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

GB/T 3003-2017

Replacing GB/T 3003-2006

Refractory fibres and their products

耐火纤维及制品

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1 Scope

China's national standard for refractory fibres and the products made from them. It specifies the terms and definitions, the classification, grading and identification, the technical requirements, the test methods, the quality assessment procedures and the packaging, marking, transport, storage and quality certificate, and it applies to refractory bulk fibre, felts, blankets, modules, boards and rigid shapes, papers and textiles. Refractory fibre insulation changed how furnaces are built. A traditional lining is brick: heavy, slow to heat, and storing an enormous amount of heat that is lost every time the furnace cools. A fibre lining weighs a fraction of it, has a very low thermal conductivity, and stores almost no heat - so a furnace lined with fibre reaches temperature far faster, uses far less fuel on a cyclic duty, and can be built on a lighter structure. For any furnace that is heated and cooled rather than run continuously, the saving is decisive. The material also has a health history that shapes its standards. Refractory ceramic fibre is respirable, biopersistent in the lung, and classified as a suspected carcinogen, and that has driven the development of alkaline earth silicate fibres that dissolve in lung fluid within days rather than persisting - which is why this standard carries a normative annex giving the method for determining the solubility of alkaline earth silicate fibre in simulated lung fluid. The other normative annexes are the specimen preparation for the permanent linear change on heating of bulk fibre, which is the property that determines whether a lining shrinks away from itself in service, and the determination of mass per unit length of twisted rope. Issued on 7 September 2017 and in force since 1 August 2018, it replaces GB/T 3003-2006.

This Standard specifies the terms and definitions, classification, grading, identification, technical requirements, test methods, quality assessment procedures, packaging, markings, transportation, storage and quality certificate of refractory fibers and products.

This Standard is applicable to refractory bulk fibers, fiber felts, blankets, modules, boards and rigid products and shapes, papers and textiles, etc.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 2828.1 Sampling Procedures for Inspection by Attribute - Part 1: Sampling Schemes Indexed by Acceptance Quality Limit (AQL) for Lot-by-lot Inspection

GB/T 3007 Refractory Products - Determination of Moisture Content

GB/T 3923.1 Textiles - Tensile Properties of Fabrics - Part 1: Determination of Maximum Force and Elongation at Maximum Force Using the Strip Method

GB/T 4984 Chemical Analysis of Refractories Containing Zirconia

GB/T 5069 Chemical Analysis of Magnesia-alumina Refractories

GB/T 6900 Chemical Analysis of Alumina-silica Refractories

GB/T 7689.3 Reinforcements - Test Method for Woven Fabrics - Part 3: Determination of Width and Length

GB/T 9914.3 The Method for Reinforcement Products - Part 3: Determination of Mass Per Unit Area

GB/T 11835 Rock Wool, Slag Wool and Its Products for Thermal Insulation

GB/T 17911 Methods of Test for Refractory Fiber Products

GB/T 18930 Terminology for Refractories

GB/T 21114 Refractories - Chemical Analysis by X-ray Fluorescence (XRF) - Fused Cast-bead Method FZ/T 65002 Test Methods for Physical and Mechanical Properties of Ropes and Belts for Special Industries YB/T 4130 Refractory Materials - Determination of Thermal Conductivity (calorimeter)

3 Terms and Definitions

What is defined in GB/T 18930, and the following terms and definitions are applicable to this Standard.

3.1 Refractory Fiber Refractory fiber refers to a man-made mineral fiber whose service temperature is above 800 °C, and mainly includes alkaline earth silicate fiber (AEF), aluminosilicate fiber (ASF) and polycrystalline fiber (PCF).

3.2 Alkaline Earth Silicate Fiber Alkaline earth silicate fiber refers to a bio-soluble amorphous fiber, which is prepared by the high-temperature melting method and has the main chemical components of alkaline earth metal oxides (calcium oxide and magnesium oxide, etc.) and silicon dioxide.

3.3 Aluminosilicate Fiber Aluminosilicate fiber refers to an amorphous fiber, which is prepared by the high- temperature melting method and has the main chemical components of aluminum sesquioxide and silicon dioxide. It can be divided into two types: aluminosilicate fiber and zirconium-containing aluminosilicate fiber.

3.4 Polycrystalline Fiber Polycrystalline fiber refers to a microcrystalline fiber, which is prepared by the chemical sol-gel method, in which, the main crystal phase of the fiber is mullite or corundum.

3.5 Refractory Bulk Fiber Refractory bulk fiber refers to loose refractory fibers used before the preparation of the products.

3.6 Refractory Fiber Blanket Refractory fiber blanket refers to a soft refractory fiber product, which is usually formed by needle punching, does not contain binding agent, and has a certain size. measurement of the length and width of refractory fiber textiles shall be conducted in accordance with GB/T 7689.3; the length of the test sample shall be not less than 1 m; the length shall be accurate to 1 m and the width shall be accurate to 1 mm.

6.1.3 The thickness of refractory fiber module and rigid refractory fiber product and shapes shall be measured by a tape or steel ruler, accurate to 1 mm. The thickness or diameter (side length) of refractory fiber board, felt, blanket, paper and textiles shall be conducted in accordance with GB/T 17911.

6.2 Specimen Preparation of Physical and Chemical Inspection

6.2.1 The preparation of general specimens shall be conducted in accordance with GB/T 17911. The specimen preparation with special requirements shall be conducted in accordance with 6.2.2 ~ 6.2.6.

6.2.2 Adopt X-ray fluorescence spectrochemical analysis - molten cast glass sheet method to test the chemical composition. In accordance with the stipulations of GB/T 21114, prepare the specimens.

6.2.3 The preparation of specimens of refractory bulk fiber for the permanent linear change on heating shall be conducted in accordance with Appendix A.

6.2.4 In the determination of the thermal conductivity of refractory fiber module (thermal conductivity of the corresponding blanket), the metal parts shall be removed first. Then, in accordance with the structural form of the module, make the thickness of the specimen reach the maximum value allowed by YB/T 4130.

6.2.5 When it is impossible to prepare specimens of rigid refractory fiber product and

shapes that satisfy the test requirements, or when destructive sampling is not allowed, the same batch of raw materials may be used, in accordance with the same production process and formula, conduct the specimen preparation based on the requirements of the inspection items.

6.2.6 In the determination of the moisture content and organic content of refractory fiber textiles, the reinforced high-temperature stainless-steel wire or glass fiber yarn shall be extracted.

6.3 Physical and Chemical Inspection

6.3.1 The determination of ZrO_2 shall be conducted in accordance with GB/T 4984 or GB/T 21114.

6.3.2 The determination of SiO_2 , Al_2O_3 , Fe_2O_3 , K_2O and Na_2O shall be conducted in accordance with GB/T 6900 or GB/T 21114.

6.3.3 The determination of CaO and MgO shall be conducted in accordance with GB/T 5069 or GB/T 21114.

6.3.4 The determination of ignition loss shall be conducted in accordance with GB/T 6900.

6.3.5 The determination of solubility of alkaline earth silicate fiber shall be conducted in accordance with Appendix B.

6.3.6 The determination of moisture content shall be conducted in accordance with GB/T 3007.

6.3.7 The determination of thermal conductivity shall be conducted in accordance with YB/T 4130.

6.3.8 The determination of thickness, volume density, permanent linear change on heating, tensile strength, resilience and slag ball content shall be conducted in accordance with GB/T 17911.

6.3.9 The determination of organic content of refractory fiber paper and textiles shall be conducted in accordance with GB/T 11835.

6.3.10 The determination of breaking force of refractory fiber cloth shall be conducted in accordance with GB/T 3923.1.

6.3.11 The determination of breaking force of refractory fiber tape and refractory fiber twisted rope shall be conducted in accordance with FZ/T 65002.

6.3.12 The determination of mass per unit area shall be conducted in accordance with GB/T 9914.3.

6.3.13 The determination of mass per unit length shall be conducted in accordance with Appendix C.