International Standard 7980

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

Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method

Qualité de l'eau — Dosage du calcium et du magnésium — Méthode par spectrométrie d'absorption atomique

First edition — 1986-05-01

UDC 543.3 : 543.422 : 546.41 : 546.46 **Ref. No. ISO 7980-1986 (E)**

Descriptors : water, quality, chemical analysis, determination of content, calcium, magnesium, spectrochemical analysis.

Price based on 3 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7980 was prepared by Technical Committee ISO/TC 147, *Water quality.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method

1 Scope and field of application

This International Standard specifies a method for the determination of dissolved calcium and magnesium by flame atomic absorption spectrometry. It is intended for the analysis of raw and drinking waters and can be used for waters having a calcium content of up to 50 mg/l and a magnesium content of up to 5 mg/l. For samples containing higher concentrations of calcium or magnesium a smaller volume of the sample must be taken for the analysis.

When using the air/acetylene flame and the dilution factor 1 in 10, as described in 6.1, the optimum range is 3 to 50 mg/l for calcium and 0,9 to 5 mg/l for magnesium.

2 Principle

Measurement by flame atomic absorption spectrometry after adding lanthanum chloride (if an air/acetylene flame is used) or caesium chloride (if a nitrous oxide/acetylene flame is used) to reduce interferences. For calcium the absorbance is measured at 422,7 nm and for magnesium at 285,2 nm.

3 Reagents and materials

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity. (Commercially available, ready-made solutions may by used.)

3.1 Hydrochloric acid (HCl), ϱ = 1,18 g/ml.

3.2 Hydrochloric acid (HCl), 0,1 mol/l.

Dilute 8 ml of hydrochloric acid (3.1) to 1 litre.

3.3 Lanthanum chloride ($LaCl_3$) solution, containing 20 g of La per litre.

To a 1 litre one-mark volumetric flask add 24 g of lanthanum oxide (La_2O_3) (atomic absorption spectrometry grade). Slowly and cautiously add 50 ml of hydrochloric acid (3.1) while stirring to dissolve the lanthanum oxide. Make up to the mark with water.

3.4 Caesium chloride (CsCl) solution, containing 20 g of Cs per litre.

Dissolve 25 g of caesium chloride in 1 litre of hydrochloric acid (3.2).

3.5 Calcium, stock solution, 1 000 mg/l.

Dry a portion of calcium carbonate ($CaCO_3$) at 180 °C for 1 h and allow it to cool in a desiccator. Weigh 2,50 ± 0,01 g of the dried material and suspend this in 100 ml of water. Add slowly the minimum amount of hydrochloric acid (3.2) necessary to dissolve the calcium carbonate (approximately 250 ml). Boil briefly to expel dissolved carbon dioxide, then cool. Transfer the solution quantitatively to a 1 000 ml one-mark volumetric flask and make up to the mark with hydrochloric acid (3.2).

Store the solution in a polyethylene or polypropylene bottle.

3.6 Magnesium, stock solution, 1 000 mg/l.

Dry a portion of magnesium oxide (MgO) at 180 °C for 1 h. Weigh 1,66 ± 0,01 g and dissolve in hydrochloric acid (3.2). Dilute with the same acid to 1 000 ml in a one-mark volumetric flask.

Store the solution in a polyethylene bottle.

3.7 Calcium-magnesium, standard solution corresponding to 20 mg of Ca and 2 mg of Mg per litre.

With pipettes, transfer 20,0 ml of the calcium stock solution (3.5) and 2,0 ml of the magnesium stock solution (3.6) to a 1 000 ml one-mark volumetric flask. Make up to the mark with hydrochloric acid (3.2).