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

GB/T 17911-2018

Replacing GB/T 17911-2006

Methods of test for refractory fibre products

耐火纤维制品试验方法

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009. This Standard replaces GB/T 17911-2006 "Refractory products - Methods of test for ceramic fibre products". Compared with GB/T 17911-2006, the main technical changes are as follows: - modified the standard's name; - added Clause 3; used GB/T 18930 as reference; deleted the definitions of resilience, thermal conductivity, tensile strength and slag content in other sub-clauses; - modified the provisions on dry sample in 6.3.2; - modified formula (3), consistent with international standard expression; - modified the unit of tensile strength as kPa, the units of sample thickness and width as mm; modified formula (7); - added negative pressure screening as test method for slag content; different sieve apertures can

be selected as needed for the determination of the content of the slag. This Standard uses redrafting method to modify and adopt ISO 10635.1999 "Refractory products - Methods of test for ceramic fibre products". Compared with ISO 10635.1999, this Standard has modifications on structure. Annex A shows the comparison list on sub-clause number between this Standard and ISO 10635.1999. There are technical differences between this Standard and ISO 10635.1999. The sub-clauses these differences involved have been marked with vertical line (|) at the outer margin. Annex B lists the technical differences between this Standard and ISO 10635.1999 as well as reasons. Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. The issuing authority shall not be held responsible for identifying any or all such patent rights. This Standard was proposed by and shall be under the jurisdiction of National Technical Committee on Refractory of Standardization Administration of China (SAC/TC 193). Methods of test for refractory fibre product

1 Scope

GB/T 17911 specifies the test methods for refractory fibre products: the ceramic fibre blanket, board, felt, paper and modules that line furnaces, kilns and heat treatment equipment. Refractory fibre is bought on a classification temperature and on a small number of physical properties, and those properties are what decide whether a lining lasts a campaign or falls off the wall. The standard covers the determination of the bulk density, the permanent linear change on heating, which is the property the classification temperature rests on, the thermal conductivity, the tensile strength, the compressive strength and recovery for the compressible products, the loss on ignition and the organic content, the shot content and the fibre diameter, the moisture, and the behaviour under thermal cycling, giving for each the apparatus, the specimen preparation, the procedure and the calculation. This is the clear-print edition. For a fibre producer, a furnace builder or a buyer verifying a delivery in China, this is the reference method.

This Standard specifies the test methods for thickness, bulk density, resilience, permanent line change, thermal conductivity, tensile strength and slag content of refractory fibre. This Standard is applicable to refractory fiber cotton, carpet, felt, woven, board, paper and preforms; not applicable to products delivered in a wet state.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 6003.1, Test sieves - Technical requirements and testing - Part 1. Test sieves of metal wire cloth (GB/T 6003.1-2012, ISO 3310-1.2000, MOD)

GB/T 8170, Rules of rounding off for numerical values & expression and judgement of limiting values

GB/T 18930, Terminology for refractories JJG 139, Tension, Compression and Universal Testing Machines

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 18930 apply.

4 Specimen preparation

The test items of the products shall be agreed by the relevant parties. The size and quantity of the specimen shall comply with the requirements of Table 1. Remove rolled material from the surrounding pressurized part. Then, make its length perpendicularly across the entire width and cut a sample of sufficient quantity for different test items. For non-rolled material, there shall be enough

5 Thickness measurement

5.1 Principle The thickness of the product is measured under specified compressive stress. The compressive stress is determined by the nominal bulk density of the product. There are two methods of measurement. the comparison method (see 5.3.1) and the acupuncture method (see 5.3.2). The comparison method is an arbitration method and is the only method for refractory fiber paper.

5.2 Specimen Prepare specimen according to Clause 4.

5.3.1 Comparison method

5.3.1.1 Equipment Thickness gauge consists of a reference plate and a comparator with a metal disc. The disc diameter is $75\text{mm} \pm 1\text{mm}$. The disc shall be capable of applying a compressive stress of $350\text{Pa} \pm 7\text{Pa}$ to a product having a nominal bulk density of $< 96\text{kg/m}^3$. For products with a nominal volume density of $\geq 96\text{kg/m}^3$, a compressive stress of $725\text{Pa} \pm 15\text{Pa}$ shall be applied.

5.3.1.2 Test steps Sweep the reference board clean. Place the disc on it. When the two are in full contact, the comparator reads zero. Smoothly lift the disc. Put the specimen on the reference board. Slowly put down the disc. Record the reading, to the nearest of 0.1mm.

5.3.2 Acupuncture

5.3.2.1 Equipment Needle type thickness gauge consists of a metal disc with a frame and a ruler with a needle, as shown in Figure 1. The ruler has marks. The diameter of the disc is $75\text{mm} \pm 1\text{mm}$. The diameter of the needle is $3\text{mm} \pm 0.2\text{mm}$. The disc shall be capable of

applying a compressive stress of $350\text{Pa} \pm 7\text{Pa}$ to a product having a nominal bulk density of $< 96\text{kg/m}^3$. For products with a nominal volume density of $\geq 96\text{kg/m}^3$, a compressive stress of $725\text{Pa} \pm 15\text{Pa}$ shall be applied.

5.3.2.2 Test steps Place the sample flat on the flat glass. Gently place the disc of the needle type. Keep the specimen at the specified temperature for a certain period of time. Indicate the change of the permanent line of the specimen in terms of the ratio of the difference between the original size and the heated size between the platinum wires inserted on the surface of the specimen to the original size.

8.2 Equipment

8.2.1 Heating furnace, shall be an oxidizing atmosphere and meet the relevant requirements of 8.4.3.

8.2.2 Measuring device, using optical instruments, such as a tool microscope with a graduation value of

0.01 mm; or a vernier caliper with an accuracy

0.05 mm.

8.2.3 Thermocouple, at least two.

8.3 Specimen

8.3.1 Prepare specimen according to Clause 4.

8.3.2 Dry specimen according to 6.3.2.

8.4 Test steps

8.4.1 Specimen preparation On the diagonal line of $100\text{mm} \times 100\text{mm}$ on the surface of each specimen, insert 4 platinum wires at the edge from 10mm ~ 15mm for marking. The spacing is about 75 mm. Platinum wire diameter is about

0.5 mm. The length shall be such that it can be inserted at least $\frac{3}{4}$ of the thickness of the specimen and has a protruding surface of 1 mm to 2 mm. NOTE. For plates and preforms, color markings (such as chromium oxide) can be used instead of platinum wire.

8.4.2 Measurement Measure the distance between the platinum wires parallel to the edge of the specimen. Measure with optical instruments, to the nearest of

0.05 mm, as an arbitration method. Measure with vernier caliper, to the nearest of

0.1 mm. The measurement method shall be indicated in the test report.

8.4.3 Heating