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Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)

Qualité de l'eau — Dosage d'éléments choisis par spectroscopie d'émission optique avec plasma induit par haute fréquence (ICP-OES)



Reference number ISO 11885:2007(E)

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Foreword

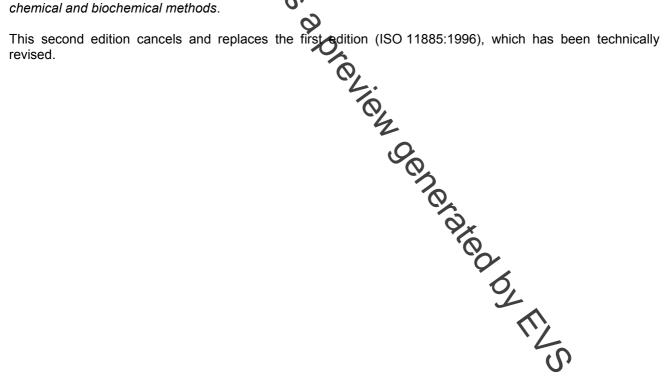
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ISO 11885 was prepared by Technical Committee ISO/TC 147, Water quality, Subcommittee SC 2, Physical, chamical and biochemical methods chemical and biochemical methods.



Introduction

When applying this International Standard, it is necessary in each case, depending on the range to be tested, to determine if and to what extent additional conditions should be established.

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Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This International Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted according to this International Standard be carried out by suitably trained staff.

1 Scope

This International Standard specifies a method for the determination of dissolved elements, elements bound to particles ("particulate") and total content of elements in different types of water (e.g. ground, surface, raw, potable and waste water) for the following elements: aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, gallium, indium, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, phosphorus, potassium, selenium, silicon, silver, sodium, strontium, sulfur, tin, titanium, tungsten, vanadium, zinc and zirconium.

Taking into account the specific and additionally occurring interferences, these elements can also be determined in digests of water, sludges and sediments (for example, digests of water as specified in ISO 15587-1 or ISO 15587-2). The method is suitable for mass concentrations of particulate matter in waste water below 2 g/l. The scope of this method may be extended to other matrices or to higher amounts of particulate matter if it can be shown that additionally occurring interferences are considered and corrected for carefully. It is up to the user to demonstrate the fitness for purpose.

Recommended wavelengths, limits of quantification and important spectral interferences for the selected elements are given in Table 1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO Guide 30, Terms and definitions used in connection with reference materials

ISO 3696, Water for analytical laboratory use — Specification and test methods

ISO 5667-1, Water quality — Sampling — Part 1: Guidance on the design of sampling programmes and sampling techniques

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

ISO 7027, Water quality — Determination of turbidity

ISO 15587-1, Water quality — Digestion for the determination of selected elements in water — Part 1: Aqua regia digestion

ISO 15587-2, Water quality — Digestion for the determination of selected elements in water — Part 2: Nitric acid digestion

3 Terms and definitions

For the purposes of this occument, the following terms and definitions apply.

3.1

accuracy

closeness of agreement between test result and the accepted reference value

NOTE The term accuracy, when applied to a set of observed values, describes a combination of random error components and common systematic error components. Accuracy includes precision and trueness.

3.2

analyte

element(s) to be determined

3.3

background equivalent concentration BEC

elemental concentration required to produce an analyte signal with the same intensity as a background signal

3.4

calibration blank solution

prepared in the same way as the calibration solution but leaving out the analyte

3.5

calibration solution

solution used to calibrate the instrument, prepared from (a) stock solution(s) or from a certified standard

3.6

calibration check solution

solution of known composition within the range of the calibration solutions, but prepared independently

3.7

determination

entire process from preparing the test sample solution up to and including measurement and calculation of the final result

3.8

instrument performance check solution

solution used to determine and control the instrument drift for relevant analytes

3.9

linearity

straight line relationship between the (mean) result of measurement (signal) and the quantity (concentration) of the component to be determined