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*भारतीय मानक मसौदा*

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*(आई एस 7908 का दूसरा पुनरीक्षण)*

*Draft Indian Standard*

**SULPHUR DIOXIDE, FOOD GRADE — SPECIFICATION**  
*(Second Revision of IS 7908)*

**ICS 67.220.20**

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Food Additives Sectional Committee, FAD 08      **Last date for comments:** 22 February 2025

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**FOREWORD**

*(Adoption clauses would be added later)*

Food additives are added to improve the appearance, flavour, texture or storage properties, etc of the processed foods. As certain impurities in these substances have been found to be harmful, it is necessary to have a strict quality control of these food additives. A series of standards have, therefore, been prepared to cover purity and identification of these substances. These standards would help in checking purity, which is required to be checked at the stage of manufacture, for it is extremely difficult to detect the impurity once these substances have been added to the processed foods. Besides, these standards are intended to guide the indigenous manufacturers in making their product conform to specifications that are accepted by scientists, health authorities and national/international bodies.

Use of sulphur dioxide, food grade as a preservative and antioxidant is permitted under the *Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011*.

**Chemical Name** — Sulphur dioxide, sulphurous acid anhydrate. Its empirical formula is SO<sub>2</sub>. Its molecular weight is 64.007.

This standard was first published in 1975. In preparation of this standard, considerable assistance was derived from Compendium of Food Additive Specifications, Volume 2, Joint FAO/WHO

Expert Committee on Food Additives (JECFA), 1992; and Food Chemical codex (FCC), Third Edition, 1981. National Academy of Science, National Research Council, Washington D.C., USA.

It was first revised in 1997 to incorporate the requirement of solubility to keep it in line with FCC; to provide the requirements for heavy metals and moisture and their corresponding test methods; and to make the limit for selenium more stringent.

In this revision, one amendment issued to the previous version of the standard has been incorporated and the following major changes have been made:

- a) The word 'on dry basis' has been removed for the requirement of purity.
- b) The requirement for heavy metals has been removed as the limit of lead (contaminant in food colours) is already covered through the standard; and
- c) The marking requirements have been updated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1 SCOPE

This standard prescribes the requirements and methods of sampling and test for sulphur dioxide, food grade.

## 2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

<i>IS No.</i>	<i>Title</i>
IS 1070 : 2023	Reagent grade water — Specification ( <i>fourth revision</i> )
IS 1699 : 2024	Food colours — Methods of sampling and test ( <i>third revision</i> )
IS 2432 : 2024	Liquid sulphur dioxide – Specification ( <i>second revision</i> )

## 3 DESCRIPTION

Sulphur dioxide shall be a colorless, nonflammable gas, with a strong, pungent suffocating odor. 36 volumes shall be soluble in 1 volume of water and 114 volumes shall be soluble in 1 volume of ethanol.

NOTE — The solubility is intended only as information regarding approximate solubility and is not to be considered as a quality requirement and is of minor significance as a means of identification or determination of purity.

## 4 REQUIREMENTS

**4.1** Sulphur dioxide shall blacken filler paper moistened with mercurous nitrate.

**4.2** Potassium iodate with starch on filter paper shall give a blue colour when exposed to sulphur dioxide. The blue colour shall fade on continued exposure.

**4.3** Filter paper moistened with acidified potassium dichromate shall give a green color when exposed to sulphur dioxide.

**4.4** The material shall conform to the requirements given in Table 1.

**Table 1 Requirements for Sulphur Dioxide, Food grade**  
(*Clause 4.4*)

<b>S.No.</b>	<b>Characteristic</b>	<b>Requirement</b>	<b>Method of Test, Ref. to Annex A</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
i)	Purity (as SO <sub>2</sub> ), percent by mass, <i>Min</i>	99.9	<b>A-1</b>
ii)	Non-volatile residue	To conform the test	<b>A-2</b>
iii)	Selenium , mg/kg, <i>Max</i>	20	<b>A-3</b>
iv)	Lead (Pb), mg/kg, <i>Max</i>	5	<b>A-4</b>

v)	Arsenic (as As), mg/kg, <i>Max</i>	3	<b>A-5</b>
vi)	Moisture, percent by mass, <i>Max</i>	0.05	<b>A-3</b> of IS 2432

## **5 PACKING**

The gas shall be compressed in cylinders. The design of the cylinders, pressure of gas in cylinders, packing, marking, painting, labelling and transport of cylinders shall be in accordance with *Gas Cylinder Rules*, 2016, with such modifications as may be ordered from time to time by the Chief Inspector of Explosives, Government of India or other duly constituted authority.

## **6 MARKING**

### **6.1 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

## **7 SAMPLING**

The representative samples of the material shall be drawn according to the method prescribed in Annex B of IS 2432.

## **8 TESTS**

**8.1** Tests shall be carried out by the method referred to in col (4) of Table 1.

### **8.2 Quality of Reagents**

Unless specified otherwise, pure chemicals and distilled water (*See* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

**ANNEX A**

[Table 1, SI. No. (i)]

**METHODS OF ANALYSIS FOR SULPHUR DIOXIDE, FOOD GRADE**

**A-1 PURITY**

**A-1.1 Titrimetric Method**

An accurately measured volume of the gas shall be absorbed in alkaline solution and determined by iodometric titration.

**A-2 NON VOLATILE RESIDUE**

**A-2.1** Collect 300 ml of liquid sulphur dioxide in a 500 ml Erlenmeyer flask and stopper the flask tightly with a cotton plug. Evaporate under a well-ventilated hood. When evaporation shall be complete, only a trace of residue shall be observed in the flask.

**A-3 DETERMINATION OF SELENIUM**

**A-3.1 Reagents**

**A-3.1.1 Selenium Stock Solution**

Transfer 120.0 mg of metallic selenium (Se) into a 1000 ml volumetric flask, add 100 ml of dilute nitric acid (1 in 2), warm gently on a steam bath to effect solution and dilute to volume with water. Transfer 5.0 ml of this solution into a 200 ml volumetric flask, dilute to volume with water, and mix. Each milliliter of this solution contains 3 µg of selenium ion (Se).

**A-3.1.2 Standard Selenium solution**

Just prior to use, transfer 20.0 ml of selenium stock solution (60 µg Se) into a 200 mm x 25 mm test tube, add 20 ml of hydrochloric acid, and mix.

**A-3.1.3 Sample Solution**

Transfer 2.0 ml of the sample to a 250 ml Erlenmeyer flask, and cautiously add 10 ml of 30 percent hydrogen peroxide. After the initial reaction has subsided, add 6 ml of 70 percent perchloric acid, heat slowly until white fumes of perchloric acid are copiously evolved, and continue heating gently for a few minutes to ensure decomposition of any excess peroxide. If the solution is brownish in color due to undecomposed organic matter, add a small portion of the peroxide solution and heat again to white perchloric acid fumes, repeating, if necessary, until decomposition of the organic matter shall be complete and a colourless solution is obtained, Cool, add 10 ml of water, and filter into a 200 mm x 25 mm test tube. Wash the filter paper with hot water until the filtrate measures 20 ml, add 20 ml of hydrochloric acid, and mix.

**A-3.2 Procedure**

Place the test tubes containing the standard selenium solution and the sample solution in a water-bath, and heat until the temperature of the solutions reaches 40 °C. To each tube, add 400 mg of ascorbic acid, stir until dissolved, and maintain at 40 °C for 30 min. Cool the solutions, dilute with

water to 50 ml, and mix. Any pink colour produced by the sample solution shall not exceed that produced by the standard solution.

#### **A-4 TEST FOR LEAD**

##### **A-4.1 Sample Solution for the Determination Lead, and Arsenic**

**A-4.1.1** Measure out 100 ml of sulphur dioxide (144 g) into a 125 ml Erlenmeyer flask, and determine the weight of sample taken by the loss in weight of the sample bomb. Evaporate to dryness on a steam bath, add 3 ml of nitric acid and 10 ml of water to the dry flask, and warm gently on a hot plate for 15 min.

Transfer the contents of the flask to a 100 ml volumetric flask, dilute to volume with water, and mix. Transfer a 10.0 ml aliquot into a second 100 ml volumetric flask, dilute to volume with water, and mix.

NOTE — The tests in which this solution is to be used will be accurate assuming a 144 g sample has been taken. If not, the weight of sample actually taken must be considered in the calculation.

##### **A-4.2 Procedure**

A 7.0 ml portion of the sample solution (**A-4.1**) diluted to 40 ml with water meets the requirements of the lead when tested as per IS 1699 using 10 µg of lead ion (Pb) in the control.

#### **A-5 TEST FOR ARSENIC**

A 7.0 ml portion of the sample solution (**A-4.1**) diluted to 35 ml with water meets the requirements of the arsenic when tested as per IS 1699.