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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 20209-2026

Replacing GB/T 20209-2006

Fireworks - Aluminium-magnesium alloy powder

烟花爆竹 铝镁合金粉

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1 Scope

GB/T 20209-2026 is the Chinese national standard covering the aluminium-magnesium powder that gives fireworks their brilliance - with the particle size, the active metal content and the moisture and storage requirements, because a damp alloy powder generates hydrogen and heat on its own. It replaces GB/T 20209-2006 and has been in force since 1 June 2026, with the aluminium powder standard GB/T 20210-2026. It was issued on 27 February 2026 and has been in force since 1 June 2026, replacing GB/T 20209-2006. The document is under the responsibility of the China National Light Industry Council. This page is published from the official record of the 2026 edition; the clause text of a standard this

recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the technical requirements, inspection rules, marking, packaging, transportation, and storage of aluminum-magnesium alloys used in fireworks and firecrackers, and describes the corresponding... Test methods. This document applies to aluminum-magnesium alloys used in fireworks and firecrackers.

4 Technical Requirements

4.1 Appearance requirements for aluminum-magnesium alloy powder. It should be silver-gray and free of foreign inclusions.

4.2 The particle size of aluminum-magnesium alloy powder should be marked, and the particle size should be uniform. The minimum particle size of aluminum-magnesium alloy powder should not be less than 550 mesh.

4.3 Scintillator products such as aluminum-magnesium alloy powder can have varying particle sizes; the content on a 120-mesh sieve should be less than or equal to 10%; the content under a 220-mesh sieve should be less than or equal to... It equals 10%.

4.4 For products with a minimum mesh size, the amount of material passing through the sieve is less than or equal to 10%, and for products with a maximum mesh size, the amount of material passing through the sieve is less than or equal to 5%.

4.5 The chemical composition of aluminum-magnesium alloy powder shall conform to the provisions of Table 1.

4.6 Alloy specifically for Kyoko. Al(52±3)%, Mg(48±3)%; Alloy for White Flash. Al(50±3)%, Mg(50±3)%, others Implement according to the highest-level requirements.

5 Test methods

5.1 Appearance Visual inspection.

5.2.1 Sieving Method (Arbitration Method)

5.2.1.1 Method Principle A certain amount of sample is placed on a standard sieve and, with the aid of vibration, passes through a standard sieve with a certain mesh size. The amount of material remaining on (below) the sieve is then weighed. The amount of material on (or below) the sieve of that mesh size is used to calculate the content of the material.

5.2.1.2 Equipment and Instruments 5.2.1.2.1 Test sieves. Test sieves shall conform to the requirements of GB/T 6003.1.The sieve frame size is phi200mmx50mm, and the test sieve assembly... The screen aperture range is 24μm (550 mesh) and above. 5.2.1.2.2 Vibrating sieve. An eccentric vibrating sieve vibrating machine (i.e., during the sieve vibrating

process, the test sieve can be made to rock in a circular motion and vibrate up and down). (Shaking) The frequency is 290 times/min, and the vibration is 145 times. 5.2.1.2.3 Antistatic soft brush. 5.2.1.2.4 Electronic balance. accuracy 0.0001g. 5.2.1.2.5 Stopwatch. Accuracy is 0.01s.

5.2.1.3 Determination Procedure (Method 1 - Mechanical Sieving Method) 5.2.1.3.1 Select the appropriate test sieve group based on the technical conditions of aluminum-magnesium alloy powder. 5.2.1.3.2 Stir the sample thoroughly and weigh 10.00g of the sample, accurate to 0.0001g. 5.2.1.3.3 Place the sample on the upper sieve, cover it with the pressure cap, and fasten the test sieve group to the vibrating sieve machine. Vibrate for 10 minutes. 5.2.1.3.4 Remove the test sieve group and weigh the aluminum-magnesium alloy powder of the material on the upper sieve and the material under the lower sieve.

5.2.1.4 Determination Procedure (Method 2 - Manual Sieving Method) 5.2.1.4.1 Select the appropriate test sieve group based on the technical conditions of aluminum-magnesium alloy powder. 5.2.1.4.2 Stir the sample thoroughly and weigh 10.00g of the sample, accurate to 0.0001g. 5.2.1.4.3 Place the sample on the upper sieve and gently brush and manually sieve the sample with a clean soft brush. 5.2.1.4.4 After the samples on the upper sieve are sieved, the samples on the lower sieve are manually sieved according to 5.2.1.4.3. 5.2.1.4.5 Remove the test sieve group and weigh the aluminum-magnesium alloy powder of the material on the upper sieve and the material under the lower sieve.

5.2.1.5 Calculation of Measurement Results 5.2.1.5.1 Calculate the mass fraction of aluminum-magnesium alloy powder on the upper sieve according to formula (1). 5.2.1.5.2 Calculate the mass fraction of aluminum-magnesium alloy powder in the undersize material according to formula (2).

5.2.2 Laser Diffraction Method

5.2.2.1 Method Principle When a laser beam irradiates metal powder particles dispersed in a liquid medium, scattering occurs, and particles of different sizes produce unique scattering effects. Characterizing the scattering pattern. The instrument receives scattered light signals through detectors distributed at different angles, and then uses optical theory and mathematical models to analyze these scattered light signals. The optical signal is used to deduce the particle size distribution of the powder sample based on volume.

5.2.2.2 Equipment and Instruments 5.2.2.2.1 Laser Particle Size Analyzer. Suitable for particle size determination of micron-sized samples, equipped with solvent-based or micro-sample cell injection system, providing accurate particle size measurement. The deviation should not be less than 0.5% (D50 deviation of national or international standard). 5.2.2.2.2 Ultrasonic disperser. frequency not less than 15kHz.

5.2.2.3 Reagents and Materials Anhydrous ethanol (AR).

5.2.2.4 Measurement Procedure 5.2.2.4.1 Stir the sample thoroughly, take about 0.3g of

the sample into a 50mL beaker, add 20mL of anhydrous ethanol, and ultrasonically disperse until the powder is dispersed. No aggregation was observed, indicating that this is test solution A. 5.2.2.4.2 Set the sample parameters and input the sample information on the operating software according to the instrument's instruction manual. 5.2.2.4.3 Add anhydrous ethanol as the circulating medium, adjust the stirring speed and the injection pump speed, and test the instrument background. 5.2.2.4.4 After measuring an effective background, add test solution A to the injection system using a dropper to make the occlusion 5%~30%. 5.2.2.4.5 Click the "Start" button on the operating software to begin the measurement. 5.2.2.4.6 After the measurement is completed, check and record the results (D10 and D90).

5.2.2.5 Expression of Measurement Results Two results were measured for each sample in parallel, with an allowable difference of no more than 0.2 μm. The arithmetic mean of the results was taken and the results were retained to two decimal places.

5.3 Determination of Aluminum Content

5.3.1 Method Summary The sample was dissolved in hydrochloric acid. Under conditions of pH 2.5-2.8, aluminum and other metal ions complexed with disodium ethylenediaminetetraacetate. When the concentration is 5-6, excess disodium ethylenediaminetetraacetate is titrated with zinc standard solution, then aluminum is replaced with sodium fluoride, releasing a fixed amount of ethylenediamine. The aluminum content was determined by titrating the released ethylenediaminetetraacetic acid disodium salt with a zinc standard solution.

5.3.2 Reagents and Materials

5.3.2.1 Hydrochloric acid (1 4).

5.3.2.2 Ammonia (1 4).

5.3.2.3 Disodium ethylenediaminetetraacetate solution (50g/L). Dissolve 50g of disodium ethylenediaminetetraacetate in 1000mL of water.

5.3.2.4 Hydrochloric acid-potassium chloride solution (pH 2.5).

16.80 mL of concentrated hydrochloric acid to a 1000 mL volumetric flask, dilute to the mark with water, and mix well;

b) Weigh 14.90g of potassium chloride (KCl) into a 500mL beaker, add an appropriate amount of water to dissolve it, and then transfer it to a 1000mL volumetric flask. Dilute with water to the mark and mix well;

33.5 mL of hydrochloric acid [5.3.2.4a)] and 250 mL of potassium chloride solution [5.3.2.4b)] into a 1000 mL volumetric flask, and dilute with water. Dilute to the mark and mix well.