

Indian Standard

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

PART 30 BROMIDE

(First Revision)

1. Scope — This standard prescribes two methods for determination of bromide. 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. The colour matching is done either visually or using a spectrophotometer. In case of any difference of opinion, the spectrophotometric method shall be the referee method.

2. Interference — Ions commonly found in water do not interfere in the test, but oxidizing and reducing agents and iodides do interfere.

3. Apparatus

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

3.2 Nessler Cyclinders — 100 ml capacity.

4. Reagents

4.1 Acetate Buffer Solution — Dissolve 68 g sodium acetate trihydrate ($\text{NaC}_2\text{H}_3\text{O}_2 \cdot 3\text{H}_2\text{O}$) in distilled water. Add 30 ml of glacial acetic acid and make up to 1 litre. The pH should be 4.6 to 4.7.

4.2 Phenol Red Indicator Solution — Dissolve 0.021 g phenol red (phenol sulphonaphthalein sodium salt) and dilute to 100 ml with distilled water.

4.3 Chloramine-T Solution — Dissolve 0.5 g chloramine-T and dilute to 100 ml with distilled water. Store in a dark bottle in refrigerator.

4.4 Sodium Thiosulphate Solution — 2 N. Dissolve 49.6 g of sodium thiosulphate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ or 31.6 g $\text{Na}_2\text{S}_2\text{O}_3$) and dilute to 100 ml with distilled water.

4.5 Stock Bromide Solution — Dissolve 744.6 mg anhydrous potassium bromide (KBr) in distilled water and make up to 1 litre. One millilitre of the solution = 0.50 mg Br.

4.5.1 Standard bromide solution — Dilute 10.0 ml of stock solution to 1 litre. One millilitre of the diluted solution = 5.00 µg Br.

5. Procedure — Take 50 ml or an aliquot of sample diluted to 50 ml containing 0.1 to 1.0 mg/l of bromide. Add 2 ml buffer solution, 2 ml phenol red solution and 0.50 ml chloramine-T solution. Mix thoroughly and allow to stand for exactly 20 minutes. Dechlorinate by mixing with 0.5 ml of sodium thiosulphate solution. Compare colour visually in Nessler cylinders against bromide standards prepared simultaneously with the sample or preferably read absorbance in a spectrophotometer at 590 nm against reagent blank. Determine mg of bromide per litre against absorbance from a calibration curve.

6. Calculation

6.1 Bromide (as Br), mg/l = $\frac{M \times 1000}{V_1}$
(in case of visual comparison)

where

M = milligrams of bromide in the matching control standard, and

V_1 = volume in ml of sample.

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EXPLANATORY NOTE

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. This standard supersedes **26** of IS : 3025-1964 'Methods of sampling and test (physical and chemical) for water used in industry'.