BS ISO 15202-1:2012

BSI Standards Publication

Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry

Part 1: Sampling

This British Standard is the UK implementation of ISO 15202-1:2012. It supersedes BS ISO 15202-1:2000 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EH/2/2, Work place atmospheres.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry —

Part 1: Sampling

Air des lieux de travail — Détermination des métaux et métalloïdes dans les particules en suspension dans l'air par spectrométrie d'émission atomique avec plasma à couplage inductif —

Partie 1: Échantillonnage

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15202-1 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 2, *Workplace atmospheres*.

This second edition cancels and replaces the first edition (ISO 15202-1:2000), which has been technically revised. The major changes in the second edition are as follows:

— definitions have been updated;

— a new Annex A has been added to provide guidance regarding sampler wall deposits.

ISO 15202 consists of the following parts, under the general title *Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry*:

— *Part 1: Sampling*

— *Part 2: Sample preparation*

— *Part 3: Analysis*

Introduction

The health of workers in many industries is at risk through exposure by inhalation of toxic metals and metalloids. Industrial hygienists and other public health professionals need to determine the effectiveness of measures taken to control workers' exposure, and this is generally achieved by taking workplace air measurements. This part of ISO 15202 has been published in order to make available a method for making valid exposure measurements for a wide range of metals and metalloids in use in industry. It will be of benefit to: agencies concerned with health and safety at work; industrial hygienists and other public health professionals; analytical laboratories; industrial users of metals and metalloids and their workers, etc.

This part of ISO 15202 specifies a generic sampling method for subsequent determination of the mass concentration of metals and metalloids in workplace air using inductively coupled plasma atomic emission spectrometry (ICP-AES). Samples obtained using the method described herein can also be subsequently analysed by other instrumental methods, such as atomic absorption spectrometry (AAS) or inductively coupled plasma mass spectrometry (ICP-MS).

This part of ISO 15202 gives details of relevant International, European and National Standards which specify characteristics, performance requirements and test methods relating to sampling equipment. It augments guidance provided elsewhere on assessment strategy and measurement strategy, and specifies a method for collecting samples of airborne particulate matter for subsequent chemical analysis.

Part 2 of ISO 15202 describes a number of procedures for preparing sample solutions for analysis by ICP-AES.

Part 3 of ISO 15202 gives requirements and test methods for analysis of sample solutions by ICP-AES.

It has been assumed in the drafting of this part of ISO 15202 that the execution of its provisions, and the interpretation of the results obtained, is entrusted to appropriately qualified and experienced people.

Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry —

Part 1: Sampling

1 Scope

1.1 This part of ISO 15202 specifies a method for collecting samples of airborne particulate matter for subsequent determination of metals and metalloids using inductively coupled plasma — atomic emission spectrometry (ICP-AES). Samples obtained using the method described herein can also be subsequently analysed for elemental composition by other instrumental methods, such as atomic absorption spectrometry (AAS) or inductively coupled plasma mass spectrometry (ICP-MS).

1.2 The method is not applicable to the sampling of mercury, which is present in air in the vapour phase at ambient temperatures; inorganic compounds of metals and metalloids that are permanent gases, e.g. arsine (AsH_3); or inorganic compounds of metals and metalloids that are present in the vapour phase at ambient temperatures, e.g. arsenic trioxide (As_2O_3).

NOTE Although the method does not describe a means of collecting inorganic compounds of metals and metalloids that are present in the vapour phase, in most instances this is relatively easily achieved by using a back-up filter which has been pre-treated to trap the compound(s) of interest, e.g. a back-up paper pad impregnated with sodium carbonate is suitable for collecting arsenic trioxide (see ISO 11041[2]).

1.3 The method is applicable to personal sampling of the inhalable or respirable fraction of airborne particles, as defined in ISO 7708, and to static sampling.

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 7708:1995, *Air quality — Particle size fraction definitions for health-related sampling*

ISO 15202-2, *Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry — Part 2: Sample preparation*

ISO 15202-3, *Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry — Part 3: Analysis*

EN 13205, *Workplace atmospheres — Assessment of performance of instruments for measurement of airborne particle concentrations*

3 Terms and definitions

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