

JIS

JAPANESE INDUSTRIAL STANDARD

General rule for test methods of
highly purified reagents

JIS K 8007-1992

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In the event of any doubt arising, the original
standard in Japanese is to be evidence

Translated
by
Japanese Standards Association

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of highly purified reagents

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1. Scope This Japanese Industrial Standard specifies general matters common to the tests of highly purified reagents. However, when a difference exists between this Standard and an individual standard, the individual standard shall apply.

Remarks: Cited standards in this Standard are as given in Attached Table 1.

2. Definitions For the main terms used in this Standard, the definitions in JIS K 0114, JIS K 0115, JIS K 0116, JIS K 0121, JIS K 0127, JIS K 0211, JIS K 0212, JIS K 0214, and JIS K 0215 apply, and the rest of the terms shall be as follows:

- (1) air tight container A container which can be closed again after unsealing. The container wherein permeation of liquid, deterioration of contents, vaporization, loss, etc. are as little as possible in daily handling or preservation (hard glass bottle, polyethylene bottle, can, polyethylene bag to be used by heat sealing, etc.)
- (2) hermetically sealed container A container of which contents' use is limited only when it is unsealed or of which contents are taken out with a syringe or the like without unsealing. The container into which gas infiltrates as little as possible in daily handling or preservation (an ampul vial, etc.)
- (3) diluted standard solution A solution which is prepared by diluted standard solution to aimed density. It is used as solution for working curve or for calibration of the working curve.
- (4) mixed standard solution A solution of which each component is prepared to aimed density by mixing standard solutions or diluted standard solution of different components. It is used as solution for working curve or for confirmation of the working curve.
- (5) inductively coupled plasma mass spectrometer An apparatus which ionizes an element by using an inductively coupled plasma and measures its mass.
- (6) inductively coupled plasma mass spectrometry A mass spectrometry which uses an inductively coupled plasma mass spectrometer.
- (7) sampling cone A part at the connection part of a plasma source and a mass spectrometer in an inductively coupled plasma mass spectrometer, which is a conical metallic tool with small hole for taking ions in from an ion source.
- (8) skimmer cone A part at the connection part of a plasma ion source and a mass spectrometer in an inductively coupled plasma mass spectrometer, which is a conical metallic tool with small hole for taking ions having passed through a sampling cone into the mass spectrometer.

- (9) sampling depth A distance between a high frequency coil (a central axis of a tube at a portion a little near to a sampling cone) and the sampling cone in an inductively coupled plasma mass spectrometer.
- (10) ion chromatograph An apparatus which detects an ion in solution by an ion chromatographic analysis to perform determination.
- (11) separation column A column for separating a necessary component in an ion chromatography.
- (12) suppressor An apparatus which reduces electric conductivity becoming a background without impairing detection of an aimed ion where an electric conductivity detector is used in an ion chromatography.
- (13) regenerating solution Solution to be used for regeneration or successive maintenance of a function of a suppressor. It is also called remover solution.
3. Common items Common items shall be in accordance with JIS K 0050.
4. Water and reagents For water and reagents, those specified in this Standard shall be used:
- (1) Water Water to be used in this Standard shall be A1 to A4 distillation water as given in Table 1 or demineralized water. The A1 to A3 water shall be used after confirming that the blank test value of a test objective component which is measured by using the test method specified in each standard is at most 1/5 of the test value of the sample.

Table 1. Classification of water

Item	Classification			
	A1	A2	A3	A4
Electric conductivity ⁽¹⁾ (mS/m) (25°C)	0.5 max.	0.1 ⁽²⁾ ⁽³⁾ max.	0.1 ⁽²⁾ max.	0.1 ⁽²⁾ max.
Total organic carbon (TOC) ⁽⁴⁾ (mgC/l)	1 max.	0.5 max.	0.2 max.	0.05 max.
Zinc ⁽⁵⁾ (µgZn/l)	0.5 max.	0.5 max.	0.1 max.	0.1 max.
Silica ⁽⁶⁾ (µgSiO ₂ /l)	-	50 max.	5.0 max.	2.5 max.
Chloride ion ⁽⁷⁾ (µgCl ⁻ /l)	10 max.	2 max.	1 max.	1 max.
Sulfate ion ⁽⁷⁾ (µgSO ₄ ²⁻ /l)	10 max.	2 max.	1 max.	1 max.
Test by potassium permanganate (ml) ⁽⁸⁾	-	0.5 max.	0.3 max.	0.2 max.

- Notes (1) The measurement shall be as described in JIS K 0552.
- (2) This is the value obtained when outlet water of a water purifier is measured by introducing it directly into the detection part of an electric conductivity meter.
- (3) Where a filter such as a precision filter or the like is connected directly to the outlet of an ion exchange equipment at a final process and outlet water is introduced directly into the detection part of an electric conductivity meter, the electric conductivity shall be at most 0.01 mS/m (25°C).
- (4) The measurement shall be as described in JIS K 0551.
- (5) The measurement shall be as described in JIS K 0553.
- (6) The measurement shall be as described in JIS K 0555.
- (7) The measurement shall be as described in JIS K 0556.
- (8) This is the amount (ml) of 5 mmol/l potassium permanganate solution consumed during the heating operation for 30 min of solution made up by such manner ; take 100 ml of water and make it acidic with sulfuric acid, then add the specific amount of 5 mmol/l potassium permanganate solution.

Remarks: The uses and refining methods of A1 to A4 water shall be generally as follows.

A1 water is used for washing appliances and raw materials of A2 to A4 water. It is refined by an ion exchange method in the final process or is refined by a method capable of obtaining the quality at least equivalent thereto.

A2 water is used for general-chemical analysis or raw materials of A3 to A4 water or the like. It is obtained by refining A1 water by combination of an ion exchange equipment, a precision filter, etc. in a final process or by refining it by a method capable of obtaining the quality at least equivalent thereto.

A3 water is used for preparation of reagents, chemical analysis of trace components, etc. It is obtained by refining A1 or A2 water by a distillation method in a final process or by refining it by a method capable of obtaining the quality at least equivalent thereto.

A4 water is used for the test of organic material [tests for total organic carbon (TOC), COD_{Mn}, etc.], chemical analysis of trace components, etc. It is obtained by refining A1 or A2 water by a distillation method wherein oxidizing agents (potassium permanganate or the like) are coexisted in a final process or by refining by a method capable of obtaining the quality at least equivalent thereto.

- (2) Reagents For reagents, the upmost grade product marked with JIS or those at least equivalent thereto in quality shall be used. However, reagents ⁽⁹⁾ such as highly purified acid or the like on the market for special uses of which the blank test value by the test specified in each standard of the highly purified reagents is lower than those of the reagents abovementioned, shall be used.

Note ⁽⁹⁾ Under the name of ultra highly purified reagents, reagents for precision analysis, chemicals for electronic industry, etc., reagents such as hydrochloric acid, nitric acid, sulfuric acid, hydrofluoric acid, aqueous ammonia, carbon tetrachloride, chloroform, etc. come into the market.

5. Instruments and container For instruments and container, those specified in this Standard shall be used.

- (1) Glassware For glassware, that of hard grade 1 ⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾ specified in JIS R 3503 shall be used.

Notes ⁽¹⁰⁾ Sodium, potassium, boron, silica, aluminum, etc. which are components of glass, are slightly eluted. Since arsenic and zinc are occasionally slightly eluted according to the product, it is used after confirming that it does not impair the test.

⁽¹¹⁾ The instrument having a ground glass part is likely to be stained at the ground glass part. That of transparent ground glass shall be used.

⁽¹²⁾ Where the analysis of silicate is aimed, the glassware shall be used after confirming that it does not impair the test.

- (2) Quartz instrument For quartz instrument, that made of transparent quartz glass ⁽¹¹⁾⁽¹²⁾ shall be used.

- (3) Synthetic resin instrument For synthetic resin instrument, that made of tetrafluoroethylene resin ⁽¹³⁾, polyethylene resin ⁽¹⁴⁾, polypropylene resin ⁽¹⁵⁾ or acrylic resin ⁽¹⁶⁾ shall be used.

Notes ⁽¹³⁾ Tetrafluoroethylene resin which is not joined by a color agent, a filler, etc. Heavy metals such as iron, chromium, nickel, copper, zinc, etc. are occasionally slightly eluted. Since foreign matters mixed in forming are occasionally contained, it shall be used after confirming that it does not impair the test.

⁽¹⁴⁾ High density polyethylene which is not joined by a color agent, a filler, etc. Since heavy metals such as iron, chromium, titanium, etc. are occasionally slightly eluted, the polyethylene resin shall be used after confirming that it does not impair the test. It is not used for the test using high concentration nitric acid.

(¹⁵) Polypropylene resin which is not joined by a color agent, a filler, etc. Since heavy metals such as iron, titanium, etc. are occasionally slightly eluted, it shall be used after confirming that it does not impair the test. It is not used for the test using a high concentration sulfuric acid.

(¹⁶) Methacrylic ester resin. That which is not joined by a flame retardant or the like. It is not used for the test using high concentration hydrochloric acid.

(4) Platinum instrument For platinum instrument, those (¹⁷) specified in JIS H 6201, JIS H 6202, and JIS H 6203 shall be used.

Note (¹⁷) Since palladium, rhodium, ruthenium, iridium, gold, silver, copper, iron, etc. are contained as alloy component or impurities, the platinum instrument shall be used after confirming that it does not impair the test.

(5) Preservation container For preservation container, the air tight container made of tetrafluoroethylene resin (¹³) or polyethylene resin (¹⁴) shall be used for preservation of testing solutions. It shall be used after confirming that a test objective component is not eluted.

6. Washing and preservation of instruments and container The washing and preservation of instruments and container shall be carried out in accordance with this Standard.

(1) Washing of glassware and quartz instrument After washing the glassware and the quartz instrument with warm nitric acid (1+1), sufficiently rinse with water. When used for the first time after purchasing, preliminarily wash with detergent and city water. After washing with water and acetone in this order, carry out the abovementioned operation.

Just before use, wash necessarily with any water among A1 to A3 according to the purpose of the test.

(2) Washing of synthetic resin instrument After dipping the synthetic resin instrument in nitric acid (1+3) contained in a polyethylene container for 0.5 day or longer, rinse sufficiently with water. When used for the first time after purchasing, after preliminarily washing with detergent and city water, water, and acetone in this order, dip into nitric acid (1+3) contained in a polyethylene container for 0.5 day or longer, wash by an ultrasonic wave for 0.5 day or longer. Thereafter, rinse sufficiently with water.

Just before use, wash necessarily with any water of A1 to A3 according to the purpose of the test.

(3) Washing of platinum instrument After heating the platinum instrument dipped in nitric acid (1+3) at 80°C or higher for one day or longer, rinse sufficiently with water (¹⁸).

Just before use, wash necessarily with any water of A1 to A3 according to the purpose of the test.

Note (¹⁸) Where any contamination by the previous sample is observed, after removing the contamination by fusing potassium disulfate, carry out this operation.