

Australian Standard[®]

Analysis of soils

**Part 2: Extraction of heavy metals
and metalloids from soil by aqua
regia—Hotplate digestion method**

This Australian Standard was prepared by Committee CH/28, Sampling and Analysis of Soils and Biota. It was approved on behalf of the Council of Standards Australia on 15 October 1997 and published on 5 December 1997.

The following interests are represented on Committee CH/28:

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Association of Consulting Engineers, Australia
Australasian Institute of Mining and Metallurgy
Australian Collaborative Land Evaluation Program
Australian Gas Association
Australian Government Analytical Laboratory
Australian Institute of Environmental Health
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH/28, Sampling and Analysis of Soils and Biota and is based on ISO 11466:1995, *Soil quality—Extraction of trace elements soluble in aqua regia*.

This Standard is the result of a consensus among the representatives on the Joint Committee to produce it as an Australian Standard.

The objective of this Standard is to provide a method of extraction of metals from soils by aqua regia, prior to determination by atomic absorption spectrometry, inductively coupled plasma spectrometry or other appropriate technique. The method is not suitable for speciation studies and the results do not constitute bioavailable heavy metal content of soils.

The subsequent determination should be carried out in accordance with the relevant Australian Standard.

It has been assumed that executing the provisions of this document is restricted to appropriately qualified and experienced people. This Standard calls for the use of procedures that may be hazardous or injurious to health if adequate precautions are not taken.

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STANDARDS AUSTRALIA

Australian Standard

Analysis of soils

Part 2: Extraction of heavy metals and metalloids from soil by aqua regia—Hotplate digestion method

1 SCOPE This Standard specifies a method for the extraction of heavy metals from soil using aqua regia. Analytical techniques appropriate to the analyte content in the solution are used for the subsequent determinations of heavy metals and metalloids in the resulting solution.

Sediments, sludges (containing less than 20% organic carbon) and other silicate materials (e.g. fill material and brick) may be extracted using this method.

NOTES:

1 The method produces a solution for determination of aqua regia extractable metals. The solution is not suitable for speciation studies, nor do the values obtained necessarily represent the total or bio-available heavy metal content of the soils.

2 No acid digestion procedure necessarily results in complete extraction of the analyte, therefore different acid digestion procedures may yield different results.

Users of this Standard should carry out a programme of analysis using reference materials to assure themselves that the method given here is appropriate for their needs. This method is suitable for use in conjunction with A NZECC/NHMRC Guidelines*, provided the appropriate method validation details are given.

Other methods use different acid combinations such as nitric/perchloric and reverse aqua regia.

3 AS 4479.1 specifies requirements for pretreatment of soil samples for analysis.

4 This procedure is to be performed only by an analyst familiar with the operational procedures associated with acid digestion.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

1289 Methods of testing soils for engineering purposes

1289.2 Part 2: Soil moisture content tests

2162 Verification and use of volumetric glassware

2162.1 Part 1: General—Volumetric glassware

2162.1.1 Laboratory glassware—One-mark volumetric flasks

2243 Safety in laboratories

2243.8 Part 8: Fume cupboards

* Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites and as subsequently amended/supplemented by the Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council.