INTERNATIONAL STANDARD

ISO 9390

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Water quality — Determination of borate — Spectrometric method using azomethine-H

Qualité de l'eau — Dosage du borate — Méthode spectrométrique à l'azométhine-H

Reference number
ISO 9390:1990(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9390 was prepared by Technical Committee ISO/TC 147, *Water quality*.

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Introduction

The natural borate content of groundwater and surface water is small. The borate content of surface water can be significantly increased due to waste water discharges, because borate compounds are ingredients of domestic washing agents.

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1 Scope

1.1 Application range

This International Standard specifies a spectrometric method for the determination of borate in water. The method is applicable to the determination of borate in concentrations between 0,01 mg and 1 mg of boron per litre. The working range may be extended by dilution.

This method is applicable to potable water, and to ground, surface and saline waters that are not heavily polluted.

1.2 Interferences

Interferences are unlikely when analysing drinking water. Mg, Zn, Ca, Na, K, phosphate, sulfate, and nitrate are known not to interfere. Mn, Zr, Cr, Ti, Cu, V, Al, Be, and Fe may cause high results.

Interference by the presence of colouration, humic acid, and/or undissolved substances may be removed by suitable procedures (e.g. destruction of the colour, filtration through a column filled with activated carbon).

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5667-3:1985, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of samples.*

3 Principle

Reaction of azomethine-H, which is the condensation product of H-acid (8-amino-naphth-1-ol-3,6-disulfonic acid) and salicylaldehyde, with dissolved forms of borate at a pH of about 6. Formation of a yellow complex that is measured spectrometrically at the absorption maximum in the range of 410 nm to 420 nm (see also 7.1).

4 Reagents

Use only reagents of recognized analytical grade and only distilled water or water of equivalent purity stored in polyethylene bottles.

4.1 Azomethine-H, solution.

Dissolve 1,0 g of azomethine-H sodium salt [8-N-(2-hydroxybenzylidene)-amino-naphth-1-ol- 3,6-disulfonic acid][1] ($C_{17}H_{12}NNaO_8S_2$) and 3,0 g of L+ − ascorbic acid ($C_6H_8O_6$) in water and dilute to 100 ml in a one-mark volumetric flask.

The solution is stable for up to a week when stored in a polyethylene bottle at a temperature of between 4 °C and 6 °C.

4.2 Buffer solution, pH = 5,9.

Mix 250 g of ammonium acetate (CH_3COONH_4), 250 ml of water, 80 ml of sulfuric acid (H_2SO_4) (ρ = 1,21 g/ml), 5 ml of phosphoric acid (H_2PO_4) (ρ = 1,71 g/ml), 1,0 g of citric acid ($C_6H_8O_7 \cdot H_2O$) and 1,0 g of disodiumethylenediamine-tetraacetic acid-dihydrate ($C_{10}H_{14}N_2Na_2O_8 \cdot H_2O$) by stirring and gentle heating.

1) IUPAC name.