भारतीय मानक

Indian Standard

IS 3025 (Part 30) : 2024

जल एवं अपशिष्ट जल के नमूने लेने तथा परीक्षण (भौतिक एवं रसायन) की पद्धतियाँ

भाग 30 ब्रोमाइड

(दूसरा पुनरीक्षण)

Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater

Part 30 Bromide

(Second Revision)

ICS 13.060.50

भारतीय मानक ब्यूरो
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April 2024 **Price Group 4**

Water Quality Sectional Committee, CHD 36

FOREWORD

This Indian Standard (Part 30) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Water Quality Sectional Committee had been approved by the Chemical Division Council.

Bromide may occur in varying amounts in well supplies in coastal areas as a result of sea water intrusion. Industrial discharges may contribute the bromide found in some fresh water streams. Under normal circumstances, the bromide content of most drinking waters is negligible, seldom exceeding 1 mg/l.

The Committee responsible for formulation of IS 3025 : 1964 'Methods of sampling and test (physical and chemical) for water used in industry' decided to revise the standard and publish it in separate parts. This standard was one of the different parts published under IS 3025 series of standards and superseded **28** of IS 3025 : 1964 'Methods of sampling and test (physical and chemical) for water used in industry'. The first revision was published in 1988.

In this revision the following changes have been incorporated:

a) Phenol red colorimetric method has been revised and updated;

b) References, ICS No. have been updated; and

c) Other editorial changes have been done to bring the standard in the latest style and format of Indian Standards.

In the preparation of this standard, considerable assistance has been derived from the method no. 4500 Br^- A and B of — Standard methods for the examination of water and wastewater, published by the American Public Health Association, Washington, USA, 23rd edition, 2017.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Indian Standard

METHODS OF SAMPLING AND TEST (PHYSICAL AND CHEMICAL) FOR WATER AND WASTEWATER

PART 30 BROMIDE

(Second Revision)

1 SCOPE

This standard (Part 30) prescribe phenol red colorimetric method for determination of bromide in water and wastewater.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provision 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:

IS No.	*Title*
IS 7022 (Part 1) : 1973	Glossary of term relating to water, sewage and industrial effluents: Part 1
IS 7022 (Part 2) : 1979	Glossary of term relating to water, sewage and industrial effluents: Part 2
IS 17614	Water quality — Sampling
(Part 1) : 2021/ ISO 5667-1 : 2020	Guidance on the design of sampling programmes and sampling techniques
(Part 3) : 2021/ ISO 5667-3 : 2018	Preservation and handling of water samples

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 7022 (Part 1) and IS 7022 (Part 2) shall apply.

4 SAMPLING AND PRESERVATION

Sampling and sample preservation shall be done as prescribed in IS 17614 (Part 1) and IS 17614 (Part 3).

5 PHENOL RED COLORIMETRIC METHOD

5.1 Principle

Bromides in the samples are oxidized to bromine in presence of phenol red and subsequently phenol red is brominated by addition of chloramine-T. The brominated compound thus produced is reddish to violet depending upon its concentration. The concentration of chloramine-T and the timing of reaction before dechlorination are critical.

5.2 Interference

Ions commonly found in water do not interfere in the test, but oxidizing and reducing agents and higher concentration of chloride and iodides may interfere. For saline and wastewater, the interferences can be reduced to acceptable limit by diluting the sample. The measurable range of detection is 0.1 mg/l to 1 mg/l.

5.3 Apparatus

5.3.1 *Spectrophotometer* — for use at 590 nm, providing a light path of at least 2 cm.

5.3.2 *Nessler Cylinders* — 100 ml capacity

5.3.3 *Acid-Washed Glassware* — remove all traces of absorbed bromide by washing glassware with 1 + 6 HNO_3 and rinsing with the distilled water.

5.4 Reagents

5.4.1 *Acetate Buffer Solution*

Dissolve 68 g sodium acetate trihydrate ($NaC_2H_3O_2.3H_2O$) and 90 g of sodium chloride (NaCl) in distilled water. Add 30 ml of glacial acetic acid and make up to 1 litre. The *p*H should be in range of 4.6 to 4.7.

5.4.2 *Phenol Red Indicator Solution*

Dissolve 0.021 g phenol red (phenolsulphonephthalein sodium salt) and dilute to 100 ml with distilled water.

5.4.3 *Chloramine-T Solution*

Dissolve 0.5 g chloramine-T (sodium p-toulenesulphonchloramide) and dilute to 100 ml with distilled water. Store in a dark bottle in refrigerator.

5.4.4 *Sodium Thiosulphate Solution* — 2 N

Dissolve 49.6 g of sodium thiosulphate ($NaC_2H_3O_2.3H_2O$ or 31.6 g $Na_2S_2O_3$) and dilute to 100 ml with distilled water.

5.4.5 *Stock Bromide Solution*

Dissolve 744.6 mg anhydrous potassium bromide (KBr) in distilled water and make up to 1 litre (1 ml = 0.50 mg Br).

5.4.6 *Standard Bromide Solution*

Dilute 10.0 ml of stock solution (5.4.5) to 1 litre (1 ml = 5.00 µg Br).

5.5 Procedure

5.5.1 *Preparation of Bromide Standards*

Prepare at least six standards of concentration in range of 0 mg Br^-/l to 1.00 mg Br^-/l, by diluting 0.0 ml, 2.00 ml, 4.00 ml, 6.00 ml, 8.00 ml and 10.00 ml of standard bromide solution (5.4.6) to 50.00 ml with distilled water.

5.5.2 *Treatment of Sample*

5.5.2.1 Take a 50.0 ml sample such that the final bromide concentration is in the range of 0.1 mg Br-/l to 1.0 mg Br-/l, add 2 ml of buffer solution to it. Add 2 ml of phenol red solution to the same sample. Next, add 0.5 ml of chloramine-T solution to the sample. Ensure thorough mixing immediately after each addition. Allow the sample to sit for exactly 20 min after adding chloramine-T. After 20 min, add 0.5 ml of sodium thiosulphate (5.4.4) solution to the sample, mixing well. This step dechlorinates the sample.

5.5.2.2 Compare the color of the sample against the bromide standards (5.5.1) prepared simultaneously. Use nessler cylinder for visual comparison or preferably use a spectrophotometer at 590 nm to measure the absorbance of the sample against a reagent blank. Determine the bromide values of the sample from a calibration curve. The calibration curve should relate the concentration of bromide, mg Br^-/l to the absorbance. 2.54 cm light path yields an absorbance value of approximately 0.36 for 1 mg Br^-/l.

5.6 Calculation

Bromide (as Br^-), mg/l = (mg Br^-/l from calibration curve) × dilution factor (if any).

Results are based on 55 ml final volume for samples and standards.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Water Quality Sectional Committee, CHD 36

Organization	*Representative(s)*
Chief Scientist, Environment Protection Training and Research Institute, Hyderabad	DR N. RAVEENDHAR **(*Chairperson*)**
Andhra Pradesh Pollution Control Board, Vijayawada	SHRIMATI M. SREERANJAN SHRIMATI A. SRI SAMYUKTHA (*Alternate*)
Bhabha Atomic Research Centre, Mumbai	SHRI S. JAYAKUMAR SHRI MANOJ MOHAPATRA (*Alternate*)
Bharat Heavy Electricals Limited, Haridwar	SHRI SHAILENDRA KUMAR SHRI SUDHIR BHARTIYA (*Alternate* I) SHRI AVINASH KUMAR (*Alternate* II)
Bureau of Indian Standards, New Delhi	MS NITASHA DOGER
CII Triveni Water Institute, New Delhi	SHRI KAPIL K. NARULA DR SIPIKA CHAUHAN (*Alternate*)
Central Pollution Control Board, New Delhi	SHRI P. K. MISHRA SHRI VISHAL GANDHI (*Alternate*)
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	DR ABHAY KUMAR SINGH
CSIR - Indian Institute of Chemical Technology, Hyderabad	DR S. SRIDHAR DR NIVEDITA SAHU (*Alternate*)
CSIR - Indian Institute of Toxicology Research, Lucknow	DR SATYAKAM PATNAIK
CSIR - National Environmental Engineering Research Institute, Nagpur	DR NOOR AFSHAN KHAN DR PARAS R. PUJARI (*Alternate*)
CSIR - National Institute of Oceanography, Dona Paula	SHRI DURBAR RAY
Envirocare Laboratories Private Limited, Thane	DR PRITI AMRITKAR DR NILESH AMRITKAR (*Alternate*)
Federation of All India Packaged Drinking Water Manufacturers Associations (FIPMA), New Delhi	SHRIMATI APURVA NARENDRA DOSHI SHRI NAVEEN GOEL (*Alternate*)
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Himachal Pradesh Pollution Control Board, Shimla	ER PRAVEEN GUPTA SHRI PRAVEEN SHARMA (*Alternate*)
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Indian Chemical Council, Mumbai	SHRI J. SEVAK SHRI DHRUMIL SONI (*Alternate*)
Indian Water Works Association, Mumbai	SHRI VIJAY CARHATE

Organization	*Representative(s)*
Karnataka State Pollution Control Board, Bengaluru	DR H. RUPADEVI MS GOURI GOLSANGI (*Alternate*)
Maharashtra State Pollution Control Board, Mumbai	DR VISHWAJEET THAKUR DR SMITA N. WAGH (*Alternate*)
Ministry of Environment Forest and Climate Change, New Delhi	DR SONU SINGH
Ministry of Jal Shakti, Department of Drinking Water and Sanitation, New Delhi	SHRI SUMIT PRIYADARSHI
NTPC Limited, New Delhi	DR VIJAY PRAKASH SHRI HIMAT DESUR GOJIYA (*Alternate*)
Shriram Institute for Industrial Research, Delhi	DR VIVEK NARAYAN SINGH DR JAGDHISH KUMAR (*Alternate*)
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Member Secretary
MS SHUBHANJALI UMRAO
SCIENTIST 'B'/ASSISTANT DIRECTOR
(CHEMICAL), BIS

Bureau of Indian Standards

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