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

GB/T 13748.1-2026

Replacing GB/T 13748.1-2013

**Methods for chemical analysis of magnesium and magnesium
alloys - Part 1: Determination of aluminium content**

镁及镁合金化学分析方法 第1部分：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 is Part 1 of GB/T 13748, "Chemical Analysis Methods for Magnesium and Magnesium Alloys". GB/T 13748 has been published with the following... part.

1. Determination of Aluminum Content;
2. Determination of Tin, Beryllium, Copper, Nickel and Titanium Content by Spectrophotometry;
3. Determination of Lithium and Silver Content by Flame Atomic Absorption Spectrometry;
4. Determination of Manganese and Zirconium Content by Spectrophotometry;
8. Determination of Rare Earth Content;
9. Determination of Iron and Silicon Content by Spectrophotometry;
13. Determination of Lead, Calcium, Potassium and Sodium Content by Flame Atomic Absorption Spectrometry;
15. Determination of Zinc Content;
18. Determination of Chlorine Content using the Silver Chloride Turbidity Method;
20. Determination of Elemental Content by Inductively Coupled Plasma Atomic Emission Spectrometry;
21. Determination of Elemental Content by Direct-Reading Atomic Emission Spectrometry;
22. Determination of Thorium Content;

1 Scope

GB/T 13748.1-2026 is the Chinese national standard covering the determination of aluminium in magnesium alloys - the principal alloying element of the AZ and AM families, and therefore the first number anyone checks. It fixes the reagents, the sample preparation, the procedure, the interferences and the precision. It replaces GB/T 13748.1-2013 and takes effect on 1 December 2026, one of the seven parts of the GB/T 13748 series revised together. It was issued on 25 May 2026 and takes effect on 1 December 2026, replacing GB/T 13748.1-2013. The document is under the responsibility of the China Nonferrous Metals Industry Association. 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.

1. Scope This document describes the spectrophotometric method for 8-hydroxyquinoline,

the spectrophotometric method for chromazin S-tetradecylpyridine chloride, and the gravimetric method for 8-hydroxyquinoline. Methods for determining the aluminum content in magnesium and magnesium alloys. This document applies to the determination of aluminum content in magnesium and magnesium alloys. Specifically, the 8-hydroxyquinoline spectrophotometric method is suitable for cases with small zirconium mass fractions. Determination of aluminum content in 1.5% magnesium and magnesium alloys, determination range (mass fraction). 0.020%~0.300%; Chromium azurite S-tetradecane chloride. The pyridine spectrophotometric method is suitable for determining the aluminum content in magnesium and magnesium alloys that do not contain titanium, zirconium, beryllium, silver, or rare earth elements. The determination range (by mass fraction) is... (Number). 0.0010%~0.300%; The 8-hydroxyquinoline gravimetric method is suitable for the determination of aluminum content in magnesium and magnesium alloys that do not contain zirconium, thorium, or rare earth elements. Specific range (mass fraction). 1.50%~12.00%.

3. Terms and Definitions This document does not contain any terms or definitions that need to be defined.

4 Instruments and Equipment

4.1 Spectrophotometer.

4.2 Glass frit funnel. 30 mL volume, G4.

4.3 Oven. The operating temperature shall not be lower than 130°C.

4.4 Inductively Coupled Plasma Atomic Emission Spectrometer. The equipment performance should meet the requirements of JJG768. Select appropriate equipment based on the specific requirements. For spectral analysis, the recommended wavelengths for aluminum analysis are 396.152 nm or 394.401 nm.

5 Samples

The sample was processed into fragments with a thickness of no more than 1 mm.

6,8-Hydroxyquinoline spectrophotometry

6.1 Method Overview The sample was dissolved in hydrochloric acid. In an ammonium carbonate solution at pH 9.5, using thioglycolic acid as a masking agent, aluminum and N-benzoyl-... were extracted with benzene. The precipitate formed by N-phenylhydroxylamine (tantalum reagent) was back-extracted with dilute hydrochloric acid to separate aluminum from interfering elements. The aluminum was then separated from the interfering elements by slow extraction with acetate-sodium acetate at pH 4.8. Aluminum in the solution reacts with 8-hydroxyquinoline to form a yellow complex. The absorbance of this complex was measured at 390 nm using a spectrophotometer, and the results were analyzed based on the working curve. The mass of aluminum was calculated.

6.2 Reagents or Materials Warning

---Benzene and chloroform are highly toxic substances. When handling them, it is your responsibility to wear protective equipment as required and avoid contact with skin and clothing. The items are handled and the operation is completed in a fume hood. Unless otherwise specified, only reagents confirmed to be of analytical grade and grade II water conforming to GB/T 6682 shall be used in the analysis.

6.2.1 Chloroform.

6.2.3 Hydrochloric acid (1 1). Transfer 500 mL of hydrochloric acid ($\rho =$

1.19 g/mL, analytical grade) to 500 mL of water and mix well.

6.2.4 Hydrochloric acid (1 10). Transfer 100 mL of hydrochloric acid ($\rho =$

1.19 g/mL, analytical grade) to 1000 mL of water and mix well.

6.2.5 Hydrochloric acid [$c(\text{HCl}) = 0.2 \text{ mol/L}$]. Transfer 17 mL of hydrochloric acid ($\rho = 1.19 \text{ g/mL}$, analytical grade) to 1000 mL of water and mix well.

6.2.6 Thioglycolic acid (1 4). Take 20 mL of thioglycolic acid ($w(\text{C}_2\text{H}_4\text{O}_2\text{S}) \geq 90.0\%$) and dissolve it in 80 mL of water, then mix well.

6.2.7 Ammonia (1 10). Transfer 100 mL of ammonia ($\rho =$

0.90 g/mL, analytical grade) to 1000 mL of water and mix well.

6.2.8 Ammonium carbonate solution (200 g/L). Weigh 200 g of ammonium carbonate and dissolve it in 1000 mL of water. Mix well and store in a plastic bottle.

6.2.9 Tantalum reagent-ethanol solution (20 g/L). Weigh 2 g of N-benzoyl-N-phenylhydroxylamine (tantalum reagent) and dissolve it in 100 mL of anhydrous ethanol. Mix well. Prepare fresh before use. 6.2.10 8-Hydroxyquinoline solution (50 g/L). Weigh 5 g of 8-hydroxyquinoline and dissolve it in 100 mL of acetic acid solution [$c(\text{CH}_3\text{COOH}) = 2 \text{ mol/L}$] Mix well, filter with medium-speed filter paper, and store in a brown reagent bottle.

6.2.11 Acetic acid-sodium acetate buffer solution. Mix equal volumes of anhydrous sodium acetate solution [$c(\text{CH}_3\text{COONa}) = 2 \text{ mol/L}$] and acetic acid solution. [$c(\text{CH}_3\text{COOH}) = 2 \text{ mol/L}$] mixture.

6.2.12 Aluminum Standard Stock Solution (1 mg/mL). Weigh 1.0000 g of aluminum ($w(\text{Al}) \geq 99.99\%$) into a 300 mL beaker, add... Add 60 mL of hydrochloric acid (6.2.3) and heat at low temperature until completely dissolved. Remove from heat and cool to room temperature. Transfer to a 1000 mL volumetric flask and add 40 mL of salt. Acid (6.2.3), dilute to the mark with water and mix well. 1 mL of this solution contains 1 mg of aluminum.