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

GB/T 16493-2026

Replacing GB/T 16493-1996

Chemical reagent - Trisodium citrate dihydrate

化学试剂 二水合柠檬酸三钠

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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 supersedes GB/T 16493-1996 "Chemical Reagents - Trisodium Citrate Dihydrate (Trisodium Citrate)", and is consistent with GB/T 16493- Compared to.1996, aside from structural adjustments and editorial changes, the main technical changes are as follows:

- a) Added technical requirements and testing methods for analytical grade purity (see Chapters 5 and 6);
- b) The technical requirements for analytical grade phosphate have been changed from " ≤ 0.002 " to " ≤ 0.005 " (see Chapter 5,.1996 edition). Chapter 4);
- c) Added technical requirements and testing methods for calcium, copper, and lead (see Chapter 5, 6.10);
- d) The method for determining iron was changed from "chemical analysis" to "inductively coupled plasma atomic emission spectrometry" (see 6.10). (
- 5.9 of the.1996 edition)
- e) Packaging and labeling were changed (see Chapter 8, Chapter 7 of the.1996 edition);
- f) The technical requirements and determination methods for heavy metals have been removed (see Chapter 4,

5.10 of the.1996 edition). 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 by the China Petroleum and Chemical Industry Federation. This document is under the jurisdiction of the National Technical Committee on Chemical Standardization (SAC/TC63). This document was drafted by: Sinopharm Chemical Reagent Co., Ltd., Beijing Chemical Reagent Research Institute Co., Ltd., and

Wenzhou Jixiang Chemical Co., Ltd. Joint-stock company, Taicang Hu Test Reagent Co., Ltd., Shanghai Wokai Biotechnology Co., Ltd., Taizhou Product Quality Supervision and Inspection Institute, Chengdu City Kelon Chemicals Co., Ltd. The main drafters of this document are. Fang Cheng, Chen Haoyun, Wang Aixia, Zheng Qi, Zhao Jifei, Wang Yuhua, Zhu Qian, Li Guanhao, Li Yiyuan, Sun Xin, and Sun Chengquan. Ke Dehong, Ling Fang, and Wang Yongsheng. The release history of this document and the document it replaces is as follows:

---First published in.1996 as GB/T 16493-1996;

---This is the first revision. Chemical reagent. trisodium citrate dihydrate

1 Scope

GB/T 16493-2026 is the Chinese national standard covering reagent grade sodium citrate - used as a buffer, a chelating agent and an anticoagulant, with the assay and the impurity limits that separate a reagent from a technical product. It replaces GB/T 16493-1996, a standard thirty years old, and has been in force since 1 September 2026. It was issued on 27 February 2026 and has been in force since 1 September 2026, replacing GB/T 16493-1996. The document is under the responsibility of the China Petroleum and Chemical Industry Federation. 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.

This document specifies the properties, technical requirements, inspection rules, packaging, and labeling of the chemical reagent trisodium citrate dihydrate, and describes the corresponding... The experimental method. This document applies to the testing of the chemical reagent trisodium citrate dihydrate.

Note. The chemical reagent, trisodium citrate dihydrate, has the molecular formula $C_6H_5Na_3O_7 \cdot 2H_2O$ and the structural formula [The remaining text appears to be incomplete and requires further context.] The molecular mass is 294.10 (according to the 2022 international relative atomic mass), and the CAS number is 6132-04-3.

4.Characteristics Trisodium citrate dihydrate is a colorless crystal or white crystalline powder, readily soluble in water but insoluble in ethanol.

5 Technical Requirements

The technical requirements for trisodium citrate dihydrate shall comply with the provisions of Table 1.

6.Test Methods Warning. Some reagents used in this test method are toxic or corrosive, and some test procedures may lead to hazardous situations. Operators must exercise

caution. It is our responsibility to take appropriate safety and health measures.

6.1 General Provisions Unless otherwise specified in this chapter, all standard titrants, standard solutions, preparations and products used shall comply with GB/T 601, GB/T 602, and GB/T 603. Prepared according to GB/T 603, laboratory water should meet the Class III water standard in GB/T 6682, and all reagents used should be of analytical grade or higher. In addition, all samples were weighed to an accuracy of 0.01g, and all solutions expressed as percentages "%" are mass fractions.

6.2 Trisodium citrate dihydrate Weigh 0.3g of the sample, accurate to 0.0001g, and place it in a dry conical flask. Dissolve it in 40mL of acetic acid (glacial acetic acid). If necessary, the solution can be diluted with an ultrafine liquid. Dissolve the substance in water, add 2 mL of acetic anhydride, shake well, add 2 drops of crystal violet indicator solution (5 g/L), and titrate with standard perchloric acid solution [$c(\text{HClO}_4) =$ Titrate with

0.1 mol/L solution until the solution turns blue (with a slight purple tinge). The mass fraction (w) of trisodium citrate dihydrate is calculated according to formula (1).

6.3 pH value The determination shall be made in accordance with the provisions of GB/T 9724.

6.4 Clarity Test Weigh 20g of the sample and dissolve it in 100mL of water. The turbidity should not exceed Grade 3 (superior grade) specified in Table 2 of HG/T 3484-1999. Clarity standard (pure, analytical grade) or No. 5 (chemically pure).

6.5 Water-insoluble matter Weigh 20g (30g for analytical grade) of the sample, dissolve it in 200mL of boiling water, cool to room temperature, and determine according to GB/T 9738.

6.6 Chloride Weigh 1g (2g for analytical grade) of sample, dissolve in 15mL of water, add 5mL of nitric acid solution (25%), and then proceed according to GB/T 9729. The turbidity of the solution should not exceed that of the standard turbidity solution. The standard turbidity solution is prepared by taking a standard solution containing

0.01 mg (analytical grade, superior grade) or

0.05 mg (chemically pure) chloride (Cl) solution. The liquid was treated in the same way as the sample.

6.7 Sulfates

6.7.1 Preparation of test solutions Weigh 7g of sample and place it in a beaker. Add 0.2mL of ammonium metavanadate solution (10g/L) and 20mL of nitric acid. Cover with a watch glass and place in a water bath. Incubate at this temperature for 1 hour, then remove the watch glass and evaporate to dryness. Add 10 mL of nitric acid, mix well, and heat in a water bath to evaporate to dryness. Add 10 mL of hydrochloric acid solution (20%), evaporate to dryness, then add 10 mL of hydrochloric acid solution (20%), and evaporate to

dryness again. Dissolve the residue in 1 mL of hydrochloric acid solution (20%) and a small amount of water. Dilute with water to 50 mL (filter if necessary).

6.7.2 Preparation of the reference solution Weigh 2g of sample and add a standard sulfate (SO_4) containing 0.15mg (analytical grade), 0.25mg (analytical grade), or 0.50mg (chemically pure). The standard solution and the standard solution containing

0.25 mg (analytical grade) or

0.5 mg (chemically pure) phosphate (PO_4) are prepared simultaneously with 6.7.1. deal with.

6.7.3 Determination Method Take 10 mL of the test solution, dilute it with water to 20 mL, add

0.5 mL of hydrochloric acid solution (20%) to acidify, and then proceed according to GB/T 9728. The turbidity of the solution should not exceed that of the standard turbidity solution. The standard turbidity solution is prepared by measuring 10 mL of the reference solution and treating it simultaneously with the same volume of the test solution.

6.8 Total Nitrogen Content Weigh 2g of sample, dissolve it in 140mL of water, and then determine the analyte according to the provisions of

4.4.1 in GB/T 609-2018. The yellow color of the solution should not be... It is darker than the standard colorimetric solution. The standard colorimetric solution is prepared by taking a standard solution containing

0.02 mg of nitrogen (N) and treating it simultaneously with the sample.

6.9 Phosphate Take 5 mL (1 mL of chemically pure solution, diluted to 5 mL) of the test solution (6.7.1), add 2 drops of saturated 2,4-dinitrophenol indicator solution, and dilute with ammonia. Adjust the aqueous solution (10%) until a yellow color just appears, then add nitric acid solution (13%) until the yellow color just disappears. Dilute to 10 mL and then... The determination shall be made in accordance with the provisions of GB/T 9727. The blue color of the organic layer should not be deeper than that of the standard colorimetric solution. The standard colorimetric solution is prepared by measuring 5 mL (1 mL for chemically pure solutions, diluted to 5 mL) of reference solution (6.7.2) and mixing it with the same volume of test solution. The test solution was treated in the same way.

6.10 Calcium, iron, copper, lead

6.10.1 Reagents, Materials and Instruments Comply with the provisions of Chapters 5 and 6 of GB/T 23942-2009.

6.10.2 Instrument Conditions Recommended wavelengths. calcium 393.366nm, iron 259.940nm, copper 324.754nm, lead 220.353nm. Incident power. 1150W. Observation height. 12mm. Argon flow rate.