

ICS 91.100.25
CCS Q 31



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

GB/T 3810.12-2016

Replacing GB/T 3810.12-2006

**Test methods of ceramic tiles -- Part 12: Determination of frost
resistance**

陶瓷砖试验方法 第12部分：抗冻性的测定

(English Translation)

Issued on: April 25, 2016

Implemented on: March 1, 2017

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China**

Table of Contents

- Foreword
- 1 Scope
- 2 Principle
- 3 Equipment and materials
- 4 Sample
 - 4.1 Samples
 - 4.2 Preparation of the sample
- 5 Soaked in water

Foreword

GB/T 3810 "ceramic tile test method" is divided into 16 parts.

- Part 1. Sampling and receiving conditions;
- Part 2. Inspection of dimensions and surface quality;
- Part 3. Determination of water absorption, apparent porosity, apparent relative density and bulk density;
- Part 4. Determination of fracture modulus and failure strength;
- Part 5. Determining the impact resistance of a brick with a recovery factor;
- Part 6. Determination of wear depth of unglazed tiles;
- Part 7. Determination of abrasion resistance of glazed tiles;
- Part 8. Determination of linear thermal expansion;
- Part 9. Determination of thermal shock resistance;
- Part 10. Determination of wet expansion;
- Part 11. Determination of glaze resistance of glazed tiles;
- Part 12. Determination of frost resistance;
- Part 13. Determination of resistance to chemical corrosion;
- Part 14. Determination of resistance to contamination;
- Part 15. Determination of lead and cadmium elution of glazed tiles;

- Part 16. Determination of small chromatic aberration.

This part is part 12 of GB/T 3810.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 3810.12-2006 "Test methods for ceramic tiles Part 12. Determination of frost resistance". This part with GB/T 3810.12-2006 compared to the main changes are as follows.

- the formula for calculating the initial water absorption rate E1 (see 5.2, version 5.2 of 5.2);
- modified the temperature requirements (see Chapter 6, Chapter 6 of the 2006 edition);
- modified the final water absorption formula for E2 (see Chapter 6, Chapter 6 of the 2006 edition).

This part uses the translation method equivalent to ISO 10545-12:1995 "Ceramic tiles Part 12. Determination of frost resistance" (English version).

This section makes the following editorial changes.

a) Standard name modified to "Ceramic tile test method Part 12. Determination of frost resistance".

b) Incorporated the contents of the Technical Corrigendum ISO 10545-12:1995/Cor.1:1997 published in 1997, with "less than 0.01%" in 4.2 (60 ± 2.6) kPa "with" (40 ± 2.6) kPa "in 5.1" (see 4.2, 5.1).

This section is proposed by the China Building Materials Federation.

This part of the National Building Sanitary Ceramics Standardization Technical Committee (SAC/TC249) centralized.

This part of the drafting unit. Xianyang Ceramic Research and Design Institute, Hangzhou Nobel Group Co., Ltd., Guangdong Mona Lisa New Materials Group Ltd., Guangdong Dongpeng Holding Co., Ltd., National Building Sanitary Ceramics Quality Supervision and Inspection Center, Ministry of Industry and Information Technology Laboratory of quality control technology for ceramic and sanitary products.

1 Scope

This part of GB/T 3810 specifies the test method for all frost resistance of ceramic tiles used in immersion and freezing conditions.

2 Principle

After the ceramic tile is saturated with water, it is circulated between 5 ° C and -5 ° C. The surfaces of the bricks should be subjected to at least 100 freeze-thaw cycles.

3 Equipment and materials

3.1

Drying box. can work at a temperature of $(110 \pm 5) ^\circ\text{C}$; can also be used to obtain the same test results of microwave, infrared or other dry system.

3.2

Balance. Accurate to 0.01% of sample mass.

3.3

Vacuum device, vacuum after the injection of water to make the water saturation of the device. vacuum pump vacuum can make the device pressure to $(60 \pm 4) \text{ kPa}$.

3.4

Freezer. can freeze at least 10 bricks, the minimum area of 0.25m^2 , and make the brick do not contact each other.

3.5

suede.

3.6

Water. The temperature is maintained at $(20 \pm 5) ^\circ\text{C}$.

3.7

thermocouple or other suitable temperature measurement device.

4.1 Samples

The use of not less than 10 pieces of the whole brick, and its minimum area of 0.25m^2 , for large size of the brick, in order to be able to load the refrigerator, Cutting, the sample should be as large as possible. Brick should be no cracks, glaze cracks, pinholes, bumps and other defects. If you have to check with defective bricks in practice, permanent defects were applied before the test, and the defects were checked after the test.

4.2 Preparation of the sample

The bricks were dried in a $(110 \pm 5) ^\circ\text{C}$ oven (3.1) to constant weight, ie, the difference between two consecutive weighings per hour was less than 0.1%. recording the quality of each dry brick (m_1).

5 Soaked in water

5.1

After the brick is cooled to ambient temperature, the brick is placed vertically in the vacuuming device (3.3) so that the brick and the brick and the brick do not come into contact with the inner wall of the device.