

ICS 81.060.30

CCS Q 30



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

GB/T 1969-2026

Replacing GB/T 1969-1996

Test method for the permeability of porous ceramics

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Issued on: May 25, 2026

Implemented on: December 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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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 replaces GB/T 1969-1996 "Test Method for Permeability of Porous Ceramics". Compared with GB/T 1969-1996, except for structural adjustments... Aside from integration and editorial changes, the main technical changes are as follows:

- a) The definition of "penetration rate" has been changed (see 3.1, Chapter 2 of the.1996 edition);
- b) The formula for the principle has been modified (see Chapter 4, Chapter 3 of the.1996 edition);
- c) The gas supply system was modified (see 5.1, 4.1 of the.1996 edition);
- d) The range of the pressure reducing control valve was changed (see 5.1, 4.1 of the.1996 edition);
- e) The flow measurement device and its accuracy were changed (see 5.2, 4.2 of the.1996 edition);
- f) The test procedure was changed (see 7.5, 6.4 of the.1996 edition);
- g) The formula for calculating permeability has been changed (see 8.1, 7.1 in the.1996 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 Industrial Ceramics (SAC/TC194). This document was drafted by: Shandong Industrial Ceramics Research and Design Institute Co., Ltd., Sinoma Advanced Materials Co., Ltd., and Shandong University of Technology. Sanxiang New Materials Co., Ltd., Harbin Institute of Technology (Weihai), Shenzhen Jiahong Stomatological Medical Co., Ltd., Maipu New Materials Technology (Shandong) Co., Ltd. The main drafters of this document are. Zhao Shikai, Fan Dongjie, Ma Tengfei, Li Jie, Li Liang, Chu Xueji, Sun Haibin, Zhu Zehua, Zhang Xiaojiao, and Xia Long. Zhang Keke, Zhang Jiumei, Tang Yudong, Wang Zenghui, Wang Xuepeng, Zhang Yudi, Xu Chuanwei, Zhang Zhen, Liu Xuejiao, Wang Hanzhi, Bo Chuanjuan, Dou Ling, Pu Jiasi Yang Hao, Zhang Hao, Zhang Meng. This document was first published in 1996, and this is its first revision. Test method for permeability of porous ceramics

5 Experimental Apparatus

5.1 Gas supply device Use a gas cylinder with sufficient pressure for gas supply. When using a gas cylinder and pressure reducing valve (see Figure 1), the gas cylinder should have sufficient volume or a pressure-stabilized supply. The gas source and pressure reducing valve should be able to finely adjust the pressure. It is recommended to select a pressure reducing valve with an appropriate range according to the sample conditions.

5.2 Flow Measurement The flow sensor should have an accuracy of $\pm 0.5\%$ FS.

5.3 Pressure Measurement Use positive and negative pressure gauges, and make the pressure measurement point as close as possible to the sample surface.

5.4 Sample Fixture The sample fixture should ensure that the air-permeable surface of the sample is fully exposed during the test, and that the fluid can flow freely. The fixture is shown in Figures 2 and 3.

5.5 Connecting Pipes The connecting pipes of each part of the test apparatus should be as short as possible, with an inner diameter of at least 8 mm.

6 Samples

6.1 Sample Preparation Samples should be cut from actual components or prepared separately. For actual components smaller than the standard sample size or with complex structures, [further details are needed]. Prepare samples for use in the furnace.

6.2 Sample Size The diameter of cylindrical samples is

0.2 mm; the height of tubular samples is

0.2 mm, and their outer and inner diameters should ensure... It can seal well with the fixture. The flatness of the upper and lower surfaces of the sample should be less than

0.02 mm.

6.3 Sample Preparation The sample was dried in a drying oven at $110^{\circ}\text{C}\pm 5^{\circ}\text{C}$ until constant weight, and then cooled to room temperature in a desiccator. If the sample is contaminated, it should be removed using effective methods.

7 Experimental Procedure

7.1 Test Conditions The experiment was conducted at room temperature, with a temperature of $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and a relative humidity of no more than 70%.

7.2 Sample Size Measurement Use a vernier caliper or other measuring tool with an accuracy of

0.02 mm to measure the length and diameter of the sample.

7.3 Flatness Measurement Test according to the method specified in GB/T 11337.

7.4 Equipment airtightness test Insert a 36mm diameter, 10mm long metal disc or a 50mm high, appropriately sized metal tube into the sample holder and press... Turn on the air supply. At this time, the pressure gauge should display a certain pressure value, while the flow sensor reading should be

0. Otherwise, all parts should be checked again until no pressure is found. Leakage.

7.5 Pressure differential and flow rate values Load the sample into the sample holder; surfaces that do not require air permeability during the test should be strictly sealed. Gradually supply air by adjusting the pressure reducing valve until the pressure gauge displays... Once the differential pressure value is stable, read the flow rate value from the flow sensor. When the pressure is changed, read at least 3 sets of differential pressure-flow rate values. The permeability values of the same sample measured under different pressure differentials should not differ by more than 5%; otherwise, the instrument used should be inspected and the pressure differential reduced for retesting. test.

8 Results and Calculations

The permeability is calculated according to formula (2).

9 Test Report

The test report should include at least the following.

- a) Test item name and implementation standard number;
- b) The name and report number of the testing organization;
- c) Sample material type and batch;

- d) Sample name, type, dimensions, quantity, and serial number;
- e) Name and model of the test equipment;
- f) Test conditions (temperature, relative humidity);
- g) Results of penetration rate;
- h) Test personnel, test date, and other details.

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