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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 4944-2026

Replacing GB/T 4944-2005

**Test method for the interlaminar tensile strength of glass fibre
reinforced plastic laminates**

玻璃纤维增强塑料层合板层间拉伸强度试验方法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. This document supersedes GB/T 4944-2005 "Test Method for Interlaminar Tensile Strength of Glass Fiber Reinforced Plastic Laminates" and is consistent with GB/T 4944- Compared to.2005, aside from structural adjustments and editorial changes, the main technical changes are as follows:

- a) The scope of application has been changed (see Chapter 1, Chapter 1 of the.2005 edition);
- b) Added terms and definitions (see Chapter 3);
- c) The dimensions of Type I and Type II specimens were changed (see 5.1, 4.1 in the.2005 edition);
- d) Requirements for sample preparation have been added (see 5.2.2 and 5.2.3);
- e) The diameter specifications for metal connecting blocks have been increased (see 6.2.1);
- f) The measurement accuracy of the specimen cross-sectional dimensions was changed (see 8.3, 7.3 in the.2005 edition);

g) The description of the test validity has been changed (see 8.6,

7.6 in the 2005 edition). Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China Building Materials Federation. This document is under the jurisdiction of the National Technical Committee on Standardization of Fiber Reinforced Plastics (SAC/TC39). This document was drafted by: Luoyang Shipbuilding Materials Research Institute (725th Research Institute of China Shipbuilding Group Corporation), China Shipbuilding Group Corporation, The 708 Research Institute of China Aero Engine Corporation, Beijing Institute of Aeronautical Materials, Force Testing (Shanghai) Scientific Instruments Co., Ltd., and Sinoma Science & Technology Wind Power Co., Ltd. Blade Co., Ltd., Beijing Fiberglass Research and Design Institute Co., Ltd. The main drafters of this document are: Guo Wantao, Ji Bing, Gu Xiaolei, Xu Zhiting, Tian Zhuangwei, Wang Bin, Yan Chen, Wang Zhandong, Lou Pengyu, and Chen Xinwen. Guo Zhao and Wu Weiwei. This document was first published in 1985, revised for the first time in 1996, revised for the second time in 2005, and this is the third revision. Interlaminar tensile strength of glass fiber reinforced plastic laminate Test methods

1. Scope This document specifies the principle, specimen, specimen assembly and preparation, and testing method for the interlaminar tensile strength test of glass fiber reinforced plastic laminates. Conditions, test procedures, result calculations, and test reports. This document applies to the determination of interlaminar tensile strength in glass fiber reinforced plastic laminates, where the glass fiber structure is limited to 2D woven fabrics and... For warp-knitted fabrics and other fiber-reinforced plastic laminates, refer to the usage guidelines.

5.1 Sample shape and size

5.1.1 Type I specimens should be used (see Figure 1). The specimen thickness h is the actual thickness of the product, with a minimum thickness of

2.5 mm; the diameter d is within the specified range. The circumference is 20mm~28mm, and the nominal diameter is 25mm.

5.1.2 When the interlaminar tensile strength of the laminate is higher than the bonding strength of the usable adhesive, and the specified number of effective test specimens cannot be obtained, Type II specimens should be used (see Figure 2). If the required number of valid specimens cannot be obtained using Type II specimens, then Type III specimens should be used (see Figure 2). Figure 3); Type III specimens can be connected to the testing machine via a special clamp (see Appendix A).

5.2 Sample Processing

5.2.1 The sample processing shall comply with the provisions of GB/T 1446.

5.2.2 When machining samples using diamond tools via milling or grinding, appropriate depth of cut, workpiece feed rate, and tool linear speed should be selected to avoid... To avoid causing delamination, burrs, and resin burns on the sample.

5.2.3 Cooling measures should be taken during the sample processing, including high-pressure coolant, spray, air cooling, etc. (oil should not be used) to avoid dry grinding.

5.3 Number of Samples The number of samples for Type I, Type II, and Type III is 10 each, and the number of valid samples should not be less than 5.

6 Sample assembly and preparation

6.1 Sample Assembly For Type I and Type II specimens, they should be made into assemblies (see Figure 4) for interlaminar tensile strength determination.

6.2 Metal Connecting Block

6.2.1 The diameter D of the metal connecting block is available in two specifications. (20 ± 0.1) mm and (25 ± 0.1) mm; the length L of the cylindrical segment of equal diameter is not less than... 30mm.

6.2.2 The shape and size of the other end of the metal connecting block shall be determined according to the testing machine.

6.2.3 The bonding surface should be flat and free of defects, and perpendicular to the axis of the metal connector, with a perpendicularity tolerance of 0.025mm.

6.3 Preparation of the Specimen Assembly

6.3.1 The appearance of the test specimen shall conform to the requirements of GB/T 1446.

6.3.2 Metal connecting blocks shall comply with the provisions of 6.2.

6.3.3 The bonding strength of the adhesive should be higher than the interlayer tensile strength. Epoxy-based adhesives are recommended.

6.3.4 Surface treatment and curing conditions for the bonding surfaces, such as temperature, pressure, and time, shall be carried out according to the process specifications in the adhesive instructions. Adhesive The curing conditions should not alter the properties of the laminate.

6.3.5 Apply adhesive to the bonding surfaces and use an alignment device (see Appendix B) to ensure that the specimens are properly bonded and accurately positioned.

6.3.6 For Type I specimens, the portion of the specimen exceeding the metal connecting block should be removed and polished.

7 Test conditions

7.1 The test environment conditions shall comply with the provisions of GB/T 1446.

7.2 The testing equipment shall comply with the provisions of GB/T 1446, and there shall be a centering fine adjustment device such as a universal joint between the specimen and the testing machine.

7.3 For Type I specimens, the loading rate is

0.02 h/min (h is the specimen thickness in mm); for Type II and Type III specimens, the loading rate should be...

0.2 mm/min.

8 Test Procedure

8.1 Check the alignment of the specimen assembly or Type III specimen.

8.2 Condition the specimens and specimen assemblies according to the provisions of GB/T 1446.

8.3 On any cross-section of the Type I specimen or the circumference of the smallest cross-section of the Type II or Type III specimen, measure the straight line at three positions that are basically evenly divided by the circumference. The diameter is calculated as the arithmetic mean of three measurements, with the measurement accurate to

0.02 mm.

8.4 When loading the specimen assembly or Type III specimen into the testing machine fixture, the center line of the specimen should coincide with the force axis of the testing machine.

8.5 Apply a uniform, continuous load to the specimen assembly at the loading rate specified in

7.3 until failure. Record the maximum load and failure condition.

8.6 The validity of the test is specified as follows:

- a) No adhesion failure, partial adhesion failure, or cohesive failure of the adhesive layer was observed between the Type I specimen and the connecting metal block. Valid sample;
- b) For Type II and Type III specimens, specimens that fail within 1/3 of the center range of the necked section (necked section dimension) are considered valid specimens;
- c) If there are fewer than 5 valid samples in the same batch, samples should be prepared and tested again.