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

GB/T 20615-2026

Replacing GB/T 20615-2006

**Fireworks - Determination of aluminium content in pyrotechnic
composition**

烟花爆竹 烟火药中铝含量的测定

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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 supersedes GB/T 20615-2006 "Determination of Aluminum Content in Fireworks and Firecrackers Pyrotechnics" and is consistent with GB/T 20615-2006. Compared to previous versions, aside from structural adjustments and editorial changes, the main technical changes are as follows:

---The underlying principles have been revised (see Chapter 4, Chapter 3 of the.2006 edition);

---The oven name and precision have been changed (see 7.1, 6.1 in the.2006 edition);

---The precision of the analytical balance has been changed (see 7.2, 6.2 in the.2006 edition);

---Added content on copper test sieves (see 7.4);

---The safety instructions have been revised (see 8.1, Chapter 7 of the.2006 edition);

---The method for preparing pyrotechnic sample has been modified (see 8.2, 7.1 of the.2006 edition);

---The temperature of the sample in the oven was changed (see 8.3,

7.2 in the 2006 edition);

---The steps have been modified (see 9.6,

1 Scope

GB/T 20615-2026 is the Chinese national standard covering aluminium in a pyrotechnic mixture. Aluminium is the fuel that gives the white light and the report, and its proportion is what separates a lifting charge from a flash composition. It fixes the reagents, the sample preparation, the procedure and the calculation. It replaces GB/T 20615-2006 and takes effect on 1 June 2026, one of the pyrotechnic analysis methods revised together. It was issued on 27 February 2026 and has been in force since 1 June 2026, replacing GB/T 20615-2006. 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 describes a method for determining the aluminum content in fireworks and firecracker gunpowder. This document applies to the determination of aluminum content in fireworks and firecracker gunpowder.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 601 Preparation of Standard Titration Solutions for Chemical Reagents

GB/T 6682 Specifications and test methods for water used in analytical laboratories

GB/T 8170 Rules for rounding off numerical values and the representation and determination of limiting values

GB/T 41644 Test Methods for Fireworks and Firecrackers AQ4115 Technical Specification for Preventing Static Electricity Hazards in Fireworks and Firecrackers

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4. Principles The aluminum in the sample comes from two parts. one part is aluminum powder or aluminum-magnesium alloy powder that is soluble in dilute nitric acid, and the

other part is insoluble in nitric acid. Cryolite, which is acidic but soluble in sulfuric acid, does not need to be tested for aluminum if the sample does not contain pyrotechnic powder that produces a yellow glow. The sample has undergone pre-treatment... After treatment, the solution is dissolved in dilute nitric acid and sulfuric acid in sequence, then filtered, the pH of the solution is adjusted, and a precipitant is added to separate the aluminum ions from the solution. Disodium ethylenediaminetetraacetate (EDTA) complexometric titration at pH 10.0 using 1-(2-pyridiniazol)-2-naphthol (PAN) as an indicator. One portion of the test solution was prepared by adding an appropriate amount of ammonium fluoride to mask aluminum ions, while the other portion was prepared by adding EDTA directly without ammonium fluoride, and then using sulfuric acid. The endpoint is reached when the copper standard titrant changes from yellow to blue. The titration is determined by the volume of copper sulfate standard titrant consumed in both titrations. The aluminum content in the sample was calculated by difference.

5. Reaction Formula The reaction formula is as follows: $\text{Al}_3\text{H}_2\text{Y}_2 = \text{AlY} \cdot 2\text{H}$ $\text{Al}_3\text{F}_6 = (\text{AlF}_6)^{3-}$
 $2\text{Na}_3\text{AlF}_6 + 6\text{H}_2\text{SO}_4 = 3\text{Na}_2\text{SO}_4 + 3\text{H}_2\text{SiF}_6 + 6\text{H}_2\text{O}$