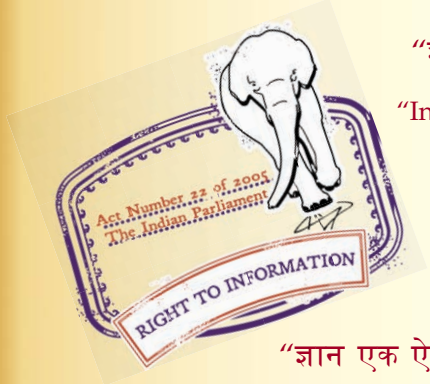
IS 14714 (1999): Geotextiles - Determination of Abrasion Resistance [TXD 30: Geotextiles and Industrial Fabrics]



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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 14714 : 1999
(Reaffirmed 2004)

भारतीय मानक

भूवस्त्रादि — अपघर्षण प्रतिरोधिता ज्ञात करना

Indian Standard

GEOTEXTILES — DETERMINATION OF ABRASION RESISTANCE

ICS 59.080.70

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

July 1999

Price Group 1

FOREWORD

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

In the preparation of this standard considerable assistance has been derived from ASTM D4886 - 88.

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.

Indian Standard

GEOTEXTILES — DETERMINATION OF ABRASION RESISTANCE

1 SCOPE

This test method covers determination of resistance of geotextiles to abrasion using an abrasion tester. The test method is applicable to all geotextiles and is not suitable for geosynthetics.

2 REFERENCES

The following standards contain provisions which through reference in the text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possiblity of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1969 : 1985	Method for determination of breaking load and elongation of woven textile fabrics
14706 : 1999	Geotextiles — Sampling and preparation of test specimen
SP 45 : 1988	Handbook on glossary of textile terms

3 TERMINOLOGY

In addition to definitions given in SP 45, following shall apply.

3.1 Geotextiles

Any permeable textile used with foundation, soil, rock, earth, or any other geotechnical engineering related material as an integral part of a man-made project structure, or system.

4 PRINCIPLE

A test specimen, mounted on a stationary platform is rubbed by an abradant having specified surface characteristics under controlled conditions of pressure and abrasive action. Resistance to abrasion is expressed as a percentage loss of breaking load of the sample.

5 APPARATUS

5.1 Abrasion Tester shall have the essential parts as described in **5.1.1** to **5.1.3**.

5.1.1 *Balanced Head and Block Assembly*

The assembly shall be two parallel, smooth plates, one of which makes a reciprocating motion. The speed of the reciprocating plate shall be adjustable between 10 and 115 double strokes per minute. The stroke length shall be 25 mm. The second plate is rigidly supported by a double-level assembly to provide free movement in a direction perpendicular to the reciprocating plate. This plate is stationary during the test and shall be well balanced so that a vertical load can be maintained by means of dead weights. Both plates are equipped with clamps at each end to hold the test sample and the abrasive medium. The clamps have adequate gripping surface to prevent slippage of the specimen or the abrading material during the test.

5.1.2 *Indicator*

Device shall be provided for indicating the number of cycles (1 cycle = 1 double stroke).

5.1.3 *Weights*

Weights shall be provided for applying a vertical load to the specimen.

6 SAMPLING

6.1 Lot Sample

For sampling of lot, the number of rolls from which samples are to be cut shall be as agreed to between the buyer and the seller. For details of sampling procedure reference may be made to IS 14706.

NOTE — Abrasion testing is not a routine quality control test for geotextiles and shall not normally be performed on every lot by the manufacturer or supplier. When testing for abrasion is performed, however, the sampling should be as described in 6.

6.2 Laboratory Sample

For laboratory sample, take a swatch extending the width of the fabric and approximately 1 m along the selvedge from each roll in the lot sample. The swatch may be taken from the end portion of a roll provided there is no evidence that it is distorted or different from other portions of the roll. In case of dispute, take a swatch that will exclude fabric from the outer wrap of the roll or the inner wrap around the core.

6.3 Test Specimens

From each swatch in the laboratory sample, prepare two sets of specimens each containing five specimens.

Cut rectangular specimens (75 mm × 200 mm) ± 1 mm. Cut the set of specimens to be tested in the machine direction with the longer dimension parallel to the machine direction and set of specimens to be tested in the cross-machine direction with the longer dimension in the cross-machine direction. Take each set of specimens from a swatch along a diagonal so that they will be taken from different positions across the length and width of the swatch. No specimen shall be taken within 1/20th of the fabric width or 100 mm of the selvedge whichever is the higher.

7 CONDITIONING

7.1 Bring the specimens to moisture equilibrium in the atmosphere having 65 ± 2 percent relative humidity and 27 ± 2°C temperature. Equilibrium is considered to have been reached when the change in mass of the specimen in successive weighings made at intervals of not less than 2 h does not exceed 0.1 percent of the mass of the specimen.

7.2 Immerse the specimens to be tested in the wet condition in water maintained at a temperature of 27 ± 2°C. The time of immersion must be sufficient to wet-out the specimens thoroughly, as indicated by insignificant change in strength or elongation following a longer period of immersion, and at least 2 min. To obtain thorough wetting, a nonionic neutral wetting agent not exceeding 0.05 percent may be added to the water.

8 PROCEDURE

8.1 Test the conditioned specimen in the standard atmosphere for testing geotextiles, as described in **7**.

8.2 Place the sample to be tested in the upper (stationary) plate and secure it by means of the clamp at each end of the plate. Place the abrasive medium on the lower (reciprocating) plate and secure it by means of the clamp at each end of the plate. Use emery cloth equal to 100 grit as the abrading medium unless specified otherwise in a material specification.

NOTE— When testing nonwoven geotextiles, secure the edges of the test specimen to the stationary plate by using double-back tape or some other type adhesive. This prevents deformation (neckdown) of the specimen during the abrasion test.

8.3 Lower the top plate onto the bottom plate by releasing the support pin for the top plate and ensuring that the abrading medium and the specimen are properly aligned.

8.4 Load the top (pressure) plate with a 1 kg load unless specified otherwise.

8.5 Start the tester and operate at a speed of 30 cycles per minute unless specified otherwise.

8.6 Operate the tester at the specified speed for 250 cycles or as agreed upon in an applicable material specification or until the specimen ruptures.

NOTE — If a specimen ruptures before the specified number of cycles is reached, report that the specimen ruptured and the number of cycles completed at the time of rupture.

8.7 If the specimen or the abrading material slips in the clamps, discard the specimen and test another specimen.

8.8 Check the abrasive medium for wear after each test. Replace every 1 250 cycles (5 specimens) or as needed to accommodate wear.

8.9 Determine the end point by the following method.

8.9.1 *Percentage Loss in Breaking Load*

Abrade the specimen for a specified number of cycles and then determine the breaking load using 50 mm ravelled-strip or cut-strip procedure given in IS 1969 with the exception of a gauge length of 100 mm and an extension rate of 300 mm /min. The abraded area of the specimen shall be placed midway between the clamps of the machine. Determine the breaking load unabraded portion of the sample under the similar conditions. Calculate the loss in breaking load and report to the nearest 1.0 percent using the following formula:

$$\text{Loss in breaking load, percent} = 100(A-B)/A$$

where

A = breaking load before abrasion, and

B = breaking load after abrasion.

9 REPORT

The report shall include the following:

a) Average loss in breaking load, in percent, for each direction;

b) Deviation from test conditions specified in this standard;

c) Number of specimens tested from each direction; and

d) Number of specimens which ruptured, if any, before the specified number of cycles was reached and the number of cycles completed before rupture.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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