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(दूसरा पुनरीक्षण)

Indian Standard

TEXTILES — POLYESTER FIBREGLASS TAPES — SPECIFICATION
(*Second Revision*)

ICS 59.080.50

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FOREWORD

Polyester fibreglass tapes are strong, heat-resistant materials used in electrical insulation, reinforcing, and sealing applications. These tapes combine the high tensile strength of fibreglass with the durability and flexibility of polyester, making them ideal for use in demanding environments such as electrical equipment, piping, and structural repairs.

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Technical Textiles for Clothtech Applications including Narrow Fabrics and Braids Sectional Committee had been approved by the Textile Division Council.

This standard was first published in 1983 and subsequently revised in 1992. The current revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

- a) Title of the standard has been modified.
- b) BIS certification marking clause has been modified; and
- c) References to Indian Standard given in Annex A has been updated.

The composition of the Committee responsible for the formulation of this standard is given in Annex C

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***TEXTILES — POLYESTER FIBREGLASS TAPES — SPECIFICATION**
*(Second Revision)***1 SCOPE**

1.1 This standard prescribes the requirements for unvarnished polyester fiberglass tapes.

1.2 This standard covers tape of nominal width 10 mm to 50 mm having nominal thickness of 0.09 mm to 0.40 mm.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions 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 possibility of applying the most recent editions of the standards indicated in Annex A.

3 MANUFACTURE**3.1 Warp**

The glass yarn used shall be continuous filament containing not more than 1 percent of sodium oxide. This is usually known as 'E' glass.

3.2 Weft

The polyester yarns shall be continuous filament polyethylene terephthalate (PET) and shall be heat set.

3.3 Weave

The weave shall be plain with uniform selvages. In case tapes are produced on shuttle less looms, picks shall be introduced at or near the selvedge opposite the one from which the weft is inserted thus preventing unravelling of the selvages during use. If a locking thread, which may be of organic material, is used, the method of interlocking shall be such that the thread cannot be pulled out of the body of the tape.

3.4 Identification

Three coloured glass warp threads close together and positioned so as to indicate the centre line of the tape. The colour thread shall be used to indicate the thickness as shown in Table 1.

4 REQUIREMENTS

4.1 The polyester fiberglass tape shall conform to the requirements given in Table 2.

Table 1 Colour Code
(Clause 3.4)

SI No.	Nominal Thickness (mm)	Colour
(1)	(2)	(3)
i)	0.09	Blue
ii)	0.13	Red
iii)	0.18	Orange
iv)	0.23	Green
v)	0.40	Brown

4.2 Effect of Heating in Air

The tape after being heated in air in a loosely coiled state for 24 h at $(150 \pm 5) ^\circ\text{C}$ and subsequently cooled to atmospheric temperature shall have width not less than 95 percent of the value (*see* col 6 of Table 2) of that obtained on the unheated tape, the specimens being drawn from the same rolls as those used for measuring width on unheated tape.

4.3 Electrical Conductivity

The electrical conductivity of the aqueous extract as determined in accordance with IS 4420 shall be less than 15 ms/m.

4.4 Length

Unless otherwise specified, the tape shall be supplied in rolls of 50 m length. The number of joints per roll shall not exceed two, and none of the jointed length in a roll shall be shorter than 10 m. The length of the tape in each roll shall be determined by the method prescribed in IS 1954.

4.4.1 Where joints occur, the tape shall be butted and joined up by a strip of coloured gummed tape which shall show on the edge of the reel to indicate the presence of a joint. Pins or other metal fasteners shall not be used for securing the ends of rolls or for joining the tape.

PACKING

5.1 The tape shall be wound on a hard tubular core of sufficient strength to withstand the pressure of the tape when wound tightly on it. The internal diameter of the core shall be not less than 10 mm and not more than 13 mm and its width shall be approximately the same as the width of the tape but shall not exceed it. The core shall not be loosened when dropped on the floor from a height of one metre.

Table 2 Requirements for Polyester Fiberglass Tapes
(Clause 4.1)

Sl No.	Thickness mm	Width mm	Number of ends per cm of Nominal Width <i>Min</i>	Number of picks per cm <i>Min</i>	Tensile Strength (Warp) N/mm of Width <i>Min</i>
(1)	(2)	(3)	(4)	(5)	(6)
i)	0.09 + 0.02 - 0.01	10, 12.5, 20, 25, 30, 40 or 50	25	24	30
ii)	0.13 + 0.03 - 0.01	12.5, 20, 25, 30 40 or 50	20	10	35
iii)	0.18 + 0.03 - 0.02				45
iv)	0.23 + 0.03 - 0.02				65
v)	0.40 + 0.03 - 0.03				75
Tolerance	—				± 1 mm for width up to 25 mm ± 1.5 mm for width over 25 mm
Method of Test, Ref to	IS 7702	B-2	B-3	B-4	B-5

5.2 A set of 10 rolls shall be wrapped in polyethylene film and the sets packed in bundles or casks as agreed to between the buyer and the seller.

6 MARKING

6.1 Each roll shall be legibly marked at both ends with following information:

- a) Nominal thickness of tape in mm,
- b) Width of the tape in mm,
- c) Length in metres,
- d) Year of manufacture,
- e) Manufacturer's name, initials or trade mark; if any, and
- f) Any other information as required by the law in force.

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

7 SAMPLING

7.1 Lot

The quantity of tape of one definite variety delivered to one buyer against one dispatch note shall constitute a lot.

7.2 The conformity of a lot to the requirements of this standard shall be determined on the basis of tests carried out on rolls of tape selected from the lot.

7.3 Unless otherwise specified, the number of rolls of tape to be selected at random from a lot shall be as given in Table 3.

7.4 For evaluating width, length, ends per centimetre, pick per centimetre and thickness, the number or rolls selected in col 3 to Table 3 shall constitute the test sample.

Table 3 Sample Size and Criteria for Conformity
(Clauses 7.3 to 7.6)

SI No.	Lot Size (Number of Rolls)	Sample Size	Permissible Number of Defective Rolls	Sub-Sample Size
(1)	(2)	(3)	(4)	(5)
i)	Up to 100	5	0	2
ii)	101 to 300	13	0	3
iii)	301 to 500	20	1	5
iv)	501 to 1000	32	2	8
v)	1001 and above	50	3	8

7.5 For evaluating tensile strength, pH value, conductivity of aqueous extract, effect of heating in air and glass content, the number of rolls selected in col 5 of Table 3 shall constitute the test sample. The rolls shall be selected at random from those drawn for the purpose of **7.4**. The required test specimens shall be drawn from each of the rolls and subjected to corresponding tests.

7.6 Criteria for Conformity

The lot shall be considered to be in conformity with the requirements of the standard if the following conditions are satisfied:

- a) The number of rolls found defective for any one or more of the characteristics mentioned in **7.4** does not exceed the corresponding number given in col 4 of Table 3.
- b) None of the test samples shall fail for any of the characteristics mentioned in **7.5**.

ANNEX A
(*Clause 2*)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>
IS 196:1966	Atmospheric conditions for testing (<i>revised</i>)
IS 1954:2024	Textiles - Fabrics - Determination of width and length (<i>Third Revision</i>)
IS 1969 (Part 1) : 2018	Textiles – Tensile properties of fabrics – Part 1 Determination of maximum force and elongation at maximum force using the strip method (<i>Fourth Revision</i>)
IS 4420: 2022	Methods for determination of conductivity of aqueous and organic extracts of textile materials (<i>First Revision</i>)
IS 7702 : 2012 ISO 5084:1996	Textiles – Determination of thickness of textiles and textile products (<i>First Revision</i>)

ANNEX B
(Clause 4.1 and Table 2)

METHOD OF TESTS

B-1 ATMOSPHERIC CONDITIONS FOR TESTING

B-1.1 All tests may be carried out under pre- vailing atmospheric conditions. However, while determining tensile strength, in all cases of disputes, the test specimens shall be condition to moisture equilibrium in a standard atmosphere at (65 ± 2) percent relative humidity and (27 ± 2) °C temperature (*see* IS 196) for 6 h and test shall be carried out in standard atmosphere.

B-2 WIDTH

B-2.1 Test specimens

Each roll in the test sample shall constitute a test specimen.

B-2.2 Equipment

A steel measuring rule graduated in millimetres.

B-2.3 Procedure

Unroll the tape and lay it on smooth surface. Apply no more tension to it than is necessary to make it lie straight and flat. Measure the width of tape by means of the steel measuring rule to the nearest millimetre. Make two measurements at random for each test specimen.

Take the mean value of the two measurements as the width of the tape. Similarly determine the width of other test specimens.

B-3 ENDS PER CENTIMETRE

B-3.1 Test Specimens

Each roll in the test sample shall constitute a test specimen.

B-3.2 Procedure

Count the number of ends across the full width of the tape and using the value for the measured width of the tape, calculate the number of ends per centimetre. Similarly determine the ends per centimetre of other test specimens.

B-4 PICKSPER CENTLMETRE

B-4.1 Test Specimens

Each roll in the test sample shall constitute a test specimen.

B-4.2 Procedure

Count the number of picks over not less than 25 mm length of the tape at minimum three different places along the length. From the value thus obtained, calculate the picks per centimetre. Similarly determine the picks per centimetre of the other test specimens.

B-5 TENSILE STRENGTH

B-5.1 General

The tensile strength shall be determined by the method prescribed in IS 1969. However, in this case, the conditions listed in **B-5.2** to **B-5.5** shall be applicable.

B-5.2 Test Specimens

From each roll in the test sample, draw at least one test specimen of sufficient length to allow an unstretched length of 200 mm between the jaws of the testing machine.

B-5.3 Preparation of Test Specimens

In order to prevent differential slips of yarns held in the clamps and cutting or abrasion of the tape before or during tests; Bollard type clamps have been found suitable for the purpose. Where these are not available, effective means of gripping and protecting the tape in clamp type grips may be ensured by securing each of the specimen to stiff paper with a suitable cement, rubber or vinyl solution, polyvinyl butyral in sheet form and thermosetting adhesive tape. Care should be taken to lay the specimen on a flat surface during the application of the reinforcement SD as to ensure that the warp threads are at a uniform tension.

B-5.4 Application of Load

Apply the load so that the time taken from the commencement of the load to the moment at which the specified minimum load is reached is 30 ± 5 seconds and continue until the test piece breaks. If the test piece breaks unevenly, or in or at a jaw of the testing machine, discard the result and make a further test using another test piece.

B-5.5 Result

Calculate the tensile strength in Newtons per millimetre width by dividing the value of the breaking load by the measure width in millimetres.

ANNEX C

(Foreword)

COMMITTEE COMPOSITION

Technical Textiles for Clothtech Applications including Narrow Fabrics and Braids Sectional
Committee, TXD 39

Organization

Additional Controller CQA (General Stores), DGQA, Ministry of Defence

ICAR - Central Institute for Research on Cotton Technology, Mumbai

Federation of Indian Chambers of Commerce and Industry

Indian Technical Textile Association, Mumbai

M K U Limited, Kanpur

Motilal Dulichand Pvt Ltd, Kanpur

National Textile Corporation, New Delhi

Ordnance Parachute Factory, Kanpur

Office of Textiles Commissioner, Mumbai

SGS Limited, Gurugram

S L Banthia Textiles Industries Pvt Ltd

Shipra International, Kanpur

Sky Industries Ltd, Navi Mumbai

Synthetic and Art Silk Mills Research Association, Mumbai

Thanawala & Co., Mumbai

The Bombay Textile Research, Association, Mumbai

U P Textile Technological Institute, Kanpur

Universal Yarn & Tex Pvt Ltd, Kanpur

BIS Directorate General

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DR P JAGAJANANTHA

DR T SENTHILKUMAR (*Alternate*)

SHRI ANU HANDA

DR ANUP RAKSHIT

SHRI VIKRAM JAIN (*Alternate*)

SHRI SUMIT KHANDLWAL

SHRI RAJIB PAL (*Alternate*)

SHRI SHAILENDRA NATH MISRA

SHRI SUKHR SHIVHARE (*Alternate*)

SHRI R K YADAV

SHRI V M BAGADE,

SHRI S KONDAIAH (*Alternate*)

SHRI V K KOHLI

SHRI HUMAYUN K (*Alternate*)

MS ANITHA JEYARAJ

SHRI GAURAV SARASWAT (*Alternate*)

SHRI SANTOSH KUMAR BANTHIA

SHRI ABHISHEK KUMAR AGRAWAL

SHRI KAPIL MEHROTRA

SHRI MICHAEL (*Alternate*)

SHRI SANJAY SAINI

SHRI PREMNATH SURWASE (*Alternate*)

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SHRI VIVAN THANAWALA (*Alternate*)

SHRI SHAIKH RIYAZ AHMED

DR PRASANTA KUMAR PANDA (*Alternate*)

DR PRASHANT VISHNOI

SHRI RAJIV K BHARTIYA

SHRI J. K. GUPTA, SCIENTIST 'E'/DIRECTOR and Head (Textiles)
[Representing Director General (*Ex-officio*)]

Member Secretary

SHRI TANISHQ AWASTHI
SCIENTIST 'B'/ASISTANT DIRECTOR
(Textiles), BIS