

**BUREAU OF INDIAN STANDARDS**

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*भारतीय मानक मसौदा*

**एस्कॉर्बिक एसिड, खाद्य ग्रेड — विशिष्टि**  
*(आई एस 5342 का दूसरा पुनरीक्षण)*

*Draft Indian Standard*

**ASCORBIC ACID, FOOD GRADE — SPECIFICATION**

*(Second Revision of IS 5342)*

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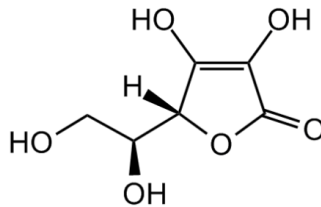
**FOREWORD**

*(Formal 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.

Ascorbic acid, food grade used as a food additive is permitted under the *Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011*.

**Chemical Names** — Ascorbic acid: *l*-ascorbic acid, 3-keto-/-gulofuranolactone. Its empirical formula is C<sub>6</sub>H<sub>8</sub>O<sub>6</sub> and molecular weight is 176.13. Structural formula of ascorbic acid is:



This standard was first published in 1968. In preparation of this standard, considerable assistance has been derived from Specification for identity and purity of food additives. Vol I Antimicrobial preservatives and antioxidants 1962, Food and Agricultural Organization of the United Nations and the World Health Organization Rome; and Ministry of Health, Pharmacopoeia of India, 1966.

This standard was first revised in 1996 to incorporate the requirement of solubility to make it in line with the food chemical codex NRC; to provide the requirement for the heavy metals and the corresponding test method; to include instruction for storage and expiry date under marking clause; and to align the requirement of specific rotation requirement with food chemical codex.

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

- a) The requirement for heavy metals has been removed as the limit of lead (contaminant in food colours) is already covered through the standard; and
- b) 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 the methods of test for *l*-ascorbic acid, food grade.

## 2 REFERENCES

The following standards 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 editions of the standards indicated below:

<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 4750 : 2025	Sorbitol powder, food grade — specification ( <i>second revision</i> )
IS 4818 : 2025	Sorbic acid, food grade — Specification ( <i>second revision</i> )

## 3 DESCRIPTION

Ascorbic acid shall be a white or almost white, odourless crystalline solid. Its melting range is 190 °C to 192 °C with decomposition. The material is freely soluble in water and sparingly soluble in ethanol and insoluble in ether.

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 Identification

**4.1.1** To 2 ml of a 2 percent solution, add a few drops of sodium nitroferricyanide followed by 1 ml of approximately 0.1 N sodium hydroxide. A transient blue colour shall be produced immediately.

**4.1.2** When to 2 ml of 2.0 percent solution in water of the material are added, 2 ml of water, 0.1 g of sodium bicarbonate and about 0.02 g of ferrous sulphate, mixture is shaken and allowed to stand, a deep violet colour shall be produced which shall disappear on the addition of 5 ml of dilute sulphuric acid.

**4.1.3** Solution of ascorbic acid in ethanol shall decolourise a solution of 2,6-dichlorophenol-indophenol.

### 4.2 Specific Rotation

When determined in a 2 percent (*m/v*) solution in water at 20 °C, specific rotation shall be between +20.5° to +21.5° under sodium light.

**4.3** pH of 2 percent (*m/v*) solution shall be between 2.4 and 2.8.

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

**Table 1 Requirements for L- Ascorbic Acid, Food Grade**

(Clause 4.4)

SI. No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity as C <sub>6</sub> H <sub>8</sub> O <sub>6</sub> , percent by mass, on dry basis, <i>Min</i>	99	Annex A
ii)	Loss on drying over sulphuric acid for 24 h, percent by mass, <i>Max</i>	0.4	IS 4818
iii)	Sulphated ash, percent by mass, <i>Max</i>	0.1	IS 4750
iv)	Arsenic (as As), mg/kg, <i>Max</i>	3	IS 1699
vi)	Lead, mg/kg, <i>Max</i>	2	IS 1699

## 5 PACKING

The material shall be securely packed in containers with minimum access to light and air. The containers shall be such as to preclude contamination of the contents with metals or other impurities.

## 6 STORAGE

The material shall be stored in a cool and dry place so as to avoid excessive exposure to heat.

## 7 MARKING

7.1 Each container shall be legibly and indelibly marked with the following information:

- a) Name of the material including the words 'Food Grade';
- b) Source of manufacture;
- c) Net content when packed;
- d) Batch or code number;
- e) Date of manufacture; and
- f) Expiry/ Best before date;
- g) Any other requirements as specified under the *Legal Metrology (Packaged Commodities) Rules, 2011* and *Food Safety and Standards (Labelling and Display) Regulations, 2020*.

### 7.1 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.

## 8 SAMPLING

Representative samples of the material shall be drawn according to the method prescribed in IS 1699.

## 9 TESTS

**9.1** Tests shall be carried out by the methods as specified in col 4 of Table 1.

**9.2 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, Sl No. (i)]  
**DETERMINATION OF PURITY**

**A-1 REAGENTS**

**A-1.1 Sulphuric Acid** — 90 percent (*m/m*), and 2 N.

**A-1.2 Iodine Solution** — 0.1 N

**A-1.3 Starch Solution**

Triturate 0.5 g of starch (potato starch, maize starch or soluble starch) with 5 ml of water and add this, stirring constantly, to sufficient water to make up about 100 ml. Boil for a few minutes, cool and filter. Starch solution shall be freshly prepared.

**A-2 APPARATUS**

**A-2.1 Vacuum Desiccator**

**A-3 PROCEDURE**

Dissolve about 400 mg of accurately weighed ascorbic acid, previously dried in a vacuum desiccator over sulphuric acid for 3 h, in a mixture of 100 ml of carbon dioxide-free water and 25 ml of dilute sulphuric acid. Titrate the solution at once with 0.1 N iodine, adding a few drops of starch as indicator as the end point is neared. Each millilitre of 0.1 N iodine is equivalent to 0.008806 g of  $C_6H_8O_6$ .