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

GB/T 6011-2026

Replacing GB/T 6011-2005

**Test method for the flammability characteristics of fibre
reinforced plastics - Incandescent rod method**

纤维增强塑料燃烧性能试验方法 炽热棒法

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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 6011-2005 "Test Methods for Burning Performance of Fiber Reinforced Plastics - Incandescent Rod Method", and is consistent with GB/T 6011- Compared to.2005, aside from structural adjustments and editorial changes, the main technical changes are as follows:

- a) A schematic diagram of the sample has been added (see 6.1);
- b) Added requirements for sample preparation and specimen scribing (see 6.3);
- c) The meaning of L0 has been changed (see 7.1, 6.1 in the.2005 edition);
- d) Requirements for terminating the test under different circumstances have been added (see 7.5);
- e) The presentation of experimental results has been changed (see Chapter 9, Chapter 8 in the.2005 edition);
- f) The wording of the test report has been changed (see Chapter 10, Chapter 9 of 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) and China Classification Society Wuhan Branch. Branch offices, Tastetech

(Suzhou) Testing Instruments Technology Co., Ltd., and Beijing Fiberglass Research and Design Institute Co., Ltd. The main drafters of this document are. Wei Xuan, Hu Changfei, Wang Fangling, Hu Hongwei, Wang Dianfeng, Wang Zhandong, Ji Bing, Li Xiang, Zhao Yongxing, and Fan Yuting. Zhang Xiaomei. This document was first published in 1985, revised for the first time in 2005, and this is the second revision. Test methods for the combustion performance of fiber-reinforced plastics Incandescent rod method

1.Scope This document specifies the principle, test equipment and instruments, test specimens, test procedures, and calculation methods for determining the flammability of fiber-reinforced plastics using the incandescent rod method. Calculations, test results, and test reports. This document applies to evaluating the flammability of fiber-reinforced plastics under the conditions specified in this document, but not to evaluating them under actual use conditions. The fire hazard.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 1446 General Rules for Test Methods of Properties of Fiber Reinforced Plastics

3.Terms and Definitions This document does not contain any terms or definitions that need to be defined.

4.Principles The sample is brought into contact with a hot rod at a constant temperature with a specified contact force. After a specified contact time, the combustion time of the sample is measured. Changes in interval, ablation length, and mass.

5 Test equipment and instruments

5.1 Ventilation System The test should be conducted in a ventilated system with an observation window.

5.2 Hot Rod Testing Apparatus

5.2.1 Equipment Structure The incandescent rod testing apparatus includes key components such as sample clamps, incandescent rods, insulating supports, counterweights, locking screws, and positioning rods, as well as other auxiliary components. The component and its structural diagram are shown in Figure 1.

5.2.2 Sample holder It is mounted on a vertical, movable column to secure the sample.

5.2.3 Heating Rod Made of silicon carbide, it has a diameter of 8mm and an effective length

of 100mm. The incandescent rod can be heated by AC or DC electricity to stabilize it at a certain temperature. $(955\pm 10)^{\circ}\text{C}$. This temperature can be calibrated using silver foil with a purity of 99.8% and a thickness of

0.06 mm (melting point 955°C).

5.2.4 Insulating support Made of ceramic, asbestos, or other heat-resistant insulating materials, this bracket is used to hold the incandescent rod. It is mounted on a base plate and can be fixed around two... The horizontal shaft on the bearing rotates so that the hot rod can leave or contact the sample.

5.2.5 Counterweight and locking screw The counterweight should provide approximately 0.3 N of contact force between the incandescent rod and the end face of the specimen. The locking screw and washer ensure the incandescent rod remains stationary during the test. The process stopped after 5mm of the sample was burned away.

5.2.6 Positioning rod A metal rod with a diameter of 8 mm. Used to adjust the sample position before the test, replacing the incandescent rod.

5.3 Timer Measurement accuracy is 0.1s.

5.4 Vernier calipers Measurement accuracy. 0.01mm.

5.5 Analytical Balance Measurement accuracy.

0.1 mg.

6 Samples

6.1 Dimensions The sample has a length of (120 ± 0.5) mm, a width of (10 ± 0.2) mm, and a thickness of (4 ± 0.5) mm. A schematic diagram of the sample is shown in Figure 2.

Note. Tests can also be conducted on samples with a thickness of 2mm to 10mm, but the test results can only be compared under the same thickness.

6.2 Preparation It should comply with the provisions of GB/T 1446.

6.3 Quantity and Appearance Inspection Ten samples were prepared. When making the sample plate, surface A and surface B were marked on both sides, and then it was cut into standard samples, each sample consisting of [number missing]. The surface numbering of the sample should correspond to surface A and surface B. Visual inspection should conform to the requirements of GB/T 1446. Each sample should be inspected at a distance from... A thin line perpendicular to the long side is drawn at 95mm from the end to be burned, which facilitates the determination of the measurement position.

6.4 State Adjustment According to GB/T 1446.

7 Experimental Procedure

7.1 Before the test, measure the length (L0) from the mark to the burned end, accurate to 0.01 mm, and weigh the original mass of the sample (M0). The dosage is confirmed to be 0.1 mg.

7.2 Clean the contaminants from the hot rod before the test. Of the 10 samples, take 5 samples with surface A facing upwards, as Group A; the other 5 samples... Sample B, with its surface facing upwards, is designated as Group B. Tilt the support and incandescent rod downwards, rotating the positioning rod to the position where the incandescent rod was during the test. Place the sample... The specimen is horizontally fixed in the specimen holder. The specimen holder and column are adjusted so that the long axis of the specimen is perpendicular to the positioning bar, and the center line of the specimen end face is aligned with the positioning bar. Make contact, and then the positioning bar rotates back to its original position.

7.3 The ventilation system should be shut off during the test, and air convection is not allowed.

7.4 Heat the incandescent rod to maintain a constant temperature of $(955 \pm 10)^\circ\text{C}$. Rotate the insulating support to bring the incandescent rod into contact with the sample, and start the timer. If a visible flame appears, use another timer to measure the burning time (t) from the first appearance of the flame to the termination of the test, accurate to 1 second. The time is from the appearance of the flame to the flame being extinguished or the flame reaching the 95mm mark.

7.5 Test Termination.

a) If no visible flame is observed, remove the hot rod after 3 minutes and terminate the test 30 seconds after the hot rod is removed;

b) If a visible flame is present, but extinguishes itself within 3 minutes and does not reach the 95mm mark, the incandescent rod still needs to be... Remove the hot rod after 3 minutes, and terminate the test 30 seconds after removing the hot rod.

c) If a visible flame remains and has not extinguished after 3 minutes, remove the hot rod. The flame should extinguish itself within 30 seconds after the hot rod is removed. If the flame goes out and the 95mm mark is not reached, terminate the test 30 seconds after the hot rod is removed.

d) If a visible flame remains and has not extinguished after 3 minutes, remove the hot rod. If the flame is still not extinguished 30 seconds after the hot rod is removed... If the flame is extinguished and the 95mm mark is not reached, the test will be terminated and the flame extinguished 30 seconds after the hot rod is removed.