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

GB/T 6609.24-2026

Replacing GB/T 6609.24-2004

**Chemical analysis and physical property determination
methods for alumina - Part 24: Measurement of the angle of
repose and the angle of flow**

氧化铝化学分析方法和物理性能测定方法 第24部分：安息角及流动角的测定

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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 is Part 24 of GB/T 6609, "Chemical Analysis Methods and Physical Property Determination Methods for Alumina". GB/T 6609 has been... The following sections were published.

1. Determination of Trace Element Content by Inductively Coupled Plasma Atomic Emission Spectrometry;

2. Determination of mass loss at 300°C and 1000°C;

---Determination of silica content by molybdenum blue spectrophotometry;

---Determination of ferric oxide content by o-phenanthroline spectrophotometry;

5. Determination of sodium oxide and potassium oxide content;

7. Determination of the content of titanium dioxide, chromium trioxide, copper oxide, fluorine, chlorine, boron trioxide, phosphorus pentoxide, and sulfate. Fixed-point spectrophotometry;

---Determination of vanadium pentoxide content by benzoylphenylhydroxylamine extraction spectrophotometry;

11. Determination of Manganese Monoxide and Magnesium Oxide Content by Flame Atomic Absorption Spectrometry;

12. Determination of Zinc Oxide Content by Flame Atomic Absorption Spectrometry;

- 13.Determination of Calcium Oxide Content by Flame Atomic Absorption Spectrometry;
 19.Determination of Lithium Oxide Content by Flame Atomic Absorption Spectrometry;
 ---Determination of gallium trioxide content by butylrhodamine B spectrophotometry;

5 Instruments and Equipment

5.1 Stainless steel funnel. inner diameter is 74mm, inner diameter of discharge port is 6mm, and a sieve with a 1mm aperture is installed between the two baffles.

5.2 Base plate. Made of steel (or corrosion-resistant materials such as marble), minimum dimensions. length 270mm, width.200mm, thickness [not specified]. 18mm. Four straight lines at 45° angles to each other are engraved on the polished, electroplated base surface. A locating pin is located below the center of the stainless steel funnel. The base plate has adjustable leveling feet.

5.3 Funnel Holder. Made of stainless steel, its structure should be robust. The centerline of the funnel is perpendicular to the center locating pin.

5.4 Height gauge. A polished cylinder made of stainless steel, 40mm high, with a locating pin at the bottom to engage with the base plate. Groove.

5.5 Flat-bottomed container. inner diameter $72.5\text{mm} \pm 0.1\text{mm}$, inner height $72.5\text{mm} \pm 0.1\text{mm}$, and vent diameter $4\text{mm} \pm 0.1\text{mm}$. The thickness of the leak's wall and root is $4.5\text{mm} \pm 0.1\text{mm}$, and the theoretical volume of the container is 300mL. The inner wall of the container is smooth, and the surface is flat. It reaches the level of machining and does not stick to the sample.

5.6 Balance. Scale division value is 0.1g.

6 Samples

Sampling shall be carried out in accordance with the provisions of Chapter 6 of GB/T 6609.22-2026, and sample preparation shall be carried out in accordance with Section

7.3 of GB/T 6609.22-2026. The regulations shall be followed.

7 Determination of the Angle of Repose

7.1 Parallel Tests Perform two parallel experiments and take the average value.

7.2 Test Procedure

7.2.1 Using a level, adjust the feet on the base plate (5.2) to make the device horizontal.

7.2.2 Use the height gauge (5.4) to adjust the discharge port of the stainless steel funnel (5.1) to contact the plane of the height gauge (5.4), and fix the funnel at this position.

Secure the stainless steel funnel (5.1) to the device (5.3) and remove the height gauge (5.4).

7.2.3 Add the sample (Chapter 6) to the center of the stainless steel funnel from a height of approximately 40 mm from the top (5.1). Control the feeding speed. The feed rate should be 20g/min to 60g/min, and should be uniform and continuous. If the screen becomes clogged, it can be gently swept with a soft brush; care should be taken not to vibrate the testing apparatus. Stop adding the sample when the top of the sample cone reaches the lower outlet of the stainless steel funnel (5.1).

7.2.4 Measure the four marked diameters in the radial direction.

8.1 Test Procedure

8.1.1 Weigh the sample cup to an accuracy of 0.1g, and record it as m_0 .

8.1.2 The test site should be free from airflow and vibration interference, and the instruments and equipment should be level and stable.

8.1.3 Plug the leak in the flat-bottomed container (5.5), and add the sample (6) into the horizontally positioned flat-bottomed container. The testing apparatus should not be vibrated. Control the feeding. The feeding speed should be 20g/min to 60g/min, and the feeding should be uniform and continuous until the sample overflows. Use a ruler to wipe away any excess sample from the top of the flat-bottomed container.

8.1.4 Place the sample cup under the flat-bottomed container, remove the drain plug, and allow the test sample to flow down.

8.1.5 After the flow stops, plug the leak in the flat-bottomed container and carefully remove the sample cup. Weigh the sample cup and the mass of the sample it contains, and record the mass. Record the mass (m_1), accurate to 0.1g.

8.1.6 Add the remaining sample from the flat-bottomed container to the sample cup. Weigh the sample cup and all samples, and record the mass (m^2), accurate to the nearest millimeter. 0.1g.

9 Precision

9.1 Repeatability (r) The absolute difference between two independent test results obtained under repeatability conditions, within the measurement range. The value should not exceed 1° , and cases exceeding 1° should not exceed 5%; the absolute difference between two flow angle test results should not exceed 1.5° , and cases exceeding 1.5° should not exceed 5%. More than 5%.

9.2 Reproducibility (R) The absolute difference between two independent test results obtained under reproducibility conditions, within the measurement range. The value should

not exceed 2° , and cases exceeding 2° should not exceed 5%; the absolute difference between two flow angle test results should not exceed 3.0° , and cases exceeding 3.0° should not be... More than 5%.

10 Test Report The test report should include the following items.

- a) Test subjects;
- b) Measurement items;
- c) This document number;
- d) Analytical results and their representation;
- e) Differences from basic experimental procedures;
- f) Observed anomalies;