

ICS 91.100.10

CCS Q11



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

GB/T 8074-2008

Testing method for specific surface of cement - Blaine method

水泥比表面积测定方法 勃氏法

Issued on: January 9, 2008

Implemented on: August 1, 2008

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine;
Standardization Administration of the PRC**

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Foreword

This Standard is revised by reference to ASTM C204 "Standard Test Methods for Fineness of Hydraulic Cement by Air-permeability Apparatus", JIS R5201 "Physical Testing Methods for Cement", and EN 196-6 "Methods of Testing Cement - Determination of Fineness". This Standard replaces GB/T 8074-1987 "Method of Determination for Specific Surface of Cement - Blaine Method". Compared with GB/T 8074-1987, the main changes in this Standard are as follows: - added GB/T 208 "Standard Test Method for Cement Density" in Normative References (Chapter 2 in this edition); - added GB/T 1914 "Chemical Analytical Filter Paper" in Normative References (Chapter 2 in this edition); - added GB 12573 "Test Method for Sampling of Cement" in Normative References (Chapter 2 in this edition); - added automatic specific surface area analyzer on the basis of original Blaine Method specific surface area analyzer (Article

5.1 in this edition); - specified the area ratio of PI and PII cement 0.500, and the one of other cements 0.530 (Article

5.2 in Edition 1987, Article

7.3 in this edition); - specified that a 2000g balance weight is used to press the temp when changing the area ratio (Article

7.3 in this edition); - deleted Table 3 in Appendix A in the previous edition. Appendix A and Appendix B in this Standard are informative. This Standard was proposed by the China Building Materials Federation. This Standard is under the jurisdiction of the National Technical Committee on Cements of Standardization Administration of China (SAC/TC

184). Main drafting organization of this Standard. China Building Materials Academy The drafting organizations of this Standard. Wuxi Jianyi Instrument & Machinery Co., Ltd., Shaoxing Kente Mechanical & Electrical Co., Ltd., Hebei Kexi Instrument & Equipment Co., Ltd. The coordinating organizations of this Standard. Lafarge (Beijing) Cement Co., Ltd., Shandong Huayin Special Cement Co., Ltd., Physicochemical Testing institute of China Cement Development Center, Benxi Cement Plant, Xidong Cement Limited Company, Fushun Cement Limited Company, Building Material Quality Detection Center of the Zhejiang Building Material Technology Co., Ltd., Huizhou Building Materials Quality Supervision Testing Station, National Building Engineering Quality Supervision and Testing Center Main drafters of this Standard. Chen Ping, Yan Bilan, Song Lichun, Zhang Xuecui, Li Diaohai, Wang Wenru. The standard replaced by this Standard is. - GB/T 8074-1987. Testing method for specific surface of cement - Blaine method

1 Scope

China's national method for determining the specific surface area of cement by the Blaine air permeability apparatus. Cement's fineness is the property that most directly controls how it behaves: hydration happens at the surface of the particles, so a finer cement reacts faster, develops early strength sooner and generates its heat more quickly - which is what a contractor wants in cold weather and precisely what he must avoid in a large pour, where the heat cannot escape and cracks the concrete as it cools. Grinding finer also costs a great deal of electricity, so the number is a direct production cost too. The Blaine method measures it indirectly and elegantly: air is drawn through a compacted bed of the powder, and the time it takes is a function of the total surface the air must pass. The standard specifies determination with the Blaine apparatus for cements and other powders with specific surface between 2000 and 6000 cm²/g, and does not apply to cellular or ultrafine powders.

This Standard specifies the method of determination for cement fineness with Blaine air permeability apparatus. This Standard is applicable to the determination of specific surface area of cements and other powdery materials that this Standard applies whose specific surface is 2000 cm²/g~ 6000 cm²/g, and it is not applicable to the determination for cellular or micro-powdery material.

2 Normative references

The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. At the time of publication, the editions indicated are valid. All standards are subject to revision. The parties who are using this Standard shall explore the possibility of using the latest version of the following standards.

GB/T 208, Standard Test Method for Cement Density

GB/T 1914, Chemical Analytical Filter Paper

GB 12573, Test Method for Sampling of Cement GSB 14-1511, Standard Samples for Determination of Cement Fineness and Specific Surface JC/T 956, Apparatus for Blaine method

3 Principle

This method is to test specific surface area of cement based on the theory that the resistance of a specific amount of air, passing through the cement layer with specific area ratio and set thickness, results in the variance in flow rate. In a cement layer with a specific area ratio, the size and quantity of cavity is the function of particle size, and also decides the flow rate of the air through the material layer.

4 Terms and definitions

For the purposes of this Standard, the following definitions and terms apply.

4.1 Specific surface (cement) Total surface area of cement powder in unit mass, expressed in (cm²/g) or (m²/kg).

4.2 Area ratio Ratio of the volume of the cavity among the particles in the sample material layer to the total volume of the sample material layer, expressed by (epsilon).

5 Testing equipment and conditions

5.1 Air permeability apparatus In this method, Blaine specific surface air permeability apparatus adopted, coming with two types - manual and automatic, shall meet the requirements of JC/T 956.

5.2 Drying box Temperature control sensitivity. $\pm 1^{\circ}\text{C}$

5.3 Analytic balance Division value.

0.001 g

5.4 Second Counter Accurate to 0.5s.

5.5 Cement sample In accordance with the requirements of GB 12573, firstly sieve the cement sample with a

0.9 mm square-mesh sieve, dry it at $110^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 1h, and cool it in a desiccator to the ambient temperature.

5.6 Reference material GSB 14-1511 reference material or ones with same level; where there is dispute about it, the one specified by GSB 14-1511 shall apply.

5.7 Pressure gauge liquid Colored distilled water or colorless distilled water.

5.8 Filter paper Intermediate speed ash-free filter specified in GB/T 1914.

5.9 Hydrargyrum Hydrargyrum (analytically pure)

5.10 Conditions of laboratory Relative humidity. not higher than 50%. Figure 1 -- U-shaped pressure gauge for specific surface determination

6 Instrument calibration

6.1 The reference material specified in GSB 14-1511 or ones with same mm Temp U shaped pressure gauge 19/38 standard female cone, solidly connected with cylinder bottom Valve The height makes the material layer thickness $15.0 \pm$

0.5 The clearance between the temp and the cylinder is less than

0.1 Permeability cylinder caves Filter paper Perforated plate 19/38 standard male cone is connected closely with the top of the pressure gauge level shall be used for instrument calibration. Where there is dispute about it, the former shall apply.

6.2 The calibration for instruments shall comply with the requirements of JC/T 956.

6.3 Calibration cycle The calibration shall be conducted at least once yearly; where instruments and equipment are used frequently, they shall be calibrated one every half a year; the instruments after being repaired, shall be re-calibrated.

7 Operating procedures

7.1 Determination of cement density The cement density determination shall comply with the requirements of GB/T 208.

7.2 Air leak detection Chock the upper opening of the permeability cylinder with a rubber stopper, and connect the permeability cylinder to the pressure gauge; with the exhauster, drawn part of air out from a limb of the pressure gauge, close the valve, and observe the air-leak condition. In case of air leak, seal the air-leak position with piston oil.

7.3 Determination of area ratio (epsilon) The area ratio of PI and PII cement shall be 0.500, and the one of other cements or fine materials shall be 0.530 ± 0.005 . Where the test sample cannot be pressed to the position required in Article

7.5 by the above area ratio, the area ratio may be allowable to change. The adjustment of the area ratio shall be subject to that the test sample is compacted (pressed) with a 2000 g balance weight (Level 5 balance weight) to the position specified in Article 7.5.

7.4 Determining the sample required amount The amount of the sample required is calculated according to formula (1). where, m - Amount of the sample required, (g); ρ - Density of sample, g/cm³; V - Volume of sample material layer, tested according to the requirements of JC/T 956, and expressed in (cm³); Epsilon - Area ratio of sample material