
International Standard



7150/2

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

**Water quality — Determination of ammonium —
Part 2: Automated spectrometric method**

Qualité de l'eau — Dosage de l'ammonium — Partie 2: Méthode spectrométrique automatique

First edition — 1986-12-15

Corrected and reprinted — 1987-03-01

UDC 543.342 : 543.42

Ref. No. ISO 7150/2-1986 (E)

Descriptors : water, quality, chemical analysis, determination of content, ammonium ion, spectrochemical analysis.

Foreword

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International Standard ISO 7150/2 was prepared by Technical Committee ISO/TC 147, *Water quality*.

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Water quality — Determination of ammonium — Part 2: Automated spectrometric method

1 Scope and field of application

1.1 Substance determined

This part of ISO 7150 specifies an automated spectrometric method for the determination of ammonium in water.

NOTE — For a manual spectrometric method for the determination of ammonium, see ISO 7150/1.

1.2 Type of sample

The method is applicable to the analysis of raw, potable and most waste waters. Application to excessively coloured or saline waters shall be preceded by distillation (see clause 11).

For interferences, see clause 9.

1.3 Range

An ammonium nitrogen concentration, ρ_N , of up to 50 mg/l can be determined using dialysis, or up to 0,5 mg/l without dialysis (see clause 5).

1.4 Limit of detection¹⁾

With dialysis, the limit of detection is $\rho_N \approx 0,03$ mg/l.

Without dialysis it is $\rho_N \approx 0,01$ mg/l.

2 Reference

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

3 Principle

Spectrometric measurement at about 650 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 by the alkaline hydrolysis of 1,3-dichloro-5-sodio-1,3,5-triazinetrione (sodium dichloroisocyanurate). Reaction of the resulting chloroamine with sodium salicylate takes place at pH 12,6 in the presence of nitroprusside. Any chloroamines present in the sample are quantitatively determined as a consequence. Sodium citrate is added to mask interference from cations, notably calcium and magnesium.

All reactions are carried out automatically using continuous flow techniques.²⁾ The absorbance of the coloured compound is measured in a flow-through spectrometer.

Two distinct analytical manifold configurations are specified. One incorporates a dialyser block and is suitable for the determination of ammonium nitrogen concentrations up to 50 mg/l. The other omits the dialyser and is suitable for the determination of low level ammonium nitrogen concentrations up to 0,5 mg/l.

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 $0,10 \pm 0,01$ ml of sulfuric acid ($\rho = 1,84$ g/ml) to $1\ 000 \pm 10$ 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) Limit of detection calculated from $3 \hat{s}_w$, where \hat{s}_w is an estimate, with at least 9 degrees of freedom, of the within-batch standard deviation of blank solution responses. Information from the United Kingdom.

2) HMSO. *Methods for Examination of Waters and Associated materials: Air Segmented Continuous Flow Automatic Analysis in the Laboratory.* London, Her Majesty's Stationery Office, 1979.