

भारतीय मानक ब्यूरो  
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*Draft for comments only*

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*भारतीय मानक मसौदा*

वस्त्रादि — एयरोस्पेस उद्देश्यों के लिए प्लास्टिक लैमिनेट्स के लिए बुने हुए ग्लास  
फाइबर कपड़े — विशिष्टि

भाग 2 डिसाइज्ड कपड़े

[ आई एस 5746 (भाग 2) का तीसरा पुनरीक्षण ]

*Draft Indian Standard*

**TEXTILES — WOVEN GLASS FIBRES FABRICS FOR PLASTIC  
LAMINATES FOR AEROSPACE PURPOSES — SPECIFICATION  
PART 2 DESIZED FABRICS**

[ *Third Revision of IS 5746 (Part 2)* ]

**ICS: 59.100.10**

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Textile Materials for Aeronautical and  
Related Products Sectional Committee, TXD 13

Last date for receipt of comments is  
12 October 2024

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**FOREWORD**

*(Formal clauses will be added later)*

This standard was first published in the year 1970 and subsequently revised in 1983 and 1987. However, the requirements of only finished fabrics were specified in both these versions. This standard has now been revised to include requirements of loomstate fabrics and desized fabrics. This standard is now being published in three parts:

Part 1 Loom-state fabrics.

Part 2 Desized fabrics.

Part 3 Finished fabrics for use with polyester resin systems.

This revision has been made to incorporate the following changes:

- a) Marking clause has been modified; and
- b) Packaging and sampling clause have been updated.

Part 1 of this standard covers loom-state woven glass fibre fabrics for plastic laminates for aerospace purposes. Many applications of woven glass fibre fabrics demand fabrics with very low residual size content, specially for electrical purposes. This standard is intended to cover requirements for such desized fabrics.

While preparing this standard, considerable assistance has been derived from BS 3396 (Part 2)-1987 'Woven glass fibre fabrics for plastics reinforcement Part 1: Specification for desized fabrics', issued by the British Standards Institution.

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.

## 1 SCOPE

This standard (Part 2) specifies requirements for glass fibre fabrics specified in Part 1 of this standard, which have been desized.

## 2 REFERENCE

The standard listed in this clause contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standard are subjected to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated in this clause.

<i>IS No.</i>	<i>Title</i>
IS 5746 ( Part 1 ) : 1987	Specification for woven glass fibre fabrics for plastic laminates for aerospace purposes — Part 1 Loom-state fabrics ( <i>second revision</i> )

## 3 REQUIREMENTS

The desized fabric shall comply with all the requirements specified in Part 1 of this standard except the residual size content and the breaking strength which shall be as given in **3.1** and **3.2**.

### **3.1 Residual Size Content**

The fabric should be desized by a two-stage treatment involving aqueous wash followed by suitable heat treatment. When determined by the method described in Annex A, the percentage of residual size on the desized fabric shall be not more than 0.1 percent.

### **3.2 Breaking Strength**

The average breaking strength of the desized fabric in warp and weft direction shall be not less than 35 percent of the value specified in Part 1 of this standard when determined by the method described in Annex C of part 1 except that:

- a) If the desized condition of the fabric is an intermediate one preparatory to finishing by the same supplier, the supplier need not carry out the test for breaking strength; or
- b) If the desized fabric does not conform to the requirements of **3.2**, or if required by the purchaser, it may be suitably finished and used to prepare a test laminate by the method described in Annex B of Part 3 of this standard. Provided the dry strength in both the warp and weft directions of the laminate complies with Table 2 of Part 3, the fabric shall be deemed to comply with the requirements of this clause; or
- c) If desized fabric does not conform to the requirements of **3.2**, a laminating procedure alternative to **3.2** (b) may be used together with appropriate cross breaking strength levels for the laminate by agreement between the purchaser and the supplier

### **3.3 Freedom from Defects and Impurities**

The fabric shall be uniform. It shall be reasonably free from streaks, stains, oil and grease spots, other contaminations, creases and wrinkles, other permanent distortions, and shall not be brittle or fused.

## **4 PACKING**

The fabric shall be packed in the form of rolls weighing not more than 100 kg. No roll shall contain more than 3 pieces. The fabric shall be rolled evenly on tubes of sufficient length and strength to produce firm packages so as to prevent collapsing or telescoping during transit, storage or handling. Both ends of the roll shall be suitably protected to prevent damage to the edges of the cloth and the whole shall be packed in moisture proof containers.

## **5 SAMPLING**

### **5.1 Lot**

The number of fabric rolls of the same description and designation delivered to a buyer against one dispatch note shall constitute a lot.

**5.2** A sample not less than 3 metres long and of full width of the fabric shall be taken from each lot of 1 000 metres or fractions thereof from the fabric of one particular designation submitted for acceptance at one time

## **6 CRITERIA FOR CONFORMITY**

The sample selected in accordance with **5.2** shall be tested for all the requirements given in **3**. There shall be no failure in respect of any of the requirement if the lot is to be accepted.

## **7 MARKING**

**7.1** Each piece or package of fabric shall be marked with the following:

- a) Designation in accordance with IS 5746 (Part 1);
- b) The word 'desized';
- c) Piece number and desizing batch number; and
- d) Manufacturer's name, trade-mark or initials.

### **7.2 BIS Certification Marking**

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and Rules and Regulations made thereunder. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

**ANNEX A**  
(Clause 3.1)

**DETERMINATION OF RESIDUAL SIZE CONTENT**

**A-1 GENERAL**

**A-1.1** After a preliminary determination of moisture content, the desized glass fabric is heated so as to ignite any residual size. Since the experimental results depend on differential weighing and as the change in weight is very small, special care is necessary, particularly to prevent access of moisture to the specimen before each weighing.

**A-2 APPARATUS**

**A-2.1 Weighing Bottle** — approximate diameter 50 mm.

**A-2.2 Desiccator** — charged with phosphorus pentoxide.

**A-2.3 Combustion Apparatus** — *see* Fig. 1.

**A-2.4 Balance** — accurate to 0.000 1 g.

**A-2.5 Drying Oven**

**A-2.6 Nickel - Silver Boat** — approximate dimensions (90 × 35 × 20) mm.

**A-3 PROCEDURE**

**A-3.1** From a rectangular specimen of the desized fabric of weight approximately 4 g, fray out five threads from each side so as to leave a fringe. Roll the prepared specimen loosely and tie with a thread of glass yarn taken from the specimen.

**A-3.2** Weigh the prepared specimen accurately in a weighing bottle of previously determined weight and heat in the drying oven for 30 minutes at  $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ . Cool in the desiccator and reweigh.

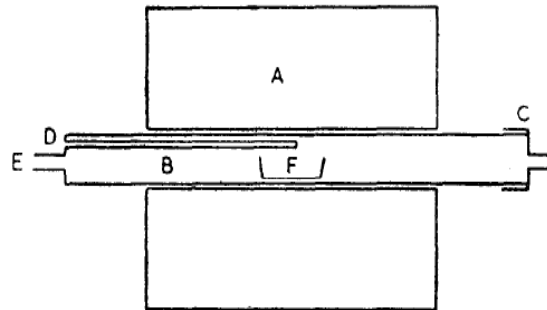
**A-3.3** Place the dried specimen in a previously dried and weighed nickel-silver boat and transfer to a combustion apparatus having the essential features shown in Fig. 1 and heat at a temperature of  $575\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$ .

**A-3.4** After heating for ten minutes, a current of air dried by passage over calcium chloride and then over phosphorus pentoxide shall be drawn through the tube containing the nickel-silver boat and specimen while heating for a further five minutes.

**A-3.5** Quickly transfer the nickel-silver boat containing the specimen to the drying oven which already holds the previously weighed weighing bottle. After the nickel-silver boat has cooled down, transfer this, together with its contents to the weighing bottle prior to removing from the drying oven.

**A-3.6** Cool to room temperature in the desiccator and reweigh.

**A-3.7** Express the loss in weight of the specimen as a percentage of the original dry weight of the specimen.



- |                                  |                       |
|----------------------------------|-----------------------|
| A - Electrically heated furnace  | D - Thermocouple tube |
| B - Combustion tube              | E - Air inlet         |
| C - Air outlet cap ( removable ) | F - Nickel-silver     |

FIG. 1 COMBUSTION APPARATUS

#### A-4 REPORT

**A-4.1** The percentage loss in weight of the specimen determined as above shall be rounded off to the first place of decimal and reported as the residual size content.

Example:

Percentages of 0.050 to 0.149 shall be reported as 0.1 percent.

**A-5** Any other suitable method may be used provided it can be shown to give the same results.