

ICS 77.120
CCS H12



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

GB/T 10267.4-2025

Replacing GB/T 10267.4-1988

**Methods for analysis of calcium metal - Part 4: Determination of
aluminum by 8-hydroxyquinoline-trichloromethane extraction
spectrophotometry**

金属钙分析方法 第4部分：8-羟基喹啉-三氯甲烷萃取分光光度法测定铝

Issued on: October 5, 2025

Implemented on: May 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

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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 4 of GB/T 10267, "Methods for the Analysis of Calcium Metals". GB/T 10267 has already published the following parts.

- 1.Determination of Chlorine by Chloride Ion Selective Electrode Method;
- 2.Photometric Determination of Trace Silicon;
- 3.Direct determination of iron, nickel, copper, manganese, and magnesium by atomic absorption spectrophotometry;
- 4.Determination of Aluminum by 8-Hydroxyquinoline-Chloroform Extraction Spectrophotometry;

5.Determination of nitrogen by distillation-Nessler reagent photometric method This document supersedes GB/T 10267.4-1988 "Analytical Methods for Calcium Metals. Determination by 8-Hydroxyquinoline-Chloroform Extraction Spectrophotometry". Compared with GB/T 10267.4-1988, the main technical changes in "Aluminum" are as follows, except for structural adjustments and editorial modifications.

- a) Added standard samples/standard substances to "Reagents or Materials" (see 5.16);

- b) Added requirements for sample condition in the "Sample" section (see Chapter 7);
- c) Added the constant volume and transfer volume to the "Experimental Data Processing" formula (see Chapter 9);
- d) The method precision for low aluminum levels has been added to the "Precision" section (see Chapter 10). Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the National Nuclear Energy Standardization Technical Committee (SAC/TC58). This document was drafted by: CNNC Northern Nuclear Fuel Element Co., Ltd., Sichuan Honghua Industrial Co., Ltd., and CNNC 404 Co., Ltd. Hanzhong Zinc Industry Special Materials Co., Ltd. The main drafters of this document are: Zhao Shenglu, Yuan Cuihong, Lü Hui, Han Shuzhen, Yuan Yulong, Fu Jianru, Wang Ling, Yang Yongming, Yang Lichun, and Li Xin. Pan Cuicui, Shen Yanan, Zhao Jing, Long Gaoxu, Zhang Rui. The release history of this document and the document it replaces is as follows:

---First published in 1988 as GB/T 10267.4-1988;

---This is the first revision.

GB/T 10267.4 "Analytical Methods for Calcium Metals - Part

1 Scope

GB/T 10267.4-2025 is the Chinese national standard on methods for analysis of calcium metal - part 4: determination of aluminum by 8-hydroxyquinoline-trichloromethane extraction spectrophotometry, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 5 October 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 May 2026.

Classification: ICS 77.120, CCS H12. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the reagents or materials, and instrumentation for determining the aluminum content in metallic calcium using the 8-hydroxyquinoline-chloroform extraction spectrophotometric method. Preparation, samples, test procedures, test data processing, precision, quality assurance and control, and test reports. This document applies to the determination of aluminum content in metallic calcium. Determination range. 10 µg/g ~ 1000 µg/g.

2 Normative references

This document has no normative references.

3 Terms and Definitions

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

4.Principles The sample was dissolved in hydrochloric acid solution, and sodium acetate and sodium diethyldithiocarbamate (copper reagent) were added to adjust the pH to 5.6. 6.0, chloroform is used to extract and separate impurities such as iron, nickel, copper, and manganese from the sample solution, and then 8-hydroxyquinoline-chloroform solution is added to the sample. Aluminum in the solution was extracted into the organic phase, and its absorbance was measured at 390 nm using a spectrophotometer. The aluminum content in the sample was calculated using the working curve method. The content of.

5.Reagents or materials Unless otherwise stated, all reagents used in the analysis are analytical grade reagents that meet national standards, and the water used in the analysis meets conductivity requirements. Deionized water with a concentration of $\leq$

0.10 mS/m (25°C).

5.1 Chloroform (CHCl₃).

5.2 Anhydrous sodium sulfate (Na₂SO₄).

5.3 Nitric acid. Superior grade, $\rho=1.42\text{g/mL}$.

5.4 Hydrochloric acid. analytical grade, $\rho=1.19\text{g/mL}$.

5.5 Sodium acetate.

5.6 Sodium diethyldithiocarbamate (referred to as "copper reagent").

5.7 Sodium hydroxide. Superior grade.

5.8 Aluminum wire. purity greater than 99.97%. 5.9 8-Hydroxyquinoline.

5.10 Nitric acid solution. $\phi(\text{HNO}_3)=50\%$, prepared with nitric acid (5.3) and water.