AS ISO 19976.2:2020
ISO 19976-2:2019

Australian STANDARD®

STANDARDS Australia

Copper, lead and zinc sulfide concentrates — Determination of cadmium

Part 2: Acid digestion and inductively coupled plasma atomic emission spectrometric method



AS ISO 19976.2:2020

This Australian Standard® was prepared by MN-005, Copper, Lead, Zinc and Nickel Ores and Concentrates. It was approved on behalf of the Council of Standards Australia on 2 September 2020.

This Standard was published on 25 September 2020.

The following are represented on Committee MN-005:

Australasian Institute of Mining & Metallurgy
Australian X-ray Analytical Association
Chamber of Minerals and Energy of Western Australia
CSIRO
International Copper Association Australia
Minerals Council of Australia
Queensland Resources Council

This Standard was issued in draft form for comment as DR AS ISO 19976.2:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:
www.standards.org.au

ISBN 978 1 76072 978 3

AS ISO 19976.2:2020
ISO 19976-2:2019

Copper, lead and zinc sulfide concentrates — Determination of cadmium

Part 2: Acid digestion and inductively coupled plasma atomic emission spectrometric method

First published as AS ISO 19976.2:2020.

COPYRIGHT

© ISO 2020 — All rights reserved
© Standards Australia Limited 2020

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

Preface

This Standard was prepared by the Standards Australia Committee MN-005, Copper, Lead, Zinc and Nickel Ores and Concentrates.

The objective of this document is to specify an acid digestion and inductively coupled plasma atomic emission spectrometric (ICP-AES) method for the determination of the mass fraction of cadmium in copper, lead and zinc sulfide concentrates as follows:

(a) For copper sulfide concentrates, the method is applicable to the determination of mass fractions of cadmium from 0.01 % to 0.30 %.

(b) For lead sulfide concentrates, the method is applicable to the determination of mass fractions of cadmium from 0.01 % to 0.30 %.

(c) For zinc sulfide concentrates, the method is applicable to the determination of mass fractions of cadmium from 0.05 % to 1.00 %.

This document is identical with, and has been reproduced from, ISO 19967-2:2019, *Copper, lead and zinc sulfide concentrates — Determination of cadmium — Part 2: Acid digestion and inductively coupled plasma atomic emission spectrometric method*.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

© Standards Australia Limited 2020

Contents

Preface ... **ii**

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Principle ... **2**

5 Reagents ... **2**

6 Apparatus ... **3**

7 Sample ... **3**
7.1 Laboratory sample ... 3
7.2 Test sample ... 3
7.3 Test portion ... 3

8 Procedure ... **4**
8.1 Number of determinations ... 4
8.2 Blank test ... 4
8.3 Dissolution of the test portion ... 4
8.4 Preparation of test solutions ... 4
8.5 Preparation of calibration solutions ... 4
8.6 Preparation of cadmium calibration curve ... 5
8.7 Determination of cadmium content in test solutions ... 5

9 Expression of results ... **5**

10 Precision ... **6**
10.1 Expression of precision ... 6
10.2 Method for obtaining the final result ... 6
10.3 Between-laboratories precision ... 6
10.4 Check of trueness ... 7
10.4.1 General ... 7
10.4.2 Type of CRM or reference material ... 8

11 Test report ... **8**

Annex A (informative) **Procedure for the preparation and determination of the mass of a pre-dried test portion** ... **9**

Annex B (normative) **Procedure for obtaining the final result** ... **11**

Bibliography ... **12**

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 183, *Copper, lead, zinc and nickel ores and concentrates*.

A list of all parts in the ISO 19976 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© Standards Australia Limited 2020

Australian Standard®

Copper, lead and zinc sulfide concentrates — Determination of cadmium

Part 2: Acid digestion and inductively coupled plasma atomic emission spectrometric method

WARNING — The use of this document might involve hazardous materials, operations and equipment. It is the responsibility of the user of this document to establish appropriate health and safety practices.

1 Scope

This document specifies an acid digestion and inductively coupled plasma atomic emission spectrometric (ICP-AES) method for the determination of the mass fraction of cadmium in copper, lead and zinc sulfide concentrates as follows:

a) for copper sulfide concentrates, the method is applicable to the determination of mass fractions of cadmium from 0,01 % to 0,30 %;

b) for lead sulfide concentrates, the method is applicable to the determination of mass fractions of cadmium from 0,01 % to 0,30 %;

c) for zinc sulfide concentrates, the method is applicable to the determination of mass fractions of cadmium from 0,05 % to 1,00 %.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 385, *Laboratory glassware — Burettes*

ISO 648, *Laboratory glassware — Single-volume pipettes*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 4787, *Laboratory glassware — Volumetric instruments — Methods for testing of capacity and for use*

ISO 8466-2, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 2: Calibration strategy for non-linear second-order calibration functions*

ISO 9599, *Copper, lead, zinc and nickel sulfide concentrates — Determination of hygroscopic moisture content of the analysis sample — Gravimetric method*

ISO 12743, *Copper, lead, zinc and nickel concentrates — Sampling procedures for determination of metal and moisture content*

ISO Guide 35, *Reference materials — Guidance for characterization and assessment of homogeneity and stability*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

© Standards Australia Limited 2020