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

GB/T 10267.5-2025

Replacing GB/T 10267.5-1988

**Methods for analysis of calcium metal - Part 5: Determination of
nitrogen by distillation-Nessler spectrophotometry**

金属钙分析方法 第5部分：蒸馏-奈斯勒试剂光度法测定氮

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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 5 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 spectrophotometry This document replaces GB/T 10267.5-1988 "Analytical Methods for Calcium Metals. Distillation-Nessler Reagent Photometric Determination of Nitrogen". Compared with GB/T 10267.5-1988, apart from structural adjustments and editorial changes, the main technical

changes are as follows:

- a) The range for nitrogen determination has been changed (see Chapter 1, Chapter 1 of the 1988 edition);
- b) Added standard samples/standard substances to "Reagents or Materials" (see 5.14);
- c) Added requirements for sample condition in "Sample" (see 7.1). 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: Jia Lingyu, Li Xin, Ji Pengbo, Lü Zhiwen, Liu Chun, Fan Hao, Xu Kai, Yang Yongming, Yang Jun, Yuan Cuihong, and Ma Yanlin. Shen Yanan, Gong Lei, Li Yanping, Yue Rongqian, Zhao Lina. The release history of this document and the document it replaces is as follows:

---First published in 1988 as GB/T 10267.5-1988;

---This is the first revision.

GB/T 10267.5 "Analytical Methods for Calcium Metals - Part

5.Determination of Nitrogen by Distillation-Nessler Reagent Photometric Method" is a standard used in my country for the detection of calcium metals. This important standard, published in 1988, has provided a scientific basis for the determination of nitrogen content in metallic calcium and has been widely used in the nuclear industry and metallurgy. In fields such as gold and new materials research and development. GB/T 10267, "Analytical Methods for Calcium Metals," aims to establish standards for analytical methods of the chemical composition of calcium metals and is proposed to consist of five parts.

1 Scope

GB/T 10267.5-2025 is the Chinese national standard on methods for analysis of calcium metal - part 5: determination of nitrogen by distillation-nessler 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 H 12. 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, instruments, equipment, samples, and experimental procedures for determining nitrogen content in metallic calcium using the distillation-Nessler reagent spectrophotometric method. Steps, test data processing, precision, quality assurance and control, and test reports. This document applies to the determination of nitrogen content in metallic calcium. Determination range. 20 $\mu\text{g/g}$ ~ 4500 $\mu\text{g/g}$.

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 After the sample is dissolved in hydrochloric acid solution, ammonium ions in the solution are converted to ammonia under alkaline conditions. The ammonia distilled by steam is then condensed. The sample was absorbed by dilute sulfuric acid, reacted with Nessler's reagent to form a colored complex, and its absorbance at 440 nm was measured. The sample was then analyzed using the standard curve method. The nitrogen content in the product.

5 Reagents or materials

5.1 Ammonia-free water. Take 10L of deionized water with a conductivity (25°C) $\leq 0.10\text{mS/m}$, add 5mL of concentrated sulfuric acid, mix well, and distill. The liquid is ammonia-free water.

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

5.3 Sulfuric acid. $\rho = 1.84\text{g/mL}$, analytical grade.

5.4 Sodium hydroxide. Superior grade.

5.5 Potassium iodide. analytical grade.

5.6 Mercuric chloride. analytical grade.

5.7 Ammonium chloride. Spectroscopically pure.

5.8 Hydrochloric acid solution. $\phi(\text{HCl}) = 50\%$, prepared by hydrochloric acid (5.2) and water.

5.9 Sulfuric acid solution. $c(\text{H}_2\text{SO}_4) =$

0.005 mol/L, prepared by mixing sulfuric acid (5.3) and water.

5.10 Sodium hydroxide solution. $\rho(\text{NaOH}) = 400\text{ g/L}$. Weigh 400 g of sodium hydroxide

(5.4) and dissolve it in approximately 800 mL of water. After cooling, use... Dilute with water to a volume of 1000 mL, mix well, and store in a plastic bottle.

5.11 Sodium hydroxide solution. $\rho(\text{NaOH}) = .200 \text{ g/L}$. Weigh 120 g of sodium hydroxide (5.4), dissolve it in water, boil, cool, and then dilute. Up to 600mL.

5.12 Potassium iodide solution. $\rho(\text{KI}) =$

0.35 g/mL. Weigh 35 g of potassium iodide (5.5), dissolve it in water, and dilute to 100 mL.