
International Standard



6595

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Water quality — Determination of total arsenic — Silver diethyldithiocarbamate spectrophotometric method

Qualité de l'eau — Dosage de l'arsenic total — Méthode spectrophotométrique au diéthylthiocarbamate d'argent

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 6595 was developed by Technical Committee ISO/TC 147, *Water quality*, and was circulated to the member bodies in November 1980.

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

Australia	France	Poland
Austria	Germany, F.R.	South Africa, Rep. of
Belgium	Hungary	Spain
Brazil	India	Sweden
Canada	Italy	United Kingdom
Czechoslovakia	Korea, Rep. of	USA
Denmark	Mexico	USSR
Finland	Netherlands	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Japan
Switzerland

Water quality — Determination of total arsenic — Silver diethyldithiocarbamate spectrophotometric method

The procedure specified in this International Standard is intended to be carried out by qualified chemists or by other suitably trained and/or supervised personnel. Attention is especially drawn to the toxic nature of arsenic and its solutions and of other reagents used in this method of analysis and to the need to take particular care in the handling and disposal of solutions. Pyridine and chloroform should be handled in a well-ventilated fume cupboard. Ephedrine is a scheduled drug and should be handled in accordance with appropriate regulations.

1 Scope and field of application

This International Standard specifies a silver diethyldithiocarbamate spectrophotometric method for the determination of arsenic in water and waste water.

It is applicable for the determination of arsenic concentrations in the range from 0,001 to 0,1 mg/l. In the case of arsenic compounds which are difficult to decompose, a method of digestion is described in the annex, clause A.1. By appropriate dilution of the test portion with arsenic-free water, higher concentrations of arsenic may also be determined.

Antimony interferes with the determination (see the annex, clause A.2). Chromium, cobalt, molybdenum, nickel, mercury, silver and platinum, in concentrations up to 5 mg/l, do not interfere with the determination.

2 Definition

For the purpose of this International Standard, the following definition applies.

total arsenic : The total amount of the element arsenic, in elementary form or bound in inorganic or organic compounds.

NOTE — Depending on the redox potential and the pH of the water, arsenic may be present in the trivalent state [for example as arsenite ions (AsO_3^{3-})], in the pentavalent state [for example as arsenate ions (AsO_4^{3-})], or as organically bound arsenic.

3 Principle

3.1 Oxidation of organic compounds or sulphides by heating with potassium permanganate and potassium peroxydisulphate.

3.2 Reduction of pentavalent arsenic to the trivalent state.

3.3 Reduction of the trivalent arsenic by nascent hydrogen in an acidic medium to arsenic trihydride (arsine).

3.4 Absorption of the arsine in a solution of silver diethyldithiocarbamate in either chloroform or pyridine, and spectrophotometric measurement of the red-violet complex thus formed, at a wavelength of 510 or 525 nm, respectively, according to the solvent.

4 Reagents

Unless otherwise specified, all reagents shall be of recognized analytical grade and the water used should be distilled or deionized water. The arsenic content of the reagents and the water should be negligibly small.

4.1 Sulphuric acid, $\rho = 1,84$ g/ml.

4.2 Sulphuric acid solution, $c(1/2 \text{H}_2\text{SO}_4) = 2$ mol/l.

4.3 Sodium hydroxide solution, $c(\text{NaOH}) = 2$ mol/l.

Store in a polyethylene bottle.

4.4 Potassium permanganate, 50 g/l solution.

Dissolve 50 g of potassium permanganate in water and dilute to 1 000 ml.

Take care to ensure complete dissolution of the reagent.

Store in a dark glass bottle.