



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

GB 1886.213-2016

**National Food Safety Standard -- Food Additives -- Sulfur
dioxide**

食品安全国家标准 食品添加剂 二氧化硫

(English Translation)

Issued on: August 31, 2016

Implemented on: January 1, 2017

Issued by: National Health and Family Planning Commission

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1 Scope

This standard is applicable to the absorption method, pure oxygen combustion sulfur method, sulfur trioxide - sulfur method of food additives liquid sulfur dioxide or absorption method of the food additive sulfur dioxide solution.

2.1 Molecular formula

SO₂

2.2 Relative molecular mass

64.06 (according to 2013 international relative atomic mass)

3.1 Sensory requirements

Sensory requirements shall comply with the requirements of Table 1.

Table 1 sensory requirements

The project requires a test method Color and colorless State gas or liquid the liquid sulfur dioxide is sampled according to the provisions of 4.2 of GB/T 3637-2011 in natural light to observe the color and state; sulfur dioxide solution can be directly observed

3.2 Physical and chemical indicators

Physical and chemical indicators should be consistent with the provisions of Table 2.

Table 2 Physical and chemical indicators

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Liquid sulfur dioxide sulfur dioxide solution Testing method Sulfur dioxide content (SO₂), w /% >=99.9 6.0 ~ 7.0 Appendix A, A.4 Lead (Pb)/(mg/kg) <= 2.0 - Appendix A A.5 Selenium (Se)/(mg/kg) <= 20.0 2.0 Appendix A A.6 Arsenic (As)/(mg/kg) <= 2.0 0.20 A.7 in Appendix A

Table 2 (continued)

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Liquid sulfur dioxide sulfur dioxide solution Testing method Iron (Fe)/(mg/kg) <= - 5.0 Appendix A A.8 Moisture, w /% <= 0.05 - Appendix A, A.9 Nonvolatile matter, w /% <= 0.05 - Appendix A. A.10 Chloride (in terms of Cl)/(mg/kg) <= - 5 Appendix A A.11 Heavy metals (Pb)/(mg/kg) <= - 2 GB 5009.74 Residue on ignition (mg/kg) <= - 50 Appendix A. A.12 Appendix A Testing method A.1 Warning Sulfur dioxide gas on the eyes, throat and respiratory system has a strong corrosive, the operation should be in a well-ventilated state, the author should do personal protection (such as wearing chemical safety glasses, rubber oil gloves, if necessary, wear filter gas masks).

Some of the reagents used in this test method are toxic or corrosive and the operator should be careful to spill on the skin and immediately use water Rinse, severe should be treated immediately. When using flammable products, it is forbidden to use open flame.

A.2 General provisions the reagents and water used in this standard, when not specified in other requirements, refer to the analysis of pure reagents and GB/T 6682 provides three levels of water. test the standard solution, impurity standard solution, preparation and preparation used in the test shall be classified according to GB/T 601, GB/T 602, GB/T 603. The solution used in the experiment, when not specified with the preparation of the solvent, refers to the aqueous solution.

A.3 Identification test A.3.1 Reagents and materials A.3.1.1 Mercury bromide test paper.

A.3.1.2 Starch - Potassium Iodide Test Paper.

A.3.2 Identification method A.3.2.1 Identification of sulfur-containing substances the sample can make the wet mercury bromide test paper black.

A.3.2.2 Identification of oxidizing properties the sample can make the wet starch - potassium iodide test paper blue.

A.4 Determination of sulfur dioxide (SO₂) content A.4.1 Differential subtraction (for liquid sulfur dioxide) Sulfur dioxide (SO₂) content of the mass fraction w₁, according to formula (A.1) calculation.

$w_1 = 100\% - (w_3 w_4)$ (A.1) where.

w₃ --- moisture content as measured by A.9,%;

w4 ---% of the nonvolatile matter measured by A.10%.

The results are fixed to 1 decimal place.

A.4.2 Volumetric method (for sulfur dioxide solution) A.4.2.1 Methodological Summary in a weakly acidic solution, the sulfite ions are oxidized to sulfuric acid ions with iodine. Starch as an indicator, with sodium thiosulfate standard drops Set the solution to titrate excess iodine.

A.4.2.2 Reagents and materials A.4.2.2.1 Iodine standard solution. $c(I_2) = 0.1 \text{ mol/L}$.

A.4.2.2.2 sodium thiosulfate standard titration solution. $c(Na_2S_2O_3) = 0.1 \text{ mol/L}$.

A.4.2.2.3 Soluble Starch Solution. 5 g/L.

A.4.2.3 Analysis steps Remove 50mL iodine standard solution, placed in iodine bottle. Weigh about 2.0g sample, accurate to 0.0002g, add to the iodine bottle, add Plug, water seal, placed in the dark 5min. Titration with sodium thiosulfate standard titration solution, near the end, add 2mL of soluble starch solution, Continue titration until the solution blue disappears as the end point. While the blank test.

Blank test In addition to the sample, the other types of operation and addition of reagents (except for the standard titration solution) and the same test sample.

A.4.2.4 Calculation of results Sulfur dioxide (SO₂) content of the mass fraction w₂, according to formula (A.2) calculation.

$$w_2 = \frac{(V_1 - V_2) \times c \times M}{m_1 \times 1000} \times 100\%$$

100% (A.2)

Where.

V₁ - Volume of sodium thiosulfate standard titration solution consumed in blank test, in milliliters (mL);

V₂ --- titration test solution consumed by sodium thiosulfate standard titration solution in milliliters (mL);

c - the concentration of sodium thiosulfate standard titration solution in moles per liter (mol/L);

M - the molar mass of sulfur dioxide in grams per mole (g/mol) [M (2SO₂) = 32.03];

m₁ --- the quality of the sample, in grams (g);

1000 --- conversion factor.

The results of the test are based on the arithmetic mean of the parallel measurement

results. The absolute difference between the two independent determinations obtained under repeatability conditions Value is not greater than 0.2%.

A.5 Determination of lead (Pb) A.5.1 Reagents and materials Nitric acid.

A.5.2 Instruments and equipment Boiling water bath.

A.5.3 Analysis steps A.5.3.1 Sampling After sampling according to 4.1.1 of GB/T 3637-2011, 50 g of the sample was weighed and placed in a conical flask.

A.5.3.2 Preparation of Test Solution A.

Place the conical flask with the sample in a boiling water bath (during heating, add a small amount of water to prevent the sample from drying) Oxidation of sulfur so far. Add 3mL nitric acid and 10mL water, heated with electric furnace for 15min, should not be evaporated. After cooling the cone in the bottle the solution was transferred to a 100 mL volumetric flask, diluted with water to a graduated volume, shaken and removed from 10 mL to 100 mL volumetric flask, diluted with water Scale, shake. This solution is the test solution A, for the sample lead content and the determination of selenium content.

A.5.3.3 Determination the test solution A was measured according to GB 5009.12.

A.6 Determination of selenium (Se) Determination of liquid sulfur dioxide sample. Remove 0.5 mL of test solution A, the following according to the provisions of GB 5009.93-2010 operation and measured.

Sulfur dioxide solution sample determination. Weigh 2g sample, accurate to 0.001g, placed in a beaker, add 10mL of water, in the boiling water bath Evaporated to a volume of about 5mL, with 5mL hydrochloric acid solution (6mol/L) to dissolve the residue, placed in the electric furnace heated to produce white smoke after cooling, turn Transferred to 100mL volumetric flask, diluted with water to the mark, shake. Remove 10mL of the solution, the following according to the provisions of GB 5009.93-2010 to operate and measure.

A.7 Determination of arsenic (As) Liquid sulfur dioxide sample determination. according to the provisions of GB 5009.76 test solution A determination.

Sulfur dioxide solution sample determination. Weigh 40g sample, accurate to 0.01g, placed in the electric furnace to keep the micro-boiling to the test solution to the volume About 5mL, cooling, according to the provisions of GB 5009.76 determination.

A.8 Determination of iron (Fe) A.8.1 Reagents and materials A.8.1.1 Ammonia solution. 10%.

A.8.1.2 Ascorbic acid solution. 100 g/L.

A.8.1.3 Acetic acid-sodium acetate buffer solution (pH ~ 3).

A.8.1.4 1,10-phenanthroline solution. 2 g/L.