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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 602-2026

Replacing GB/T 602-2002

Chemical reagent - Preparation of standard solutions for impurity determination

化学试剂 杂质测定用标准溶液的制备

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents. This document serves as a replacement of GB/T 602-2002 Chemical reagent - Preparations of standard solutions for impurity. In comparison with GB/T 602-2002, apart from structural adjustments and editorial modifications, the main technical changes are as follows:

a) The requirements for the weighing precision of reagents have been added (see 4.1);

b) The requirements for storage containers for standard solutions used in impurity determination have been added (see 4.5);

c) The storage temperature and shelf life have been changed (see 4.6;

3.3 of the 2002 Edition);

d) The preparation methods for acetate, iodide, and bromide have been added (see Items 2, 36, and 38 in Table 1);

e) The standard solutions and preparation methods for 10 substances. carbon (organic carbon), dichromate, cyanide, lithium, scandium, rubidium, yttrium, cesium, lanthanum, and cerium have been added (see Items 13, 25, 33, 43, 57, 72, 74, 85, 87, and 88 in Table 1);

f) The preparation methods for silicon dioxide, hexafluoro silicate, silicate, silicon, and gallium have been changed (see Items 17, 21, 26, 51, and 68 in Table 1; Items 14, 18, 22, 45, and 61 in Table 1 of the 2002 Edition). Please note that certain contents of this document may involve patents. The institution issuing this document assumes no responsibility for identifying such patents. This document was proposed by China Petroleum and Chemical Industry Federation. This document shall be under the jurisdiction of National

Technical Committee 63 on Chemicals of Standardization Administration of China (SAC/TC 63). The drafting organizations of this document. Guangdong Guanghua Sci-Tech Co., Ltd.; Beijing Chemical Reagent Research Institute Co., Ltd.; Anpel-trace Standard Technical Services (Shanghai) Co., Ltd.; Beijing Huateng Testing and Certification Co., Ltd.; Tianjin Scheird Sci & Tech Co., Ltd.; Jiangxi Jixiang Pharmchemical Co., Ltd. The main drafters of this document. Zhou Yilang, Zhang Jianfeng, Lin Jiong, Wang Shenlian, Zhao Jifei, Wang Yuhua, Huang Xinmei, Lin Changrou, Liao Huana, Yan Chenbin, Zhao Yuan, Ju Rongling, Yang Peijie, Han Lijin, Cheng Xiaoxia. The previous issued versions of this document and the documents it replaces are as follows: Chemical Reagent - Preparations of Standard Solutions for Impurity

1 Scope

GB/T 602-2026 is the Chinese national standard covering the standard solutions against which impurities are measured - how each is prepared, from what starting material and to what concentration, with the storage and the shelf life that determine whether it is still standard when used. Every reagent specification in the Chinese catalogue points back to this one. It replaces GB/T 602-2002 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 602-2002. 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 describes the preparation methods for standard solutions used in the determination of impurities in chemical reagents. This document applies to the preparation of solutions containing a precise quantity of a substance (element, ion, or molecule) per unit volume and is applicable to the determination of impurities in chemical reagents. It may be used as a reference in other fields.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable 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 685-2013 Chemical reagent - Formaldehyde solution

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

GB/T 6684-2002 Chemical reagent - Hydrogen peroxide 30%

3 Terms and Definitions

This document contains no terms or definitions that require clarification.

4 General Provisions

4.1 Unless otherwise specified, all reagents used in this document shall be of analytical grade or higher. Key reagents for preparing standard solutions shall be weighed to an accuracy of ±0.0004 g, while other reagents shall be weighed to an accuracy of

0.01 g or measured to an accuracy of

0.1 mL. Standard titration solutions, preparations, and products shall be prepared in accordance with the provisions of GB/T 601 and GB/T 603.Water used in experiments shall comply with the specifications for Grade 3 water as defined in GB/T 6682.

4.2 In this document, solution concentrations expressed as a percentage (%) refer to mass fraction.

4.3 Graduated pipettes shall be used to measure the standard solutions used in impurity determination. For each measurement, select a graduated pipette with a capacity not exceeding three times the volume of the standard solution used in impurity determination.

4.4 The volume of the standard solution used in impurity determination to be measured shall be between

0.05 mL and

2.00 mL. When the volume to be measured is less than

0.05 mL, the standard solution used in impurity determination shall be diluted proportionally, such that the volume of the diluted solution to be measured during actual use is not less than

0.05 mL; when the volume to be measured exceeds

2.00 mL, the quantities of reagents and preparations used shall be increased proportionally based on the original preparation method for the standard solution used in impurity determination; the scale of this increase shall be such that the volume of the resulting solution to be measured during actual use does not exceed

4.5 Unless otherwise specified, storage containers for standard solutions used in impurity determination shall be clean, dry high-density polyethylene bottles or borosilicate glass bottles. For the acceptance and cleaning of storage containers, reference should be made

to Appendix A.

4.6 Unless otherwise specified, standard solutions used in impurity determination generally have a shelf life of three months when stored in sealed containers at room temperature (15°C to 26°C); they shall be freshly prepared if turbidity, precipitation, or a change in color occurs.

5 Preparation Methods

Warning. Some reagents used in these preparation methods are toxic or corrosive, and certain test procedures may involve hazardous situations; it is the responsibility of the operator to implement appropriate safety and health measures. The preparation methods for standard solutions used in impurity determination shall comply with the provisions of Table 1.

Appendix B

(Normative) Determination of the Mass Fraction of Acetaldehyde (40%) and Hexafluoro silicic Acid, and the Concentration of Solution I (Chlorine) B.1 Determination of the Mass Fraction of Acetaldehyde (40%) Pipette

50.00 mL of hydroxylammonium chloride solution (140 g/L) into a stoppered conical flask and weigh it. Add

1.5 mL of acetaldehyde (40%), immediately stopper the flask tightly, shake occasionally, and let it stand for 30 min. Weigh the flask again (weighing to an accuracy of 0.0001 g in both instances). Add 30 mL of water and 10 drops of bromophenol blue indicator solution (

0.4 g/L), then titrate with sodium hydroxide standard titration solution [c(NaOH)=1 mol/L] until the solution turns blue. A blank test shall be conducted simultaneously. The mass fraction (w) of acetaldehyde (40%) is calculated according to Formula (B.1). Where. V1 -- Volume of sodium hydroxide standard titration solution consumed by the sample, in milliliters (mL); V2 -- Volume of sodium hydroxide standard titration solution consumed in the blank test, in milliliters (mL); c -- Concentration of sodium hydroxide standard titration solution, in moles per liter (mol/L); M -- Molar mass of acetaldehyde, in grams per mole (g/mol) [M(CH3CHO)=

44.05 g/mol]; m -- Mass of the weighed acetaldehyde (40%) sample, in grams (g). B.2 Determination of the Mass Fraction of Hexafluoro silicic Acid Weigh 3 g of hexafluoro silicic acid to the nearest 0.0001 g and place it in a polyethylene beaker. Add 100 mL of water, 10 mL of saturated potassium chloride solution, and 3 drops of phenolphthalein indicator solution (10 g/L). Cool the mixture to 0°C and titrate with sodium hydroxide standard titration solution [c(NaOH)=1 mol/L] until the solution turns pink and remains so for 15 s (V1). Then, heat the solution to approximately 80°C and continue titrating with the sodium hydroxide standard titration solution [c(NaOH)=1 mol/L] until the solution turns a stable pink