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NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 6682-2008

Replacing GB/T 6682-1992

Water for Analytical Laboratory Use -

Specification and Test Methods

分析实验室用水规格和试验方法

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Foreword

This Standard is modified in relation to ISO 3696:1987 "Water for Analytical Laboratory Use - Specification and Test Methods" (English edition).

This Standard was modified during the adoption of ISO 3696: 1987, in consideration of the national conditions of China. Those technical differences have already been incorporated into the text and marked with perpendicular single line on the margin of relevant clauses. Comparison Between chapter and article numbers of this Standard and ISO 3696:1987 is listed in Annex A. Technical differences and reasons between this Standard and ISO 3696:1987 is listed in Annex B for reference.

This Standard replaces "Water for Analytical Laboratory Use - Specification and Test Methods" GB/T 6682 - 1992. Compared with GB/T 6682 - 1992, this Standard has the following main changes:

- ADD the test report (Chapter 8 of this edition).

Annex C of this Standard is normative; Annex A and Annex B are informative.

This Standard is proposed by China Petroleum and Chemical Industry Association.

This Standard is under the jurisdiction of Chemical Reagent Subcommittee of National Technical Committee on Chemical of Standardization Administration of China (SAC/TC 63/SC 3).

Drafting organization of this Standard: Sinopharm Chemical Reagent Co., Ltd.

Main drafters of this Standard: Chen Haoyun, Chen Hong.

This Standard was issued in 1686 for the first time and revised in 1992 for the first time.

Water for Analytical Laboratory Use - Specification and Test Methods

1 Scope

This Standard specifies the level, specification, sampling and storage, test methods and test report of water for analytical laboratory use.

This Standard is applicable to the water for chemical analysis and inorganic trace analysis tests. Water of different levels may be selected according to the requirements of actual work.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 601 Chemical reagent - Preparations of standard volumetric solutions

GB/T 602 Chemical reagent - Preparations of standard solutions for impurity (GB/T 602-2002, ISO 6353-1:1982, NEQ)

GB/T 603 Chemical reagent - Preparations of reagent solutions for use in test methods (GB/T 603-2002, ISO 6353-1:1982, NEQ)

GB/T 9721 Chemical reagent - General rules for the molecular absorption spectrophotometry (ultraviolet and visible)

GB/T 9724 Chemical reagent - General rule for the determination of pH (GB/T 9724-2007, ISO 6353-1:1982, NEQ)

GB/T 9740 Chemical reagent - General method for the determination of dry residue after evaporation (GB/T 9740-2008, ISO 6353-1:1982, NEQ)

3 Appearance

Water for analytical laboratory use shall be colorless, transparent liquid through visual observation.

4 Level

Raw water for analytical laboratory use shall be drinking water or water in proper purity.

Water for analytical laboratory use is classified into three levels: level 1 water, level 2 water and level 3 water.

4.1 Level 1 water

Level 1 water is used for the analytical test with strict requirements, including the test with requirements for particles, such as water for high performance liquid chromatography analysis.

Level 1 water may be prepared by level 2 water after distilled by quartz equipment or treated by ion exchange mixed bed, and then filtered through 0.2μm microporous filtering film.

4.2 Level 2 water

Level 2 water is used for inorganic trace analysis test, such as water for atomic absorption spectroscopy.

Level 2 water may be prepared by such methods as several distillation or ion exchange.

4.3 Level 3 water

Level 3 water is used for general chemical analysis test.

Level 3 water may be prepared by such methods as distillation or ion exchange.

5 Specification

Specification of water for analytical laboratory use is detailed in Table 1.

6.3 Storage

During the storage period of water at various levels, the main contamination sources are soluble constituent of container, carbon dioxide in the air and other impurities. Therefore, level 1 water shall not be stored, but prepared before application. Level 2 water and level 3 water may be prepared in the right amount. They shall be respectively stored in the corresponding containers washed with water of the same level in advance.

Water at various levels shall be prevented from being contaminated during the transportation process.

7 Test Methods

In the test methods, each test shall be carried out in the clean environment and adequate measures shall be taken to prevent the sample from being contaminated. Water sample shall be measured out to the accuracy of 0.1mL; adopted solution represented by "%" is mass fraction.

Analytical reagent and water of corresponding level shall be used in the test.

7.1 pH value

100mL of water sample shall be measured out and determined according to the requirements of GB/T 9724.

7.2 Conductivity

7.2.1 Instrument

7.2.1.1 Conductivity meter for level 1 and level 2 water determination: equipped with "online" conductivity cell with $0.01\text{cm}^{-1}\sim 0.1\text{cm}^{-1}$ electrode constant, have temperature automatic compensation function.

In the case of conductivity meter without temperature compensation function, "online" heat exchanger may be installed to control the water temperature $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ in the determination; or water temperature may be recorded and reduced according to Annex C.

7.2.1.2 Conductivity meter for level 3 water determination: equipped with conductivity cell with $0.1\text{cm}^{-1}\sim 1\text{cm}^{-1}$ electrode constant, have temperature automatic compensation function.

In the case of conductivity meter without temperature compensation function, thermostatic water-bath groove may be installed to control the to-be-measured water

7.4.1 Instrument conditions

Quartz absorption cell: thickness of 1cm and 2cm.

7.4.2 Determination procedures

Respectively POUR the water sample into 1cm and 2cm absorption cells, USE the water sample in 1cm absorption cell as reference at 254nm, DETERMINE the absorbance of water sample in 2cm absorption cell.

If the sensitivity of instrument is insufficient, the thickness of measurement absorption cell may be added properly.

7.5 Evaporation residue

7.5.1 Instrument

7.5.1.1 Rotary evaporator: equipped with 500mL distillation flask.

7.5.1.2 Thermostatic water-bath.

7.5.1.3 Evaporation pan: the materials may be platinum, quartz and borosilicate glass.

7.5.1.4 Electric oven: temperature may be controlled between $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$.

7.5.2 Determination procedures

7.5.2.1 Water sample pre-contraction

MEASURE out 1000mL of level 2 water (500mL of level 3 water), ADD the water sample into the distillation flask of rotary evaporator in several times, CARRY out reduced pressure evaporation on the water bath (avoiding evaporate to dryness), SYOP heating until the water sample is evaporated to 50mL.

7.5.2.2 Determination

TRANSFER the above pre-contraction water sample INTO a evaporation pan constant volume at $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$, RINSE the distillation flask with 5mL~10mL of water sample for twice, COMBINE the washing liquid and pre-contraction water sample into a evaporation pan, DETERMINE according to the requirements of GB/T 9740.

7.6 Soluble silicon

7.6.1 Reagent preparation

7.6.1.1 Silicon dioxide standard solution (1mg/mL)

It shall be prepared according to the requirements of GB/T 602.

The preparation of standard colorimetric solution: TAKE 0.50 mL of silicon dioxide standard solution (0.01mg/mL), DILUTE to 20mL with water sample, treat meanwhile and likewise with the test solution of the same volume.

8 Test Report

Test report shall include the following contents:

- a) Sample determination;
- b) Referenced adopted method;
- c) Results and representation methods;
- d) Abnormal phenomena description in the determination;
- e) Any operation not included in this Standard.

Annex B

(Informative)

Technical Differences and Reasons Between this Standard and ISO 3696:1987

B.1 Technical differences and reasons between this standard and ISO 3696:1987 are detailed in Table B.1.

Table B.1 Technical differences and reasons between this Standard and ISO 3696:1987

Chapter and article numbers of standard	Technical differences	Reasons
1	ADJUST literal description of scoped.	Developing according to the standard development rules of China.
2	ADD normative references.	To meet the national conditions of China
6	ADJUST literal description of sampling and storage.	To meet the national conditions of China
7.1	REPLACE silver-silver chloride electrode BY glass-saturated calomel electrode according to the requirements of GB/T 9724.	This kind of electrode is prevalent in China.
7.2	ADD method for converting the conductivity measured under the actual water temperature to that at 25°Cd.	To meet the national conditions of China
7.3.1.1	REPLACE 1mol/L sulfuric acid solution BY sulfuric acid solution (20%) prepared according to GB/T 603.	General rules of quoted national standards.
7.5.1.1	REPLACE 250mL distillation flask BY 500mL distillation flask.	Distillation flask of this specification is convenient.
7.5.1.4	REPLACE 110°C±2°C electric oven BY 105°C±2°C electric oven according to the requirements of GB/T 9740.	General rules of quoted national standards.
7.6.1.1	PREPARE 0.1mg/mL silicon standard solution according to GB/T 602.	General rules of quoted national standards.
7.6.1.2	REPLACE 1mL of solution with 0.005mg of SiO ₂ BY 1mL of solution with 0.01mg of SiO ₂ .	To add operability.
7.6.1.5	REPLACE 2.5mol/L sulfuric acid solution BY sulfuric acid solution (20%) prepared according to GB/T 603.	General rules of quoted national standards.

13	1.3142	0.00276	36	0.8233	0.00950
14	1.2831	0.00292	37	0.8126	0.00994
15	1.2530	0.00312	38	0.8027	0.01044
16	1.2237	0.00330	39	0.7936	0.01088
17	1.1954	0.00349	40	0.7855	0.01136
18	1.1679	0.00370	41	0.7782	0.01189
19	1.1412	0.00391	42	0.7719	0.01240
20	1.1155	0.00418	43	0.7664	0.01298
21	1.0906	0.00441	44	0.7617	0.01351
22	1.0667	0.00466	45	0.7580	0.01410
46	0.7551	0.01464	49	0.7518	0.01650
47	0.7532	0.01521	50	0.7525	0.01728
48	0.7521	0.01582			

END

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