International Standard 7150/1

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Water quality — Determination of ammonium — Part 1: Manual spectrometric method

Qualité de l'eau — Dosage de l'ammonium — Partie 1 : Méthode spectrométrique manuelle

First edition — 1984-06-01

UDC 543.342 : 543.42

Ref. No. ISO 7150/1-1984 (E)

Descriptors : water, quality, chemical analysis, determination of content, ammoniacal nitrogen, ammonium ion, spectrophotometric analysis, water pollution.

Price based on 7 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7150/1 was developed by Technical Committee ISO/TC 147, *Water quality*, and was circulated to the member bodies in February 1983.

It has been approved by the member bodies of the following countries :

Australia
Austria
Belgium
Canada
Chile
Czechoslovakia
Denmark
Finland
France
Germany, F.R.
Hungary
India
Iran
Iraq
Italy
Korea, Dem. P. Rep. of
Korea, Rep. of
Mexico
Netherlands
New Zealand
Norway
Poland
Romania
South Africa, Rep. of
Spain
Sweden
Switzerland
Thailand
United Kingdom
USSR

The member body of the following country expressed disapproval of the document on technical grounds :

Japan

Printed in Switzerland

Water quality — Determination of ammonium — Part 1 : Manual spectrometric method

1 Scope and field of application

1.1 Substance determined

This part of ISO 7150 specifies a manual spectrometric method for the determination of ammonium in water.

NOTE — An automated spectrometric method for the determination of ammonium will form the subject of ISO 7150/2.

1.2 Type of sample

The method is applicable to the analysis of potable water, and most raw and waste waters. Application to excessively coloured or saline waters shall be preceded by distillation (see clause 10).

For interferences, see clause 9.

1.3 Range

An ammonium nitrogen concentration, ϱ_N of up to 1 mg/l, using the maximum test portion of 40 ml, can be determined. Much higher concentrations can be determined by taking smaller test portions.

1.4 Limit of detection[1]

When using cells of optical path length 40 mm and a 40 ml test portion, the limit of detection lies within the range ϱ_N = 0,003 to 0,008 mg/l.

1.5 Sensitivity[1]

Using a 40 ml test portion and a cell of optical path length 40 mm, ϱ_N = 0,200 mg/l gives an absorbance of about 0,69 units.

Using a 40 ml test portion and a cell of optical path length 10 mm, ϱ_N = 0,750 mg/l gives an absorbance of about 0,65 units.

2 Reference

ISO 5664, *Water quality — Determination of ammonium — Distillation and titration method.*

3 Principle

Spectrometric measurement at about 655 nm of the blue compound formed by reaction of ammonium with salicylate and hypochlorite ions in the presence of sodium nitrosopentacyanoferrate(III) (sodium nitroprusside).

Hypochlorite ions are generated *in situ* by the alkaline hydrolysis of *N*, *N'*-dichloro-1,3,5-triazine-2,4,6 (1H, 3H, 5H)-trione, sodium salt (sodium dichloroisocyanurate). Reaction of the chloramine with sodium salicylate takes place at pH 12,6 in the presence of sodium nitroprusside. Any chloramines present in the sample are quantitatively determined as a consequence. Sodium citrate is incorporated in the reagent to mask interference from cations, notably calcium and magnesium.

4 Reagents

During the analysis, use only reagents of recognized analytical grade and only water prepared as described in 4.1.

4.1 Water, ammonium-free, prepared by one of the following methods.

4.1.1 Ion exchange method

Pass distilled water through a column of strongly acidic cation exchange resin (in the hydrogen form) and collect the eluate in a glass bottle provided with a well-fitting glass stopper. Add about 10 g of the same resin to each litre of collected eluate for storage purposes.

4.1.2 Distillation method

Add 0,10 ± 0,01 ml of sulfuric acid (ϱ = 1,84 g/ml) to 1 000 ± 10 ml of distilled water and redistil in an all glass apparatus. Discard the first 50 ml of distillate, and then collect the distillate in a glass bottle provided with a well-fitting glass stopper. Add about 10 g of strongly acidic cation exchange resin (in the hydrogen form) to each litre of collected distillate.

---

[1] Data from a United Kingdom interlaboratory exercise involving five participants.