GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 81.080

Q 40

GB 18301-2012

Replacing GB/T 18301-2001

Refractory Products - Determination of Resistance to Abrasion at Ambient Temperature

耐火材料 常温耐磨性试验方法

(ISO 16282:2007, Dense Shaped Refractory Products - Determination of Resistance to Abrasion at Ambient Temperature, MOD)

Issued on: November 05, 2012 **Implemented on: May 01, 2013**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;

Standardization Administration of PRC.

Table of Contents

Refractory Products - Determination of Resistance to Abrasion at Ambient Temperature

1 Scope

This Standard specifies the terms and definitions, principles, equipment, specimens, test procedures, result calculations, equipment inspections and test reports, etc. for the resistance to abrasion test of refractories at ambient temperature.

This Standard is applicable to the determination of the resistance to abrasion of dense refractories at ambient temperature under abrasion and erosion environments.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 2480 Conventional Abrasive - Silicon Carbide

GB/T 2997 Test Method for Bulk Density, Apparent Porosity and True Porosity of Dense Shaped Refractory Products (GB/T 2997-2000, eqv ISO 5017:1998)

GB/T 8170 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

GB/T 9258.1 Coated Abrasives - Grain Size Analysis - Part 1: Grain Size Distribution Test

GB/T 9258.2 Coated Abrasives - Grain Size Analysis - Part 2: Determination of Grain Size Distribution of Macro-Grits P12 to P220

ISO 565 Test Sieves – Metal Wire Cloth, Perforated Metal Plate and Electroformed Sheet – Nominal Sizes of Openings

3 Terms and Definitions

For the purpose of this document, the following terms and definitions apply.

Ensure that there is a gap of 2mm between one end of the sand blasting pipe and the outlet end of the compressed air nozzle; and the abrasion medium enters the sand blasting pipe through this gap. This operation can be done by placing the glass tube on a brass rod with a diameter of 4.5mm, 117mm from the top, and with a 7.9mm lug. So that it allows the glass tube to be inserted into the steel tube and enter into the gun barrel until the top of the brass rod touches the air nozzle, thereby ensuring a 2mm gap between the glass tube port and the air nozzle.

A new glass tube must be replaced for each measurement.

5.2 Feeding system

It has the ability to supply 1000g of abrasion medium to the injection device within (450±15) s. The auxiliary air shall be able to carry abrasion medium into the system. A suitable feeding mechanism is shown in Figures 3 and 4, which consists of 3 funnels:

a) An upper (charging) funnel;

b) A middle (loading control) funnel with an orifice made of metal, glass or plastic installed on it to provide the required feeding rate;

c) A lower (feeding) funnel.

5.3 Test chamber (see Figure 3)

It consists of a sealed chamber with a door. The specimen may be placed and taken out through this door. The injection device is installed vertically on the top of the test chamber, so that the abrasion medium is sprayed down onto the specimen through (203 ± 1) mm from the top of the glass nozzle.

The test chamber shall be equipped with an exhaust pipe and a butterfly valve to adjust the pressure in the chamber during the test. A dust bag of appropriate volume may be installed at the tail of the exhaust pipe.

A pipe and shut-off valve shall be installed on the upper part of the chamber to connect the pressure gauge.

5.4 Liquid pressure gauge

Range: 0Pa~400Pa (41mm water column); it is used to measure the pressure in the test chamber during the test.

5.5 Vacuum gauge

Range: 0Pa~-0.1MPa (75mm mercury column); it is used to measure the pressure at the inlet of the abrasion medium of the injection device.

5.6 Balance

By using a regulator and a barometer with a division value of 7kPa, supply clean and dry air to the injection device under the specified pressure; and the regulator and pressure gauge shall be installed as close to the injection device as possible.

6 Specimen

6.1 General

The amount of test samples and the number of samples for each specimen shall be determined by the relevant parties through negotiation, and shall be indicated in the test report.

6.2 Shaped refractories

In addition to the most abrasion-resistant materials, other materials shall cut the specimen with a size of (100~114) mm × (100~114) mm × (25~65) mm from refractory bricks or finished products. A square surface of each specimen shall be a flat original brick surface with no marks on it (see NOTE 1 in Clause 7). The size of specimen for the material with good abrasion resistance may be 100mm×100mm×25mm. The specimen size shall be indicated in the test report.

6.3 Unshaped refractories

The specimen size mentioned above may be directly prepared by test materials. The preparation process including forming, processing and roasting temperature may be carried out in accordance with the relevant product technical requirements and standard specified methods, or by the relevant parties through consultation. A square surface of each specimen shall be the bottom surface of the mould (see NOTE 1 in Clause 7). The preparation conditions of the specimen and the size of the specimen shall be fully recorded in the test report.

7 Test Procedures

7.1 Before the test, dry the specimen to a constant weight at a temperature of (110 ± 5) °C.

7.2 Weigh the specimen, accurate to 0.1g. Measure the length, width, and height of the specimen by a vernier caliper (5.7), and accurate to 0.5mm; then calculate the volume of the specimen.

7.3 Align the test surface of the specimen vertically at the glass nozzle (see NOTE 2) in the test chamber; and place it at a position (203 ± 1) mm away from the end of the nozzle. For shaped refractory specimens, the original flat brick surface without marking shall be used for the test. For unshaped refractory specimens, the test surface shall

$$A = \left(\frac{m_1 - m_2}{\rho} \right) = \frac{m}{\rho} \qquad \text{.....(1)}$$

Where:

ρ – volume density, in g/cm^3;

m_1 – mass of the specimen before test, in g;

m_2 – mass of the specimen after test, in g;

m – loss mass of the specimen, in g.

8.3 The volume density and the amount of abrasion are accurate to 2 digits after the decimal point; and are rounded off according to GB/T 8170.

9 Inspection of the Equipment

Use 10mm~12mm thick colourless transparent float plate glass as the calibration sample; and the data deviation of the two repeated tests does not exceed 7% of the average value. When standard samples are available, use standard samples to check the accuracy of the equipment.

10 Test Report

The test report shall include the following contents:

a) Description of test materials, including manufacturer, model, batch number, etc.;

b) The implemented national standard, namely GB/T 18301-2012;

c) The name of the testing organization;

d) Specimen size;

e) The sample quantity and the number of specimens for each sample;

f) For unshaped specimens, including the conditions of specimen preparation, treatment and baking;

g) If it is different from the content specified in Clause 7, all information on the abrasion surface is required to be indicated;

h) If it is different from the content specified in Clause 7, the impact angle of the specimen placement is required to be indicated;

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------