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

GB/T 4348.1-2026

Replacing GB/T 4348.1-2013

**Component determination of sodium hydroxide for industrial
use - Part 1: Sodium hydroxide and sodium carbonate**

工业用氢氧化钠成分分析 第1部分：氢氧化钠和碳酸钠

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document is Part 1 of GB/T 4348 "Component determination of sodium hydroxide for industrial use". The following parts of GB/T 4348 have been published: Part 1: Sodium hydroxide and sodium carbonate; Sodium hydroxide for industrial use - Determination of sodium chloride content - Mercurimetric method; Sodium hydroxide for industrial use - Determination of iron content - 1,10-phenanthroline spectrophotometric method.

This document replaces GB/T 4348.1-2013 "Sodium hydroxide for industrial use - Determination of sodium hydroxide and sodium carbonate content". Compared with GB/T 4348.1-2013, apart from structural and editorial changes, the main technical changes are as follows: a) the principle for the determination of sodium hydroxide was changed (see 4.1, 3.1 of the 2013 edition); b) single-mark pipettes, single-mark volumetric flasks, a potentiometric titrator, a balance and an analytical balance were added (see Clause 6); c) the preparation of the sample solution was changed (see 7.1, 6.1 of the 2013 edition); d) the determination on sample solution B by the indicator method and the potentiometric titration method were added (see 7.2.1.2 and 7.2.2); e) the calculation of results was changed (see Clause 8, Clause 7 of the 2013 edition); f) the requirements for the permissible difference were changed (see 8.3, 7.3 of the 2013 edition); g) the content of the test report was changed (see Clause 9, Clause 8 of the 2013 edition).

Attention is drawn to the possibility that some of the content of this document may be the subject of patent rights. The issuing body of this document takes no responsibility for

identifying them.

This document was proposed by the China Petroleum and Chemical Industry Federation and is under the jurisdiction of the National Technical Committee on Chemical Standardization (SAC/TC 63).

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This document was first issued in 1984, first revised in 2000 and second revised in 2013; this is the third revision.

Introduction

GB/T 4348 "Component determination of sodium hydroxide for industrial use" is intended to establish the criteria for determining the components of sodium hydroxide for industrial use, and is planned to consist of three parts.

Part 1: Sodium hydroxide and sodium carbonate - its purpose is to describe the methods for determining the sodium hydroxide content and the sodium carbonate content of sodium hydroxide for industrial use. Part 2: Sodium chloride - its purpose is to describe the method for determining the sodium chloride content. Part 3: Iron - its purpose is to describe the method for determining the iron content.

1 Scope

WARNING - Those who use this document should have practical experience of working in a regular laboratory. This document does not point out every possible safety problem. The user is responsible for taking appropriate safety and health measures and for ensuring compliance with the conditions laid down in the relevant national regulations.

This document describes the test principle and the test method for the sodium hydroxide content and the sodium carbonate content of sodium hydroxide for industrial use, and specifies the reagents or materials, the apparatus, the calculation of results and the content of the test report.

It applies to the determination of the sodium hydroxide content and the sodium carbonate content of sodium hydroxide for industrial use.

2 Normative references

The content of the following documents constitutes, through normative reference in this text, indispensable provisions of this document. For dated references, only the edition corresponding to that date applies; for undated references, the latest edition (including all amendments) applies.

GB/T 601 Chemical reagent - Preparation of standard volumetric solutions · GB/T 603 Chemical reagent - Preparation of reagent solutions for use in test methods · GB/T 6682 Water for analytical laboratory use - Specification and test methods · GB/T 9725 Chemical reagent - General rule for potentiometric titration

3 Terms and definitions

No terms and definitions need to be defined in this document.

4 Principle

4.1 Principle for the determination of sodium hydroxide. Barium chloride is first added to the sample solution, converting the sodium carbonate into a precipitate of barium carbonate, and the solution is titrated with standard hydrochloric acid volumetric solution. The end point is indicated either by phenolphthalein or, using potentiometric titration, by the abrupt change in electrode potential. The reactions are: $\text{Na}_2\text{CO}_3 + \text{BaCl}_2$ gives BaCO_3 precipitate plus 2 NaCl ; $\text{NaOH} + \text{HCl}$ gives $\text{NaCl} + \text{H}_2\text{O}$.

4.2 Principle for the determination of sodium carbonate. The sample solution is titrated with standard hydrochloric acid volumetric solution to the end point using bromocresol green - methyl red as indicator, which gives the sum of the sodium hydroxide and sodium carbonate contents; the sodium carbonate content is obtained by subtracting the sodium hydroxide content from that sum.

5 Reagents or materials

5.1 Unless otherwise stated, the reagents and the water used in this document are analytical reagent grade and grade 3 water as specified in GB/T 6682, free of carbon dioxide. The standard volumetric solutions, the preparations and the products required are

prepared as specified in GB/T 601 and GB/T 603.

5.2 Barium chloride solution: 100 g/L. Before use it is adjusted to a faint pink with standard sodium hydroxide volumetric solution, using phenolphthalein (5.4) as indicator.

5.3 Standard hydrochloric acid volumetric solution: $c(\text{HCl}) = 1 \text{ mol/L}$.

5.4 Phenolphthalein indicator solution: 10 g/L.

5.5 Bromocresol green - methyl red indicator solution.

6 Apparatus

6.1 Single-mark pipettes: 25 mL and 50 mL, class A. 6.2 Burette: 50 mL, scale interval 0.1 mL, class A. 6.3 Single-mark volumetric flask: 500 mL, class A. 6.4 Magnetic stirrer. 6.5 Potentiometric titrator: accuracy 2 mV, with a glass - saturated calomel electrode or a combination pH electrode. 6.6 Balance: accurate to 0.01 g. 6.7 Analytical balance: accurate to 0.0001 g.

7 Test method

7.1 Preparation of the sample solution. 7.1.1 Sample solution A: using a dry, clean weighing bottle of known mass, $(15 \pm 1) \text{ g}$ of solid sodium hydroxide or $(25 \pm 1) \text{ g}$ of liquid sodium hydroxide is weighed rapidly from the sample bottle to the nearest 0.01 g, transferred to a beaker containing about 200 mL of water, cooled to room temperature, transferred to a 500 mL volumetric flask, made up to the mark with the washings of the weighing bottle and beaker, and mixed. 7.1.2 Sample solution B: a quantity of liquid sodium hydroxide corresponding to 0.7 g to 0.8 g of NaOH is weighed rapidly, to the nearest 0.0001 g, into a conical flask of known mass or into the titration vessel of the potentiometric titrator, about 50 mL of water is added at once and the solution is mixed. It is used for the determination of the sodium hydroxide content.

7.2 Determination of the sodium hydroxide content. 7.2.1 Indicator method - on sample solution A, a 50 mL aliquot is titrated in a 250 mL conical flask after adding 10 mL of barium chloride solution and two to three drops of phenolphthalein, under magnetic stirring, to a faint pink end point; on sample solution B, 5 mL of barium chloride solution and two to three drops of phenolphthalein are added and the solution titrated in the same way. 7.2.2 Potentiometric titration - on sample solution A, a 25 mL aliquot is taken into the titration vessel or a beaker, 5 mL of barium chloride solution and about 30 mL of water are added and the titration is carried out under magnetic stirring as specified in GB/T 9725, the end point being determined automatically by the instrument or by the graphical or second-derivative method; on sample solution B, 5 mL of barium chloride solution is added and the titration carried out in the same way. The volume of standard hydrochloric acid consumed is recorded in each case.