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

GB/T 534-2014

Sulphuric acid for industrial use

工业硫酸

(English Translation)

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1 Scope

This Standard specifies the classification, requirements, test methods, inspection rules and marks, transportation, storage and safety of sulphuric acid for industrial use.

This Standard applies to sulphuric acid for industrial use produced from pyrite, sulfur, smelting flue gas or other sulfur-containing raw materials.

2 Normative references

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

GB 190-2009, Packing symbol of dangerous goods

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

GB/T 602, Chemical reagent - Preparations of standard solutions for impurity

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

GB/T 610, Chemical reagent - General method for the determination of arsenic

GB/T 6680, General rules for sampling liquid chemical products

GB/T 6682-2008, Water for analytical laboratory use - Specification and test methods

GB/T 8170, Rules of rounding off for numerical values and expression and judgement of limiting values

3 Product classification

Sulphuric acid for industrial use is divided into concentrated sulphuric acid and fuming

Keep away from light.

5.5.1.2.6 Iron (Fe) standard solution. 0.1mg/mL.

5.5.1.2.7 Iron (Fe) standard solution. 10µg/mL.

Measure 10.00mL of iron standard solution (5.5.1.2.6) into a 100mL volumetric flask.

Use water to dilute to the scale. Shake well. Prepare this solution when it is required.

5.5.1.3 Instruments

Spectrophotometer. with 1cm cuvette.

5.5.1.4 Analysis steps

5.5.1.4.1

Drawing of working curve

Take five 50mL volumetric flasks. Add 0mL, 2.50mL, 5.00mL, 7.50mL, 10.00mL of iron standard solution (5.5.1.2.7) respectively. Do the following for the solution in each volumetric flask. Add water to about 25mL. Add 2.5mL of hydroxylamine hydrochloride solution (5.5.1.2.3) and 5mL of acetic acid-sodium acetate buffer solution (5.5.1.2.4). After 5min, add 5mL of o-phenanthroline hydrochloric acid solution (5.5.1.2.5). Use water to dilute to the scale. Shake well. Leave it for

15min~30min to develop color.

At the wavelength of 510nm, use a 1cm cuvette. Use the blank solution without iron standard solution as a reference. Use a spectrophotometer to determine the absorbance of

the above solution.

Take the mass of iron in the above solution (in micrograms) as the abscissa, and the corresponding absorbance value as the ordinate, to draw the working curve. Or calculate a linear regression equation based on the obtained absorbance value.

5.5.1.4.2

Determination

Weigh 10g~20g of specimen, accurate to 0.01g. Put in a 50mL beaker. Evaporate to dryness on a sand bath (or temperature-controlled hotplate). Cool. Add 2mL of hydrochloric acid solution (5.5.1.2.2) and 25mL of water. Heat to dissolve the salt.

Transfer to a 100mL volumetric flask. Use water to dilute to the scale. Shake well.

Use a pipette to measure a certain volume of the test solution. Place it in a 50mL volumetric flask. Make the corresponding iron mass between 10 μ g~100 μ g. Add water to dilute to about 25mL. Then follow the steps in "Add 2.5mL of hydroxylamine hydrochloride solution (5.5.1.2.3)... develop color" in 5.5.1.4.1.

At a wavelength of 510nm, use a 1cm cuvette. Use the blank solution without iron standard solution as a reference. Use a spectrophotometer to determine the absorbance of the test solution.

Measure 10.00mL of iron standard solution (5.5.2.3.2) into a 100mL volumetric flask.

Use water to dilute to the scale. Shake well. Prepare this solution when it is required.

5.5.2.4 Instruments

5.5.2.4.1

Dropping bottle. the capacity is about 30mL.

5.5.2.4.2

Atomic absorption spectrophotometer (with iron hollow cathode lamp).

5.5.2.5 Analysis steps

5.5.2.5.1

Drawing of working curve

Take five 50mL volumetric flasks. Add 0mL, 1.00mL, 2.00mL, 3.00mL, 4.00mL of iron standard solution (5.5.2.3.3) respectively. Add 25mL of nitric acid solution (5.5.2.3.1) to each. Use water to dilute to the scale. Shake well.

On an atomic absorption spectrophotometer, according to the working conditions of the instrument, with air-acetylene flame, carry out zero adjustment with blank solution without

adding iron standard solution. Determine the absorbance of the solution at a wavelength of 248.3nm.

Take the mass of iron in the above solution (in micrograms) as the abscissa, and the corresponding absorbance value as the ordinate, to draw the working curve. Or calculate a linear regression equation based on the obtained absorbance value.

5.5.2.5.2

Determination

Use a dropping bottle filled with specimen. Weigh 4g~10g of specimen by subtraction method, accurate to 0.01g. Put in a 50mL beaker. Evaporate slowly to dryness on a sand bath (or an adjustable temperature electric stove). Cool. Add 25mL of nitric acid solution (5.5.2.3.1). Heat to dissolve the residue. Then evaporate to dryness. Cool. Add

25mL of nitric acid solution to dissolve the residue. Transfer to a 50mL volumetric flask.

Use water to dilute to the scale. Shake well.

On the atomic absorption spectrophotometer, according to the working conditions of the instrument, with air-acetylene flame, carry out zero adjustment with blank solution without adding iron standard solution. Measure the absorbance of the solution at a wavelength of 248.3nm. According to the absorbance value of the test solution, find out from the working curve or calculate the mass of iron in the teste solution according to the linear regression equation.

5.5.2.6 Calculation of results

The mass fraction w_5 of iron (Fe) is calculated according to formula (5).

Weigh 0.5g of potassium hydroxide. Place it in a 150mL beaker. Add about 50mL of water to make it completely dissolved. Add the weighed 1.5g of potassium borohydride

[$w(\text{KBH}_4) \geq 95\%$]. Use water to dilute to 100mL. Shake well. This solution shall be stored away from light. Prepare it when it is required.

5.6.1.3.4 Thiourea-ascorbic acid solution. 50g/L.

Weigh 5g of thiourea and ascorbic acid, respectively. Use water to slightly dissolve and dilute to 100mL.

5.6.1.3.5 Arsenic (As) standard solution. 0.1mg/mL.

5.6.1.3.6 Arsenic (As) standard solution. 1 μ g/mL.

Measure 1.00mL of arsenic standard solution (5.6.1.3.5) into a 100mL volumetric flask.

Use water to dilute to the scale. Shake well. Prepare this solution when it is required.

5.6.1.3.7 Arsenic (As) standard solution. 0.1 μ g/mL.