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

GB/T 16632-2019

Replacing GB/T 16632-2008

**Determination of scale inhibition performance of water
treatment chemicals - Calcium carbonate precipitation method**

水处理剂阻垢性能的测定 碳酸钙沉积法

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009. This Standard replaces GB/T 16632-2008, Determination of scale inhibition performance of water treatment agents - Calcium carbonate precipitation method; compared with GB/T 16632-2008, the main technical changes, except editorial changes, are as follows: -- Change the sodium bicarbonate standard solution to prepare when needed (see 4.4; 4.7 of version 2008); -- Add the requirement of using water for actual working conditions as test water (see Chapter 6); -- Change the addition of water treatment chemicals from "5.0 mL" to "a certain amount" (see 7.1.2, 7.1.3; 6.1 of version 2008); -- In the test procedure, change filter "after cooling to room temperature" to filter "while hot" (see Chapter 8; Chapter 7 of version 2008). This Standard was proposed by China Petroleum and Chemical Industry Federation. This Standard shall be under the jurisdiction of National Standardization Technical Committee of Chemical (SAC/TC 63). The drafting organizations of this Standard. Henan Qing Shui Yuan Technology Co., Ltd., Guangzhou Special Pressure Equipment Inspection and Research Institute, Hangzhou Special Equipment Testing and Research Institute, Nanjing Yushui

Science & Technology Co., Ltd., Shenzhen ZhunNuo Test Technology Co., Ltd., Shandong Taihe Water Treatment Technologies Co., Ltd., Suzhou Branch of Special Equipment Safety Supervision Inspection Institute of Jiangsu Province, CenerTech Tianjin Chemical Research and Design Institute Co., Ltd., Jiashan Green Environmentally Friendly Materials Plant, Hangzhou Mingzhu Water Treatment Technology Co., Ltd., Tianjin Zhengda Science & Technology Co., Ltd. The drafters of this Standard. Jing Yuanyuan, Xie Haiyuan, Xiong Weidong, Chen Wei, Li Haitian, Wang Ningning, Yan Hao, Li Lin, Zhu Chunlian, Du Hao, Hu Sanmu, Shao Hongqian. The previous versions of the standards which are replaced by this Standard are. -- GB/T 16632-1996, GB/T 16632-2008. Determination of scale inhibition performance of water treatment chemicals - Calcium carbonate precipitation method

1 Scope

GB/T 16632-2019 is the Chinese national standard on determination of scale inhibition performance of water treatment chemicals - calcium carbonate precipitation method, in the field of chemical technology. 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 30 August 2019 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 July 2020. Classification: ICS 71.040.40, CCS G76. 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 Standard specifies the determination of scale inhibition performance of water treatment chemicals to inhibit calcium carbonate precipitation -- calcium carbonate precipitation method. This Standard applies to the evaluation of the scale inhibition performance of water treatment chemicals to inhibit calcium carbonate precipitation under the same conditions in the circulating cooling water system; it also applies to the screening of the water treatment chemicals to inhibit calcium carbonate scale formulation.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 601, Chemical reagent - Preparations of reference titration solutions

GB/T 603, Chemical reagent - Preparations of reagent solutions for use in test methods

GB/T 6682, Water for analytical laboratory use - Specification and test methods

3 Method summary

Use water for actual working conditions, or prepared water that contains a certain amount of bicarbonate radical and calcium ions AND water treatment chemicals to prepare into the test solution. Under heating conditions, promote the accelerated decomposition of calcium bicarbonate into calcium carbonate.

4 Reagents or materials

4.1 The reagents and water that are used in this standard, unless otherwise specified, shall be analytical reagents and grade-3 water that complies with the provisions of GB/T 6682.

4.2 Potassium hydroxide solution. 200 g/L.

4.3 Borax buffer solution. pH ~ 9; weigh

3.80 g of sodium tetraborate decahydrate ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$) to dissolve in water; dilute to 1 L.

4.4 Sodium bicarbonate standard solution. 1 mL contains about

18.3 mg of HCO_3^- ; prepare and calibrate according to the following steps.

4.5 Calcium chloride standard solution. 1 mL contains about

6.0 mg of Ca^{2+} ; prepare and calibrate according to the following steps.

4.6 Hydrochloric acid standard titration solution. $c(\text{HCl})$ is about

0.1 mol/L.

4.7 Ethylene Diamine Tetraacetic Acid standard titration solution. $c(\text{EDTA})$ is about

0.01 mol/L.

5 Instruments and apparatuses

5.1 Constant-temperature water bath. with stirring device; the temperature can be controlled at $(80 \pm 1) ^\circ\text{C}$.

5.2 Conical flask. 500 mL; equipped with a rubber stopper for installing a glass tube whose diameter is 5 mm ~ 10 mm and length is about 300 mm.

6 Test water

Test water sample. prepared water or water for actual working conditions.

7.1 Preparation of test solution

7.1.1 Water treatment chemical sample solution.

1.00 mL contains

0.500 mg of water treatment chemicals (on a dry basis).

7.1.3 Prepared water. add 250 mL of water in a 500 mL volumetric flask; use a burette to add a certain volume of calcium chloride standard solution, to make the amount of calcium ions 120 mg.

7.2 Preparation of blank test solution In another 500 mL volumetric flask, except that no water treatment chemical sample solution is added, operate according to the steps of

8 Test procedure

Respectively place the test solution and the blank test solution in two clean conical flasks; immerse in a constant-temperature water bath of $(80 \pm 1) ^\circ\text{C}$ (the liquid level of the test solution shall not be higher than that of the water bath); keep at constant temperature for 10 hours. Use a medium-speed quantitative paper for dry filter while it is hot.

9 Result calculation

The scale inhibition performance of the water treatment chemicals is calculated by eta; the value is expressed in %; it is calculated according to Formula (3).