IS 13162-2 (1991): Geotextiles - Methods of test, Part 2: Determination of resistance to exposure of ultra-violet light and water (Xenon arc type apparatus) [TXD 30: Geotextiles and Industrial Fabrics]

BLANK PAGE

IS 13162 (Part 2) : 1991
(Reaffirmed 2006)

भारतीय मानक

भूवस्त्रादि – परीक्षण की पद्धतियाँ

भाग 2 परा बैंगनी प्रकाश और पानी में अनावरण का प्रतिरोध ज्ञात करना (जीनान-आर्क टाइप उपकरण द्वारा)

Indian Standard

GEOTEXTILES – METHODS OF TEST

PART 2 DETERMINATION OF RESISTANCE TO THE EXPOSURE OF ULTRAVIOLET LIGHT AND WATER (XENON-ARC TYPE APPARATUS)

UDC 677·06 [624·13] : 620·193·6

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

August 1991

Price Group 1

FOREWORD

This Indian Standard (Part 2) 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.

Geotextiles are manufactured using a variety of processes and formulations of polymers and each geotextile varies in its sensitivity to ultraviolet radiation. Ultraviolet radiation from the sun varies with duration of exposure, angle of inclination of the sun, atmospheric conditions, topography, and geography. The Xenon-arc test cannot simulate all these variables, so it is not likely that Xenon-arc test results will relate directly to sunlight exposure test results for a specific fabric at a given site.

The method prescribed is suitable for comparative evaluation of geotextiles and is not recommended for acceptance testing of commercial shipments since information on inter-laboratory precision is incomplete.

In the preparation of this standard considerable assistance has been derived from ASTM D 435-64 'Standard test method for deterioration of geotextile from exposure to ultraviolet light and water (Xenon-arc type apparatus)' issued by the American Society for Testing and Materials, USA.

In reporting the results of a test 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 — METHODS OF TEST

PART 2 DETERMINATION OF RESISTANCE TO THE EXPOSURE OF ULTRAVIOLET LIGHT AND WATER (XENON-ARC TYPE APPARATUS)

1 SCOPE

1.1 This standard (Part 2) prescribes a method for the determination of resistance of geotextiles to the exposure of ultraviolet light and water.

1.2 The light and water exposure apparatus employs a Xenon-arc light source.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
1969 : 1985	Methods for determination of breaking load and elongation of woven textile fabrics (*second revision*)
2454 : 1985	Methods for determination of colour fastness of textile materials to artificial light (Xenon lamp) (*first revision*)
6359 : 1971	Method for conditioning of textiles
13162 (Part 5) : 1991	Geotextiles — Methods of Test : Part 5 Determination of tensile properties using a wide width strip

3 PRINCIPLE

3.1 Specimens of geotextiles for the machine and cross directions are exposed for 0, 150, 300 and 500 hours of ultraviolet exposure in a Xenon-arc apparatus. The exposure consists of 120 minute cycles consisting of 102 minutes of light only, followed by 18 minutes of water spray and light. After the exposure, the specimens are subjected to a cut strip tensile test as prescribed in IS 1969 : 1985 or wide width strip test as prescribed in IS 13162 (Part 5): 1991. The test results are compared to the test results for unexposed specimens and the deterioration which has taken place due to ultraviolet exposure is assessed. This method will enable the user to develop a degradation curve for the geotextiles being tested to determine the tendency of a geotextile to deteriorate when exposed to ultraviolet light and water.

4 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

4.1 Condition the test specimens to moisture equilibrium from the dry side in the standard atmosphere of 65 ± 2 percent relative humidity and 27 ± 2°C temperature (*see also* IS 6359 : 1971). When the specimens have been left in such an atmosphere so that both the faces are exposed to the standard atmosphere as far as possible for 24 hours, they shall be deemed to have reached the state of moisture equilibrium.

5 PREPARATION OF TEST SPECIMENS

5.1 Take two pieces each of one square metre from each roll as selected in **9.2**, one from machine direction and the other from cross machine direction.

5.2 Cut 20 test specimens from each of the machines and the cross directions from the test pieces obtained in **5.1**, that is, a total of 40 test specimens.

5.3 Specimens from a roll shall be cut from positions evenly distributed over the full width and length of the sample, but not closer than 100 mm to the selvedges.

5.4 Specimens shall not contain dirt, irregular spots, creases, holes or other visible faults.

5.5 Any two specimens shall not contain the same longitudinal or transversal position. If it is not possible, it shall be reported.

5.6 Before cutting structured geotextiles exact instructions for cutting shall be laid down, and these shall be followed with great care.

5.7 If the cutting causes fragments of geotextile to loosen influencing the test results and if this cannot be avoided, this fact shall be reported.

5.8 The specimens shall be kept free from dust, dry, kept in dark and protected against chemical and physical damage until the test is performed.

6 APPARATUS

6.1 The working details of Xenon-arc apparatus are described in IS 2454 : 1985.

6.1.1 The apparatus should be capable of exposing the specimens to cycles of light only, followed by water spray and light under controlled atmospheric conditions.

6.1.2 The apparatus should be equipped with an inner and outer borosilicate filter glass as described in IS 2454 : 1985.

6.2 Tensile strength testing machine as described for cut strip test in IS 1969 : 1985.

7 PROCEDURE

7.1 Operate the Xenon-arc apparatus as directed in IS 2454 : 1985 to provide 120 minute cycles as follows:

102 minutes of light only at 65 ± 5°C black panel temperature, and 30 ± 5 percent relative humidity, followed by 18 minutes of light and water spray.

7.1.1 Set the minimum level of gradation to 0·5 W/m^2, 1 nm bandpass at 340 nm.

7.2 Randomly assign five specimens for each direction from each laboratory sample to each of the following exposure times, zero (unexposed), 150, 300 and 500 hours. Place 30 specimens (15 for each direction) out of the total 40 test specimens in the apparatus, such that the side most likely to be exposed to the effects of ultraviolet light will be exposed in the apparatus.

7.3 At the end of each exposure time, remove the appropriate five specimens for each direction for tensile test using cut strip test as given in IS 1969 : 1985 or wide width strip test as given in IS 13162 (Part 5) : 1991.

7.4 Select five unexposed specimens (zero exposure time) and five exposed specimens for each exposure time interval and direction, from a laboratory sample as per the method given in IS 1969 : 1985. Test these specimens for breaking strength on a constant-rate-of-extension (CRE) or a constant rate-of-traverse (CRT) type testing machine by cut strip test, as given in IS 1969 : 1985 (*see* Note) or for wide width test as given in IS 13162 (Part 5) : 1991. In case of controversy, the CRE method shall prevail.

NOTE — A specimen of 50 mm width at a gauge length 75 ± 1 mm shall be used. If tested on a CRT machine, the traverse speed shall be 300 ± 15 mm/min.

8 CALCULATIONS

8.1 Calculate the average breaking strength in kN/m for all exposed and unexposed specimens for each direction.

8.2 Calculate the percent loss of strength for the unexposed specimens for the average results of each exposure time for each direction.

9 SAMPLING

9.1 A random sample shall be selected from the lot. The sample selected should be homogeneous and representative of the lot.

9.2 The number of rolls to be selected from a lot shall be in accordance with the procedure laid down in the relevant material specification or as agreed to between the buyer and the seller.

10 REPORT

10.1 The test report shall include the following information:

a) Nature of geotextile being tested;

b) The average breaking strength for unexposed (control) specimens, and exposed specimens in each direction for each of the exposure period of 150, 300 and 500 hours;

c) Graph of average breaking strength between exposure time, for each direction; and

d) The roll number, roll width, roll length and colour of roll.

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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.

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. TXD 29 (2525)

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 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16
Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95

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

Printed at Printwell Printers, Delhi, India