

सोडियम ब्रोमाइड, शुद्ध — विशिष्टि
(पहला पुनरीक्षण)

Sodium Bromide, Pure —
Specification
(First Revision)

ICS 71.060.50

© BIS 2024



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

November 2024

Price Group 7

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Inorganic Chemicals Sectional Committee had been approved by the Chemical Division Council.

This standard was first published in 1964. In this revision, instrumental test methods for the determination of chlorides, sulphates, iron, lead and arsenic have been added as alternate test methods. In addition to this, editorial corrections have been made wherever required. Also, reference clause has been incorporated. Further, packing and marking clause has been updated.

Sodium bromide is used in the chemical industry and the laboratory for the preparation of bromides and in medicine.

The composition of the Committee responsible for formulation of this standard is given in [Annex D](#).

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.

*Indian Standard***SODIUM BROMIDE, PURE — SPECIFICATION***(First Revision)***1 SCOPE**

This standard prescribes the requirements and the methods of test for sodium bromide, pure.

2 REFERENCES

The standards listed in [Annex A](#) 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 Indian Standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 REQUIREMENTS**3.1 Description**

The material shall be in the form of small colourless transparent or opaque crystals, or a white granular powder, free from foreign matter and visible impurities. It is very deliquescent and should be kept in well-closed containers.

3.2 The material shall comply with the requirements given in [Table 1](#) when tested according to the methods specified in [Annex B](#). Reference to the relevant clauses of [Annex B](#) is given in col (4) of the [Table 1](#).

4 PACKING AND MARKING**4.1 Packing**

Unless otherwise agreed to between the purchaser

and the supplier, the material shall be packed in clean galvanized iron drums lined with polyethylene or in glass bottles.

4.2 Marking

Each container shall be marked with the following information:

- a) Name of the material;
- b) Name of the manufacturer and recognized trade-mark; if any
- c) Weight of the material in the container;
- d) Batch number; and
- e) Date of manufacture.

4.2.1 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.

5 SAMPLING

The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in [Annex C](#).

Table 1 Requirements for Sodium Bromide, Pure(Clauses [3.2](#), [B-3.2.3.1](#), [B-4.2.1](#), [B-5.2.3.1](#), [B-6.2.3.1](#), [B-7.2.3.1](#), [B-10.2.1](#) and [C-4.2](#))

Sl No.	Characteristics	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Sodium bromide, percent by weight of dried material, <i>Min</i>	98.5	B-2
ii)	Chlorides (as Cl), percent by weight, <i>Max</i>	0.6	B-3
iii)	Bromates (as BrO ₃), percent by weight, <i>Max</i>	0.001	B-4
iv)	Heavy metals (as Pb), percent by weight, <i>Max</i>	0.001	B-5
v)	Iron (as Fe), percent by weight, <i>Max</i>	0.008	B-6
vi)	Sulphates (as SO ₄), percent by weight, <i>Max</i>	0.06	B-7
vii)	Moisture, percent by weight, <i>Max</i>	5.0	B-8
viii)	Arsenic (as As ₂ O ₃), ppm, <i>Max</i>	10	B-9
ix)	Alkali (as Na ₂ CO ₃), percent by weight, <i>Max</i>	0.02	B-10
x)	Barium	To pass test	B-11

ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 264 : 2005	Nitric acid — Specification (<i>third revision</i>)	(Part 2) : 2019/ ISO 11885 : 2007	Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP- OES) (<i>first revision</i>)
IS 323 : 2009	Rectified spirit for industrial use — Specification (<i>second revision</i>)		
IS 1070 : 2023	Reagent grade water — Specification (<i>fourth revision</i>)	(Part 65) : 2022/ ISO 17294-2 : 2016	Application of inductively coupled plasma mass spectrometry (ICP-MS) — Determination of selected elements including uranium isotopes (<i>first revision</i>)
IS 2088 : 2023	Methods for determination of arsenic (<i>second revision</i>)		
IS 3025	Methods of sampling and test (physical and chemical) for water and wastewater		

ANNEX B

(Clause 3.2)

ANALYSIS OF SODIUM BROMIDE, PURE

B-1 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (see IS 1070) shall be used in tests.

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

B-2 DETERMINATION OF SODIUM BROMIDE**B-2.1 Reagents**

B-2.1.1 *Standard Silver Nitrate Solution* — 0.1 N

B-2.1.2 *Concentrated Nitric Acid* — see IS 264

B-2.1.3 *Nitrobenzene*

B-2.1.4 *Ferric Alum Indicator Solution* — saturated solution

B-2.1.5 *Standard Ammonium Thiocyanate Solution* — 0.1 N

B-2.2 Procedure

Dry the material to constant weight at (105 ± 2) °C. Weigh accurately about 0.4 g of the dried material and dissolve in 50 ml of water. Add with a pipette 50 ml of standard silver nitrate solution, 2 ml of concentrated nitric acid, 15 ml of nitrobenzene and finally 2 ml of ferric alum indicator solution. Titrate the solution with standard ammonium thiocyanate solution to the first persistent colour change.

B-2.3 Calculation

Sodium bromide (as NaBr), Percent by weight of the dried material

$$= \frac{1.029 (50 - V)}{W}$$

where

V = volume, in ml, of standard ammonium thiocyanate solution used in the titration; and

W = mass, in g, of the dried material taken for the test.

NOTE — Presence of chlorides increases the results for sodium bromide and the results shall therefore be corrected. One gram of chloride (as Cl) is equivalent to 2.899 g of sodium bromide.

B-3 TEST FOR CHLORIDES**B-3.1 General**

Two methods are prescribed for determining chlorides, namely, Method A and ion chromatography method as prescribed in B-13. In case of dispute, ion chromatography method shall be used as referee method.

B-3.2 Method A**B-3.2.1 Apparatus**

B-3.2.1.1 *Nessler tubes* — 50 ml capacity

B-3.2.2 Reagents

B-3.2.2.1 *Dilute nitric acid* — 1 : 2

B-3.2.2.2 *Hydrogen peroxide* — Dilute one volume of 30 percent hydrogen peroxide with one volume of water

B-3.2.2.3 *Concentrated nitric acid* — same as in B-2.1.2

B-3.2.2.4 *Silver nitrate solution* — 10 percent

B-3.2.2.5 *Standard chloride solution*

Dissolve 0.164 9 g of sodium chloride in water and make up the volume to 1 000 ml. Dilute 100 ml of the solution to 1 000 ml. One millilitre of the solution contains 0.01 mg of chloride (as Cl).

B-3.2.3 Procedure

Dissolve 0.5 g of the material in 15 ml of dilute nitric acid in a small conical flask. Add 6 ml of hydrogen peroxide and digest on a steam-bath until the solution is colourless. Wash down the sides of the flask with water, digest again for 15 min, cool and dilute to 250 ml with water. Pipette out 10 ml of the solution into a Nessler tube, dilute to about 25 ml with water, add 1 ml of concentrated nitric acid and 0.5 ml of silver nitrate solution. Dilute to 50 ml and mix well. Carry out a control test in another Nessler tube using 12 ml of standard chloride solution and the same quantities of the other reagents.

B-3.2.3.1 The material shall be taken as not having exceeded the limit given in Table 1 if the turbidity produced with the material is not greater than that produced in the control test.

B-4 TEST FOR BROMATES**B-4.1 Reagents****B-4.1.1 Potassium Iodide Solution** — 10 percent**B-4.1.2 Starch Solution****B-4.1.3 Dilute Sulphuric Acid** — 1 : 15**B-4.2 Procedure**

Dissolve 1 g of the material in 16 ml of water. Add 2 drops of potassium iodide solution, 1 ml of starch solution and 5 drops of dilute sulphuric acid. Mix thoroughly and allow to stand for 10 min.

B-4.2.1 The material shall be taken as not having exceeded the limit prescribed in [Table 1](#) if no blue colour is produced.

B-5 TEST FOR HEAVY METALS (as Pb)**B-5.1 General**

Three methods are prescribed for determining heavy metals (as Pb), namely, Method A, ICP-OES method as prescribed at [B-12](#) and ICP-MS method as prescribed in IS 3025 (Part 65). In case of dispute, ICP-MS shall be used as referee method.

B-5.2 Method A**B-5.2.1 Apparatus****B-5.2.1.1 Nessler tubes** — 50 ml capacity**B-5.2.2 Reagents****B-5.2.2.1 *p*-Nitrophenol indicator solution**

Dissolve 0.2 g of *p*-nitrophenol in hot water and dilute to 100 ml

B-5.2.2.2 Dilute ammonium hydroxide — 1 : 9**B-5.2.2.3 Dilute hydrochloric acid** — 1 : 99**B-5.2.2.4 Hydrogen sulphide solution** — saturated and freshly prepared**B-5.2.2.5 Standard lead solution**

Dissolve 1.60 g of lead nitrate in water and make up the solution to 1 000 ml with water. Pipette out 10 ml of the solution and dilute again to 1 000 ml with water. One millilitre of this solution contains 0.01 mg of lead (as Pb).

B-5.2.3 Procedure

Dissolve 2 g of the material in 25 ml of water in a Nessler tube and add one drop of *p*-nitrophenol indicator solution. Add dilute ammonium hydroxide dropwise until the solution turns yellow. Add dilute

hydrochloric acid dropwise until the solution becomes colourless and then add 0.5 ml of the acid in excess. Add 5 ml of hydrogen sulphide solution, dilute to the mark and mix well. Carry out a control test in a similar manner in another Nessler tube using 2 ml of standard lead solution.

B-5.2.3.1 The limit prescribed in [Table 1](#) shall be taken as not having been exceeded if the intensity of colour produced with the material is not greater than that produced in the control test.

B-6 TEST FOR IRON**B-6.1 General**

Three methods are prescribed for determining iron, namely, Method A, ICP-OES method as prescribed at [B-12](#) and ICP-MS method as prescribed in IS 3025 (Part 65). In case of dispute, ICP-MS shall be used as referee method.

B-6.2 Method A**B-6.2.1 Apparatus****B-6.2.1.1 Nessler tubes** — 50 ml capacity**B-6.2.2 Reagents****B-6.2.2.1 *p*-Nitrophenol indicator solution** — same as in [B-5.2.2.1](#)**B-6.2.2.2 Dilute ammonium hydroxide** — 1 : 9**B-6.2.2.3 Dilute hydrochloric acid** — 1 : 99**B-6.2.2.4 Acetate buffer solution**

Add 2.3 g of anhydrous sodium acetate to 58 ml of acetic acid (2 M) and dilute to one litre with water. Adjust the final pH of the solution to (5.0 ± 0.1) with acetic acid or sodium hydroxide solution (10 percent).

B-6.2.2.5 *o*-Phenanthroline reagent

Thoroughly mix equal volumes of *o*-phenanthroline solution (0.1 percent aqueous), hydroxylamine hydro chloride solution (10 percent aqueous) and acetate buffer solution.

B-6.2.2.6 Standard iron solution

Dissolve 0.702 g of ammonium ferrous sulphate in about 100 ml of water containing 10 ml of dilute sulphuric acid (4 N) and dilute to 1 000 ml. Further, dilute 100 ml of the solution to 1 000 ml. One millilitre of the diluted solution contains 0.01 mg of iron (as Fe).

B-6.2.3 Procedure

Dissolve 1 g of the material in 25 ml of water in a

Nessler tube and add one drop of p-nitrophenol indicator. Add dilute ammonium hydroxide dropwise until the solution turns yellow. Add dilute hydrochloric acid dropwise until the solution becomes colourless and then add 2 ml in excess. Add 5 ml of o-phenanthroline reagent, mix well and let stand for 10 min. Dilute to 50 ml and mix well. Simultaneously, carry out a control test using 8 ml of standard iron solution.

B-6.2.3.1 The limit prescribed in [Table 1](#) shall be taken as not having been exceeded if the intensity of colour produced with the material is not greater than that produced in the control test.

B-7 TEST FOR SULPHATES

B-7.1 General

Two methods are prescribed for determining sulphates, namely, Method A and ion chromatography method as prescribed in [B-13](#). In case of dispute, ion chromatography method shall be used as referee method.

B-7.2 Method A

B-7.2.1 Apparatus

B-7.2.1.1 *Nessler tubes* — 50 ml capacity

B-7.2.2 Reagents

B-7.2.2.1 Standard sulphate solution

Dissolve 0.148 g of anhydrous sodium sulphate in water and dilute to one litre in a volumetric flask. One millilitre of the solution contains 0.1 mg of sulphates (as SO₄).

B-7.2.2.2 *Dilute hydrochloric acid* — 1 : 99

B-7.2.2.3 *Barium chloride solution* — 10 percent

B-7.2.3 Procedure

Dissolve 1 g of the material in 25 ml of water and transfer to a Nessler tube. In another Nessler tube, carry out a control test using 6 ml of standard sulphate solution and 25 ml of water. To each tube, add 1 ml of dilute hydrochloric acid and 5 ml of barium chloride solution. Dilute the contents of each tube to the mark and stir well.

B-7.2.3.1 The limit prescribed in [Table 1](#) shall be taken as not having been exceeded if the turbidity produced with the material is not greater than that produced in the control test.

B-8 DETERMINATION OF MOISTURE

B-8.1 Procedure

Weigh accurately about 5 g of the material in a low form glass-stoppered weighing bottle. Dry at (105 ± 2) °C for 4 h, cool in a desiccator and weigh.

B-8.2 Calculation

$$\text{Moisture, percent by weight} = \frac{100 W_1}{W_2}$$

where

W_1 = loss in weight, in g, on drying; and

W_2 = weight, in g, of the material taken for the test.

B-9 TEST FOR ARSENIC

B-9.1 General

Three methods are prescribed for determining arsenic, namely, Method A, ICP-OES method as prescribed at [B-12](#) and ICP-MS method as prescribed in IS 3025 (Part 65). In case of dispute, ICP-MS shall be used as referee method.

B-9.2 Method A

Dissolve 1 g of the material in 10 ml of water and carry out the test for arsenic as prescribed in IS 2088, using 0.01 mg of arsenic trioxide for preparing the comparison stain.

B-10 TEST FOR ALKALI

B-10.1 Reagents

B-10.1.1 Phenolphthalein Indicator Solution

Dissolve 0.1 g of phenolphthalein in 60 ml of rectified spirit conforming to IS 323 and dilute with water to 100 ml.

B-10.1.2 Standard Hydrochloric Acid — 0.02 N

B-10.2 Procedure

Dissolve 1 g of the material in 50 ml of freshly boiled and cooled water and add 5 drops of phenolphthalein indicator solution. If any pink colour is produced, titrate with standard hydrochloric acid.

B-10.2.1 The material shall be taken not to have

exceeded the limit prescribed in [Table 1](#) if not more than 0.2 ml of standard hydrochloric acid is required to discharge the pink colour.

B-11 TEST FOR BARIUM

B-11.1 Reagent

B-11.1.1 *Dilute Sulphuric Acid* — approximately 4 N

B-11.2 Procedure

Dissolve 0.5 g of the material in 10 ml of water and add 1 ml of dilute sulphuric acid.

B-11.2.1 The material shall be taken to have passed the test if no turbidity is produced within 5 min.

B-12 DETERMINATION OF ARSENIC, IRON AND LEAD BY INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETER (ICP-OES) METHOD

B-12.1 Principle

The sample solution under analysis is nebulized through a nebulizer inside a spray chamber. The aerosol formed is aspirated to argon plasma torch produced by a radio-frequency inductively coupled plasma (ICP)], where the molecules break into constituent atoms and/or molecular species and atoms are get excited. These excited atoms then return back to the lower energy state by emitting radiation of specific wavelength. These emitted radiations are characteristic of an element and are measured by the Photomultiplier tube detector and intensity of such emitted radiation is directly proportional to the concentration of respective constituent element in the sample.

B-12.2 Recommended Wavelength, Limit of Quantification and Important Spectral Interferences

Elements along with the recommended wavelengths and typical estimated limits of quantification are listed in [Table 2](#). Actual working detection limits are dependent on the type of instrumentation, detection device and sample introduction system used and on the sample matrix. Therefore, these concentrations can vary between different instruments.

Additionally, [Table 2](#) lists the most important spectral interferences at the recommended wavelengths for analysis.

B-12.3 Reagents and Solutions

B-12.3.1. *Nitric Acid (65 percent) Suprapure*

B-12.3.2 *Standard Stock Solution*

Either prepare by dissolving proportionate amount of soluble compounds of elements (preferably spectroscopic grade), or use commercially available certified stock solution of 10 µg/ml, 100 µg/ml or 1 000 µg/ml of lead, iron, calcium, magnesium, manganese, arsenic, molybdenum, aluminium and mercury in 2 to 5 percent nitric acid. It is preferable to prepare single stock solution of multi elemental standards for analysis.

B-12.3.3 Standard Solution

Pipette out 5 ml from 100 µg/ml standard stock solution into a 100 ml volumetric flask and make up volume with 2 percent nitric acid to prepare 5 µg/ml solution. From this 5 µg/ml solution, an aliquot of 1.0 ml, 3.0 and 5.0 ml taken in 50 ml volumetric flasks (separate) and make up volume with 2 percent nitric acid to prepare 0.1 µg/ml, 0.3 µg/ml and 0.5 µg/ml solution of respective elements under reference.

B-12.3.4 Sample preparation

Weigh about 2.5 g of the sample in a 50 ml volumetric flask and add 1.0 ml nitric acid and make up the volume with water.

NOTE — Sample should be clear before injecting to the instrument.

B-12.3.5 Reagent Blank Solution

Place 50 ml of nitric acid and 1 000 ml of water into an HDPE or PP container. For ultra-trace analysis, polytetrafluoroethylene (PTFE) containers should be used. Prior to analysis, make sure that the acid matrix and concentration of the reagent blank solution is the same as in the standard and sample solutions.

B-12.4 Instrument

Set up the instrument as per the manufacturer's instructions manual for recommended operating parameters, based on the manufacturers operating manual and evaluated by internal check analysis using of standard solution of element as well as data selected carefully from [Table 2](#).

For analysis of mercury and arsenic, a gas (hydride)/vapour generating system is coupled with ICP, instead of using of nebulizer. The mercury vapour/arsine generated through the system is carried by the carrier gas (Ar) to plasma torch, and other instrumental conditions shall be the same as above.

NOTE — Sensitivity, instrumental detection limit, precision, linear dynamic range and interference effects will be investigated and established for each individual analyte line on that particular instrument.

Table 2 Recommended Wavelengths, Achievable Limits of Quantification for Different Configuration of Instruments and Important Spectral Interferences*(Clauses [B-12.2](#) and [B-12.4](#))*

Sl No.	Element	Wavelength (nm)	Approximately Achievable Limits		Interfering Elements
			Radial Viewing (µg)	Axial Viewing (µg)	
(1)	(2)	(3)	(4)	(5)	(6)
i)	As	188.979	18	14	Al, Cr, Fe, Ti
		193.696	5	14	Al, Co, Fe, W, V
		197.197	(100)	31	Al, Co, Fe, Pb, Ti
ii)	Fe	238.204	14	(3)	Co
		259.940	6	2	Co
		271.441	-	-	-
iii)	Pb	220.353	14	5	Al, Co, Fe, Ti
		283.305	(70)		Cr, Fe
		217.00		(20)	

B-12.5 Procedure**B-12.5.1 Calibration**

Profile and calibrate the instrument according to the instrument manufacturer's recommended procedures, using the intermediate mixed standard solutions ([B-12.3.5](#)). The relationship between concentration and intensity is linear up to six orders of magnitude. Examine the spectra of the element and make necessary adjustments (if required) for the exact peak positions and baselines to ensure proper measurements of the respective peak intensities. Flush the system with the reagent blank solution between each standard.

B-12.5.2 Before beginning the sample run, re-analyse the reference standard with the highest concentration as if it were a sample. Ensure that the concentration values do not deviate from the actual values by more than ± 5 percent (or the established control limits, whichever is lower). If they do, follow the recommendations of the instrument manufacturer to correct for this condition. Begin the sample run by flushing the system with the reagent blank solution between each sample. It is recommended to analyse a calibration check solution and the calibration blank solution every 10 samples. Analyze the sample solution and calculate the concentration in µg/ml of the lead (and/or Iron, arsenic) in the sample solution.

NOTE — It is recommended that IS 3025(Part 2)/ISO 11885 may be referred and practiced for ensuring precise and reproducible analysis.

B-12.6 Calculation

The mass concentrations for each element are determined with the aid of the instrument software by following steps:

- Relate emission signals from calibration blank and calibration solutions with the signals from reference elements and establish a calibration plot; and
- Determine the mass concentrations of samples with the aid of the emissions and the calibration graphs and calculate the quantity in mg/kg of the constituent elemental impurities in the sample, by multiplying the value by 20 (Dilution factor).

B-13 ION CHROMATOGRAPHY FOR CHLORIDES AND SULPHATES**B-13.1 Principle**

Ion Chromatography is an innovative method for the determination of ions. The technique is used for the analysis of chlorides and sulphates. The technique separates ions and polar molecules based on their affinity to ion exchanger. When the method is employed for the determination of the anions as chlorides and sulphates, the identification should be made by using a matrix covering the ions of interest. In cation exchange chromatography, the stationary phase is functionalized with anions. These anions will attach cations towards it. These surface bound

molecules/ionic species can then be removed by using a suitable eluent containing substituted ions to replace them or they can be removed by changing the pH of the column. Similarly, in anion exchange chromatography, the stationary phase is cationic in nature. These cations will then separate the anions.

Conductivity detector is generally used in this method. In case of suppressor ion exchange chromatography, analyte ions are separated on the ion exchange column and these ions together with the eluent move to the matrix suppressor. The eluent conductivity is lowered in the suppressor and the sample ion conductivity is increased leading to the large increase in signal to noise ratio.

B-13.2 Equipment

B-13.2.1 Anion Guard Column — a protector of the separator column

B-13.2.2 Anion Separator Column — suitable for selective separation of ions under analysis

B-13.2.3 Anion Suppressor device

Anion micro membrane suppressor is used to analyse the data

B-13.2.4 Detector — conductivity detector

B-13.2.5 Software

Software suitable for control of various operating parameters, receiving inputs and analysis of all data

B-13.2.6 Sample loop of 100 µl, 200 µl, 500 µl or 1000 µl be used to determine ionic concentration as per instrument manual and practice.

B-13.3 Reagents

B-13.3.1 Glass or Polyethylene Sample bottles

B-13.3.2 Distilled Water or Deionized Water free from the Anions of Interest

B-13.3.3 Eluent

1.7 mM of sodium bicarbonate and 1.8 mM of sodium carbonate solution is used. For preparation of these solution, 0.285 6 g of sodium bicarbonate and 0.381 6 g of sodium carbonate is dissolved in 2 litre of water.

B-13.3.4 Micro Membrane Suppressor Solution: (0.025 N of sulphuric acid)

Dilute 2.8 ml of concentrated sulphuric acid in 4 litre of water

B-13.4 Standard solutions

B-13.4.1 Chloride

Dissolve NaCl, 1.648 5 g in 1 000 ml of reagent water

B-13.4.2 Sulphate

Dissolve 1.81 g of potassium sulphate in 1 000 ml of reagent water

B-13.5 Calibration and Standardization

For each analyte of interest, prepare calibration standards at three concentration levels and a blank by adding measured stock standards and diluting with reagent water. If the concentration of the sample exceeds the calibration range, the sample may be diluted. Using 0.1 ml to 1.0 ml injections of each calibration standard, tabulate area responses or peak height against the concentration. Use these results to prepare calibration curve. Record the retention time during the procedure.

B-13.6 Procedure

Dissolve between 1 g to 5 g samples in 25 ml reagent grade water in PTTE/HDPE beaker and use this solution for analysis. Inject a well-mixed sample (0.1 ml to 1.0 ml) and flush it through an injection loop using each new sample. Use the loop of same size for the standards and samples. Record the peak in size and area units. An automated constant volume injection system may preferably be used. The width of peak for retention time of ions should be same for sample and standard. Dilute the sample with the help of reagent water if the response for the peak exceeds the working range of the system for analysis. If required, spike the sample with an appropriate amount of standard and reanalyze in case of absence of distinct resolution. Retention time is inversely proportional to concentration. For solid sample of cobalt acetate, following extraction procedure may be used-

Add reagent water in an amount equal to 10 times the dry weight of the sample. The slurry is made and stirred for about 10 min using magnetic stirrer. This slurry is filtered from 0.45 µ membrane. This membrane can be directly attached to the end of the syringe. For clear resolution, the sample can further be diluted. The dilution should be made to an extent till there is no deviation from the method.

B-13.7 Data analysis and Calculations

Prepare a calibration curve for each analyte by plotting instrument response against concentration. Compare the sample response with the standard curve and compute sample concentration. Multiply the value by appropriate dilution factor.

Report results in mg/l or by suitably modifying into percentage. Only report those values that fall within the range of lowest and highest calibration standards.

ANNEX C

(Clause 5)

SAMPLING OF SODIUM BROMIDE, PURE

C-1 GENERAL REQUIREMENTS OF SAMPLING

C-1.1 In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

C-1.2 The sampling instrument and the containers for the samples shall be such that the material has no action on them. They shall be clean and dry.

C-1.3 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature and, as far as possible, the material shall also be protected from light.

C-2 SGALE OF SAMPLING**C-2.1 Lot**

In a single consignment of the material, all the containers of the same size and drawn from the same batch of manufacture shall constitute a lot. If a consignment of the material is known to consist of different batches of manufacture or of different sizes of containers, then the containers belonging to the same batch and size shall be grouped together and each group shall constitute a separate lot.

C-2.2 For ascertaining the conformity of the lot to the requirements of this specification, tests shall be carried out for each lot separately. The number of containers to be selected for this purpose (n) shall depend on the size of the lot (N) and shall be in accordance with [Table 3](#).

C-2.3 The containers shall be selected at random from the lot and in order to ensure randomness of selection, random number tables shall be used. In case these tables are not available, the following procedure is recommended for use:

Arrange all the containers in the lot in a systematic manner and starting from any container, count them as 1, 2, 3, , up to r and so on, where r is the integral part of N/n . Every r^{th} container thus counted shall be withdrawn to give sample for tests.

C-3 PREPARATION OF TEST SAMPLES

C-3.1 From each of the containers selected according to [C-2.3](#), a small representative portion of the material of about 100 g shall be drawn with the help of a suitable sampling instrument.

C-3.2 Out of these portions, equal quantities of the material (not more than 90 g) shall be taken and

mixed thoroughly to form a composite sample of about 250 g. The composite sample shall be divided into three equal parts, one for the purchaser, another for the supplier and the third to be used as a referee sample.

C-3.3 The remaining portion of the material from each container shall be divided into three equal parts, each forming an individual sample. One set of individual samples representing the n containers sampled shall, be marked for the purchaser, another for the supplier and the third to be used as a referee sample.

C-3.4 All the individual samples and the composite sample shall be transferred to separate sample containers. All the containers shall be sealed and labelled with full identification particulars.

C-3.5 The referee test samples consisting of a composite sample and a set of individual samples shall bear the seal of both the purchaser and the supplier. They shall be kept at a place agreed to between the purchaser and the supplier, to be used in case of any dispute between the two.

C-4 NUMBER OF TESTS

C-4.1 Test for the determination of sodium bromide shall be performed on each of the individual samples (*see* [C-3.3](#)).

C-4.2 Tests for the determination of all other characteristics given in [Table 1](#) shall be performed on the composite sample (*see* [C-3.2](#)).

C-5 CRITERIA FOR CONFORMITY**C-5.1 For Individual Samples**

From the test results for sodium bromide, the mean (\bar{x}) and range (R) of test results shall be computed

(range being defined as the difference between the maximum and minimum values of test results).

C-5.1.1 The lot shall be declared as conforming to the requirement for sodium bromide if the value of the expression $(\bar{x} - 0.6 R)$ as calculated from the test results is equal to or greater than 98.5.

C-5.2 For Composite Sample

For declaring the conformity of the lot to the requirements of all other characteristics tested on the composite sample, the test result for each of the characteristics shall satisfy the relevant requirement specified.

Table 3 Scale of Sampling*(Clause [C-2.2](#))*

SI No.	Lot Size	No. of Containers to be Selected
	<i>N</i>	<i>n</i>
(1)	(2)	(3)
i)	Up to 15	3
ii)	16 to 40	4
iii)	41 to 65	5
iv)	66 to 110	7
v)	111 and above	10

NOTE — In the case of very small lots where the selection of 3 containers may be uneconomical, the method of judging the conformity of the lot to the requirements of the specification shall be as agreed to between the purchaser and the supplier.

ANNEX D

(Foreword)

COMMITTEE COMPOSITION

Inorganic Chemicals Sectional Committee, CHD 01

<i>Organization</i>	<i>Representative(s)</i>
Central Salt and Marine Chemicals Research Institute, Bhavnagar	DR KANNAN SRINIVASAN (Chairperson)
Alkali Manufacturers Association of India, Delhi	SHRI K. SRINIVASAN SHRI H. S. DAS (<i>Alternate</i>)
Bhabha Atomic Research Centre, Mumbai	DR A. V. R. REDDY DR S N ACHARY (<i>Alternate</i>)
Central Drugs Standard Control Organization, New Delhi	SHRI C. HARIHARAN
Consumer Voice, Delhi	SHRI M. A. U. KHAN SHRI K. C. CHAUDHARY (<i>Alternate</i>)
Consumer Education & Research Centre, Ahmedabad	DR ANINDITA MEHTA DR KARTIK ANDHARIA (<i>Alternate</i>)
Delhi Jal Board, New Delhi	SHRI ASHUTOSH KAUSHIK
Directorate General of Quality Assurance (DGQA), New Delhi	DR A. K. PATRA SHRI B. S. TOMAR (<i>Alternate</i>)
Geological Survey of India, Kolkata	SHRI PVVR SARMA
Global Adsorbents Pvt Ltd, Kolkata	SHRI SANJAY DHANUKA
Grasim Industries Ltd, Nagda	SHRI ALOK SINGH SHRI PANKAJ GUPTA (<i>Alternate</i>)
Gujarat Alkalies and Chemicals Ltd, Vadodara	SHRI V. K. MAHIDA SHRI SHAILESH PATEL (<i>Alternate</i>)
Hindalco, Mumbai	SHRI NAGESWAR KAPURI SHRI AJITH RAMACHANDRA (<i>Alternate</i>)
Hindustan Lever Ltd, Mumbai	MS VRINDA RAJWADE SHRI SOJAN VARGHESE (<i>Alternate</i>)
Indian Chemical Council (ICC), New Delhi	DR UMESH SHETKAR DR RAKESH KUMAR (<i>Alternate</i>)
Indian Institute of Chemical Technology, Hyderabad	DR PRAVEEN R. LIKHAR DR RAJENDER REDDY (<i>Alternate</i>)
Industrial Carbon Pvt Ltd, Ankleshwar	SHRI SATYAN ROHIT KUMAR
Ministry of Chemicals & Fertilizers, New Delhi	DR ROHIT MISRA DR O. P. SHARMA (<i>Alternate</i>)
Ministry of Defence (DGQA), Kanpur	SHRI R. N. APARAJIT

<i>Organization</i>	<i>Representative(s)</i>
MSME - Testing Centre, Kolkata	SHRI PRITENDU MAL SHRI ALAK KUMAR MITRA (<i>Alternate</i>)
National Chemical Laboratory, Pune	DR DARBHA SRINIVAS DR PARESH DHEPE (<i>Alternate</i>)
National Metallurgical Laboratory, Jamshedpur	DR TRILOCHAN MISHRA SHRI DEVBRATA MISHRA (<i>Alternate</i>)
National Mineral Development Corporation Ltd, Hyderabad	SHRI RAJAN KUMAR DR PRASHANT SHARMA (<i>Alternate</i>)
National Peroxide Ltd, Mumbai	DR JOY ANTHONY
National Physical Laboratory, New Delhi	DR NAHAR SINGH DR S. P. SINGH (<i>Alternate</i>)
National Test House, Ghaziabad	MS RICHA KUNDRA
Office of the Development Commissioner (MSME), New Delhi	DR KARTHIKEYAN MS ANNA BACKIAM (<i>Alternate</i>)
Shriram Institute for industrial research, Delhi	DR LAXMI RAWAT SHRI B. GOVINDAN (<i>Alternate</i>)
Tamilnadu Petroproducts Limited, Chennai	SHRI RAVI MUTHUKRISHNAN
Tata Chemicals Ltd, Mithapur	SHRI NAJMUL HASAN KHAN
The Dharamsi Morarji Chemicals Co. Ltd, Mumbai	MANDAR GAIKWAD
Vaibhav Analytical Services, Ahmedabad	SHRI GAURANG OZA
In Personal Capacity (<i>Hari Nagar Co-Op-Society, Gotri Road, Vadodara - 390007</i>)	SHRI R. S. BAGHEL
In Personal Capacity (<i>514 Veer Apt, Sector 13, Rohini, New Delhi - 110085</i>)	SHRI D. K. JAIN
BIS Directorate General	SHRI AJAY KUMAR LAL, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (CHEMICAL) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary
SHRI SAGAR SINGH
SCIENTIST 'D'/JOINT DIRECTOR
(CHEMICAL), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: CHD 01 (25382).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Central : 601/A, Konnectus Tower -1, 6th Floor,
DMRC Building, Bhavbhuti Marg, New
Delhi 110002

Telephones

{ 2323 7617

Eastern : 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V,
Salt Lake, Kolkata, West Bengal 700091

{ 2367 0012
2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg,
Chandigarh 160019

{ 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113

{ 2254 1442
2254 1216

Western : 5th Floor/MTNL CETTM, Technology Street, Hiranandani Gardens, Powai
Mumbai 400076

{ 25700030
25702715

Branches : AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYANA (CHANDIGARH), HUBLI, HYDERABAD, JAIPUR, JAMMU, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.