इंटरनेट मानक

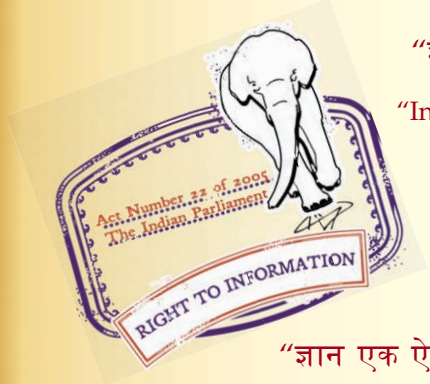
Disclosure to Promote the Right To Information

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 14294 (1995): Geotextiles - Method for determination of apparant opening size by dry sieving technique [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

भारतीय मानक

ज्योटैक्सटाइल — ड्राई सिविंग तकनीक द्वारा आभासी छिद्र (ऐपरन्ट ओपनिंग साइज) ज्ञात करने की पद्धति

Indian Standard

GEOTEXTILES — METHOD FOR DETERMINATION OF APPARENT OPENING SIZE BY DRY SIEVING TECHNIQUE

UDC 677.07[624.13] : 677.017.285

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

September 1995

Price Group 2

Geotextiles Sectional Committee, TX 29

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.

Using a geotextile as a medium to retain soil particles necessitates compatibility between it and the adjacent soil. This test method is used to indicate the apparent opening size of a geotextile, which reflects the approximate largest opening dimension available for soil to pass through.

In the preparation of this standard assistance has been drawn from ASTM Designation : D4751-87 'Standard test method for determining apparent opening size of a geotextile', issued by the American Society for Testing and Materials, USA.

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*)'.

AMENDMENT NO. 1 JULY 2003
TO
IS 14294 : 1995 GEOTEXTILES — METHOD FOR DETERMINATION OF APPARENT OPENING SIZE BY DRY SIEVING TECHNIQUE

(*Page* 1, *clause* **1**) — Substitute the following for the existing clause:

'1 SCOPE

This Indian Standard specifies method to determine apparent opening size (AOS) by dry sieving technique. This method is suitable for AOS 60 microns and above '

(*Page* 1, *clause* **4**, *line* 4) — Delete the word 'laterally'.

[*Page* 1, *clauses* **4**, **5.5**, **6.3**, **7.3**, **7.4**, **7.6**, **7.7**, **8.1**, **8.2**, **8.3**, **9(b)**, **9(c)**, *Notes under* clauses **7.6** *and* **8.4**, *and Table under Annex* A)] — Substitute the *words 'beads' or 'glass beads' wherever existing by the words 'glass beads or* graded sand particles'.

(*Page* 1, *clause* **5.3** *line* 1) — Substitute '**Spherical Glass Beads or Graded Sand Particles**' *for* '**Spherical Glass Beads**'

(*Page* 1, *clause* **5.3**, *line* 5) — Substitute 'fractions' *for* 'beads'.

(*Page* 1, *clause* **5.7**) — Substitute the following for the existing:

'**5.7 Pan, for Collecting Sieved Beads or Graded Sand Particles**'

(*Page* 2, *clause* **7.5**) — Substitute the following for the existing clause:

'**7.5** Place cover and pan on sieve frame and place in shaker Shake the sieve horizontally as well as vertically for 15 min.'

(*Page* 2, *Note under clause* **7.8**) — Delete the word 'bead' or 'beads' or 'glass beads' wherever exist

(TX 30)

Reprography Unit, BIS, New Delhi, India

Indian Standard

GEOTEXTILES — METHOD FOR DETERMINATION OF APPARENT OPENING SIZE BY DRY SIEVING TECHNIQUE

1 SCOPE

This Indian Standard specifies method to determine apparent opening size (AOS) by sieving glass beads through the geotextile. This method is suitable for AOS 60 microns and above.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
460 (Part 1) : 1985	Specification for test sieves : Part 1 Wire cloth test sieves (*third revision*) (Reaffirmed 1990)
(Part 2) : 1985	Part 2 Perforated plate test sieves (*third revision*) (Reaffirmed 1990)
(Part 3) : 1985	Part 3 Methods of examination of apertures of test sieves (*third revision*) (Reaffirmed 1990)
6359 : 1971	Method for conditioning of textiles (Reaffirmed 1993)
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 as given in IS 13321 (Part 1) : 1992 shall apply.

4 PRINCIPLE

A specimen of geotextile is placed in a sieve frame and sized glass beads are placed on the geotextile surface. The geotextile and frame are shaken laterally so that the jarring motion will induce the beads to pass through the test specimen. The procedure is repeated on the same specimen with various size glass beads until its apparent opening size has been determined.

5 APPARATUS

5.1 Mechanical Sieve Shaker — A mechanical sieve shaker, if used, shall impart a vertical, or lateral and vertical, motion to the sieve, causing the particles thereon to bounce and return so as to present different orientations to the sieving surface.

5.2 Pan, Cover and 200 mm Diameter Sieves

5.3 Spherical Glass Beads, in size fractions in accordance with Table 1. It is only necessary to have on hand the bead size fractions necessary for the range of geotextiles for which testing is anticipated. The sizing of all beads shall be verified prior to each use by sieving on the pairs of seives shown in Table 1. Prepare at least 50 g of each size fraction to be used prior to beginning the test.

5.4 Balance, having a capacity adequate for the mass of samples anticipated and accurate to ±0.05 g.

5.5 Static Elimination, to prevent the accumulation of static electricity when the beads are shaken on the surface of geotextile. Commercially available devices or 'anti-static' sprays are acceptable.

5.6 Drying Oven

5.7 Pan, for Collecting Sieved Beads

Table 1 Glass Bead Sizes
(*Clause* 5.3)

Bead Size Range		Bead Size Designation
Passing IS Sieve, mm	Retained IS Sieve, mm	IS Sieve, mm
2 0	1 70	1.7
1 4	1 18	1 18
1 00	0 850	0 850
0 710	0.600	0 600
0 500	0.425	0.425
0 355	0.300	0 300
0 250	0.212	0 212
0 180	0.150	0 150
0 125	0.106	0 106
0.090	0 075	0 075

6 PREPARATION OF TEST SPECIMEN

6.1 Cut five specimens from sample of geotextile with each specimen being cut to fit the appropriate sieve pan.

6.2 Weigh the specimens and then submerge them in distilled water for 1 hour at the standard atmosphere specified in IS 6359 : 1971.

6.3 Dry the specimens and glass beads at 30°C until no weight (mass) change is recorded. Probable time required may be between 12 and 24 hours.

7 PROCEDURE

7.1 Carryout the test at the standard atmosphere for testing textiles in such a manner that static electricity is prevented from affecting test results. If standard atmosphere cannot be maintained and static electricity is observed, any of the following methods may be used to prevent static electricity.

7.1.1 Install static eliminating devices equally spaced along the circumference of sieve and one on centre of cover, or

7.1.2 Apply commercially available 'anti-static' spray uniformly to the geotextile.

7.2 Secure the geotextile between two sieves. It is important that the geotextile be supported so that it is tight, without wrinkles or bulges. The geotextile shall not be stretched or deformed such that it changes or distorts the openings in the fabric. Two systems may be used to secure the geotextile sample

7.2.1 Wedge between two sieve frames.

7.2.2 Secure with hoop inside sieve frame.

7.3 Prior to each use, sieve the glass beads in the laboratory to verify size of beads

7.4 Start with the smallest diameter glass beads that will be tested. Place 50 g of one size glass beads on the centre of the geotextile.

7.5 Place cover and pan on sieve frame and place in shaker. Shake sieves for 10 minutes.

7.6 Place the glass beads still on the surface of the specimen in a pan and weigh. Include beads that fall off as a result of turning the specimen over and tapping the rims of the sieves.

NOTE — The step provides information concerning the amount of glass beads trapped within the geotextile and the amount of any beads lost during testing

7.7 Weigh the glass beads that pass through the specimen, and record data on a worksheet (*see* Annex A for a sample worksheet).

7.8 Repeat 7.3 through 7.7 using the next larger bead size fraction. Repeat the trial using succeedingly larger bead size fractions until the weight of beads passing through the specimen is 5 percent or less. Perform the trials such that the percent passing decreases from a value greater than 5 percent to a value less than or equal to 5 percent.

NOTE — All size glass beads are sieved through a single specimen of geotextile. Geotextile variability would make it difficult to obtain consistent results by sieving each size glass bead through a separate specimen

7.9 Repeat 7.2 to 7.8 for all five specimens.

8 CALCULATIONS

8.1 For each size of beads tested with each specimen, compute to the nearest percent the beads passing through the specimen using the following equation:

$$B = 100\,P/T$$

where

B = beads passing through specimen, percent;
P = mass of glass beads in the pan, g, and
T = total mass of glass beads used, g.

8.2 Record calculations and percent beads passing (*see* Annex A).

8.3 Assign the AOS for each specimen as the size designation in millimetres (*see* 5.3) of the beads of which 5 percent or less pass.

8.4 Determine the AOS for the sample by averaging the AOS values of the five specimens.

NOTE — It is often desirable to compare the data from each specimen by plotting the percentage beads passing the specimen *versus* bead size for each of the bead sizes used for each specimen and to evaluate the consistency of the testing operation for internal quality control Plotting is also desirable when the results of two laboratories differ and it is desired to compare the data from each laboratory to pinpoint the cause of the discrepancy

9 REPORT

Report shall include the following information:

a) IS number of the method followed for testing;
b) Bead size range (in millimetres) used;
c) Plots of bead size *versus* percentage beads passing for each specimen, if required;
d) The average apparent opening size (AOS = O_{95}) in millimetres;
e) When requested, AOS in terms of sieve number, that is, having nominal openings, in millimetres, next larger than or equal to the AOS, in millimetres; and
f) Deviation, if any.

ANNEX A

(Clauses 7 7 and 8 2)

SAMPLE WORKSHEET

DETERMINATION OF APPARENT OPENING SIZE OF GEOTEXTILE

DATE
TLST BY
COMP BY
CHECK BY

Range (mm) IS Sieve	Minimum Dia (mm)	Wt F+G* W/Beads	Wt F+ G	Wt s Beads	% Retained	Wt Pan W/Beads	Wt Pan	Wt Bead	% Passing	Wt F+G Before	Wt F+G After	Wt Retained in Geotextile	% Retained in Geotextile
2 0-1 70	1 70												
1 4-1 18	1 18												
1 0- 850	850												
710- 60	600												
50- 425	425												
355- 30	300												
25- 212	212												
18- 15	150												
125- 106	106												
09- 075	075												

*F = Frame
G = Geotextile

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 (0244).

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.

Printed at Printograph New Delhi-5 (INDIA)