

## Water - Bepaling van ammonium - Deel 1: Handmatige spectrometrische methode (ISO 7150-1:1984, IDT)

Water quality - Determination of ammonium - Part 1: Manual spectrometric method (ISO 7150-1:1984, IDT)

augustus 2002  
ICS 13.060.50

Vervangt NEN 6472:1983

Als Nederlandse norm is aanvaard:

- ISO 7150-1:1984, IDT

Normcommissie 390 016 "Milieu analyses"

Apart from exceptions provided by the law, nothing from this publication may be duplicated and/or published by means of photocopy, microfilm, storage in computer files or otherwise, which also applies to full or partial processing, without the written consent of the Netherlands Standardization Institute.

The Netherlands Standardization Institute shall, with the exclusion of any other beneficiary, collect payments owed by third parties for duplication and/or act in and out of law, where this authority is not transferred or falls by right to the Reproduction Rights Foundation.

Auteursrecht voorbehouden. Behoudens uitzondering door de wet gesteld mag zonder schriftelijke toestemming van het Nederlands Normalisatie-instituut niets uit deze uitgave worden veeleenvoudigd en/of openbaar gemaakt door middel van fotokopie, microfilm, opslag in computerbestanden of anderszins, hetgeen ook van toepassing is op gehele of gedeeltelijke bewerking.

Het Nederlands Normalisatie-instituut is met uitsluiting van ieder ander gerechtigd de door derden verschuldigde vergoedingen voor veeleenvoudiging te innen en/of daartoe in en buiten rechte op te treden, voor zover deze bevoegdheid niet is overgedragen c.q. rechtens toekomt aan de Stichting Reprorecht.

Although the utmost care has been taken with this publication, errors and omissions cannot be entirely excluded. The Netherlands Standardization Institute and/or the members of the committees therefore accept no liability, not even for direct or indirect damage, occurring due to or in relation with the application of publications issued by the Netherlands Standardization Institute.

Hoewel bij deze uitgave de uiterste zorg is nagestreefd, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het Nederlands Normalisatie-instituut en/of de leden van de commissies aanvaarden derhalve geen enkele aansprakelijkheid, ook niet voor directe of indirecte schade, ontstaan door of verband houdend met toepassing van door het Nederlands Normalisatie-instituut gepubliceerde uitgaven.

Voorbeeld  
Preview

# 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

Preview  
Copyright

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

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

Japan

# 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,  $\rho_N$ , 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<sup>1)</sup>

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

### 1.5 Sensitivity<sup>1)</sup>

Using a 40 ml test portion and a cell of optical path length 40 mm,  $\rho_N = 0,200$  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,  $\rho_N = 0,750$  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  $0,10 \pm 0,01$  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) Data from a United Kingdom interlaboratory exercise involving five participants.

## ISO 7150/1-1984 (E)

**4.2 Colour reagent.**

Dissolve  $130 \pm 1$  g of sodium salicylate ( $C_7H_6O_3Na$ ) and  $130 \pm 1$  g of trisodium citrate dihydrate ( $C_6H_5O_7Na_3 \cdot 2H_2O$ ) in water (4.1) in a 1000 ml one-mark volumetric flask. Add sufficient water to give a total liquid volume of about 950 ml and then add  $0,970 \pm 0,005$  g of sodium nitroso-pentacyanoferrate(III) dihydrate {sodium nitroprusside,  $[Fe(CN)_5NO]Na_2 \cdot 2H_2O$ }. Dissolve the solid and then dilute to the mark with water.

Stored in an amber glass bottle, this reagent is stable for at least 2 weeks.

**4.3 Sodium dichloroisocyanurate, solution.**

Dissolve  $32,0 \pm 0,1$  g of sodium hydroxide in  $500 \pm 50$  ml of water (4.1). Cool the solution to room temperature and add  $2,00 \pm 0,02$  g sodium dichloroisocyanurate dihydrate ( $C_3N_3O_3Cl_2Na \cdot 2H_2O$ ) to the solution. Dissolve the solid and transfer the solution quantitatively to a 1000 ml one-mark volumetric flask. Dilute to the mark with water.

Stored in an amber glass bottle, this reagent is stable for at least 2 weeks.

**4.4 Ammonium nitrogen, standard solution,**  
 $\rho_N = 1\ 000$  mg/l.

Dissolve  $3,819 \pm 0,004$  g of ammonium chloride (dried at  $105^\circ C$  for at least 2 h) in about 800 ml of water (4.1) in a 1000 ml one-mark volumetric flask. Dilute to the mark with water.

1 ml of this standard solution contains 1 mg of ammonium nitrogen.

Stored in a stoppered glass bottle, this solution is stable for at least 1 month.

**4.5 Ammonium nitrogen, standard solution,**  
 $\rho_N = 100$  mg/l.

Pipette 100 ml of ammonium nitrogen standard solution (4.4) into a 1000 ml one-mark volumetric flask. Dilute to the mark with water.

1 ml of this standard solution contains 0,1 mg of ammonium nitrogen.

Stored in a stoppered glass bottle, this solution is stable for 1 week.

**4.6 Ammonium nitrogen, standard solution,**  
 $\rho_N = 1$  mg/l.

Pipette 1 ml of ammonium nitrogen standard solution (4.5) into a 100 ml one-mark volumetric flask. Dilute to the mark with water.

1 ml of this standard solution contains 1  $\mu g$  of ammonium nitrogen.

Prepare this solution immediately before use.

**4.7 Cleaning solution.**

Dissolve  $100 \pm 2$  g of potassium hydroxide in  $100 \pm 2$  ml of water. Cool the solution and add  $900 \pm 50$  ml of 95 % (V/V) ethanol.

Store the solution in a polyethylene bottle.

**5 Apparatus**

Ordinary laboratory apparatus and

**5.1 Spectrometer**, capable of operating at a wavelength of 655 nm with cells of optical path length between 10 and 50 mm.

**5.2 Water-bath or incubator**, capable of being maintained at  $25 \pm 1^\circ C$ .

**NOTE ON CLEANING OF GLASSWARE**

All glassware shall be carefully cleaned using the cleaning solution (4.7) followed by thorough rinsing with water (4.1).

**6 Sampling and samples**

Laboratory samples shall be collected in polyethylene or glass bottles. They should be analysed as quickly as possible, or else stored at between 2 and 5  $^\circ C$  until analysed. Acidification with sulfuric acid to  $pH < 2$  may also be used as an aid to preservation, provided that possible contamination of the acidified sample by absorption of any atmospheric ammonia is avoided.

**7 Procedure****7.1 Test portion**

The maximum test portion volume is 40 ml, which can be used for the determination of ammonium nitrogen concentrations up to  $\rho_N = 1$  mg/l.

Smaller test portions may be used as appropriate in order to accommodate much higher ammonium nitrogen concentrations. Laboratory samples containing suspended matter should be allowed to settle, or filtered by gravity through a pre-rinsed glass fibre paper before taking the test portion. Alternatively, prior distillation of the sample may be used (see clause 10).

**7.2 Preparation of test solution**

Pipette the test portion (7.1) into a 50 ml one-mark volumetric flask, and, if necessary, dilute to  $40 \pm 1$  ml with water (4.1).

**7.3 Determination****7.3.1 Formation of the absorbing compound**

Add  $4,00 \pm 0,05$  ml of colour reagent (4.2) and mix well. Then add  $4,00 \pm 0,05$  ml of sodium dichloroisocyanurate solution (4.3) and mix well.

**NOTE** — After this addition the pH of the solution should be  $12,6 \pm 0,1$ . Extremes of acidity or alkalinity in the sample may cause deviation.

# Bestelformulier

## Stuur naar:

NEN Standards Products & Services  
t.a.v. afdeling Klantenservice  
Antwoordnummer 10214  
2600 WB Delft



**NEN** Standards Products & Services

Postbus 5059  
2600 GB Delft

Vlinderweg 6  
2623 AX Delft

T (015) 2 690 390  
F (015) 2 690 271

[www.nen.nl/normshop](http://www.nen.nl/normshop)

## Ja, ik bestel

\_\_ ex. NEN-ISO 7150-1:2002 en Water - Bepaling van ammonium - Deel 1: Handmatige spectrometrische methode € 53.43

**Wilt u deze norm in PDF-formaat? Deze bestelt u eenvoudig via [www.nen.nl/normshop](http://www.nen.nl/normshop)**

### Gratis e-mailnieuwsbrieven

Wilt u op de hoogte blijven van de laatste ontwikkelingen op het gebied van normen, normalisatie en regelgeving? Neem dan een gratis abonnement op een van onze e-mailnieuwsbrieven. [www.nen.nl/nieuwsbrieven](http://www.nen.nl/nieuwsbrieven)

## Gegevens

Bedrijf / Instelling \_\_\_\_\_

T.a.v. \_\_\_\_\_ O M O V

E-mail \_\_\_\_\_

Klantnummer NEN \_\_\_\_\_

Uw ordernummer \_\_\_\_\_ BTW nummer \_\_\_\_\_

Postbus / Adres \_\_\_\_\_

Postcode \_\_\_\_\_ Plaats \_\_\_\_\_

Telefoon \_\_\_\_\_ Fax \_\_\_\_\_

**Factuuradres** (indien dit afwijkt van bovenstaand adres)

Postbus / Adres \_\_\_\_\_

Postcode \_\_\_\_\_ Plaats \_\_\_\_\_

Datum \_\_\_\_\_ Handtekening \_\_\_\_\_

### Retourneren

Fax: 015 2 690 271

E-mail: [klantenservice@nen.nl](mailto:klantenservice@nen.nl)

Post: NEN Standards Products & Services,

t.a.v. afdeling Klantenservice  
Antwoordnummer 10214,  
2600 WB Delft

(geen postzegel nodig).

### Voorwaarden

- De prijzen zijn geldig tot 31 december 2018, tenzij anders aangegeven.
- Alle prijzen zijn excl. btw, verzend- en handelingskosten en onder voorbehoud bij o.m. ISO- en IEC-normen.
- Bestelt u via de normshop een pdf, dan betaalt u geen handeling en verzendkosten.
- Meer informatie: telefoon 015 2 690 391, dagelijks van 8.30 tot 17.00 uur.
- Wijzigingen en typfouten in teksten en prijsinformatie voorbehouden.
- U kunt onze algemene voorwaarden terugvinden op: [www.nen.nl/leveringsvoorwaarden](http://www.nen.nl/leveringsvoorwaarden).