
**Hardmetals — Determination of silicon in
cobalt metal powders using graphite-
furnace atomic absorption**

*Métaux durs — Dosage du silicium dans les poudres métalliques de
cobalt par absorption atomique à four graphite*



Reference number
ISO 17352:2008(E)

© ISO 2008

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

Contents

Page

Foreword	iv
1 Scope	1
2 Principle	1
3 Reagents	1
4 Apparatus	2
5 Procedure	2
6 Calibration	2
7 Calculation	2
8 Precision	2
9 Test report	3
Bibliography	4

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 17352 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 4, *Sampling and testing methods for hardmetals*.

Hardmetals — Determination of silicon in cobalt metal powders using graphite-furnace atomic absorption

1 Scope

This International Standard specifies a test method, using graphite-furnace atomic absorption, to determine the mass fraction of silicon in cobalt metal powder with varying compositions within the range of 5 µg/g to 40 µg/g.

2 Principle

This test method for the chemical analysis of cobalt metal powder is to be used to determine traces of silicon. It is assumed that all those who use this test method will be trained analysts capable of performing common laboratory procedures skilfully and safely. It is expected that all the work will be performed in a properly equipped laboratory.

3 Reagents

Reagents of the highest purity and only double-distilled water or their equivalents shall be used.

- 3.1 **Nitric acid**, $\rho = 1,4$ g/ml.
- 3.2 **Hydrochloric acid**, $\rho = 1,15$ g/ml.
- 3.3 **Cobalt powder**, purity > 99,9 % by mass.
- 3.4 **Si solution**, 1,000 g/l.

4 Apparatus

4.1 Graphite-furnace atomic absorption spectrometer

Follow the manufacturer's instruction manual for installation and operation.

4.2 Additional information

The following parameters are for information purposes only and have to be adapted to the special requirements of every laboratory.

Lamp:	hollow cathode lamp for Si
Tube:	coated pyrolytic C-tube without a platform
Wavelength:	251,6 nm
Slit:	0,2 nm
Injection volume:	20 µl
Temperature program:	drying — 120 °C ashing — 1 200 °C atomising — 2 700 °C conditioning — 2 750 °C

5 Procedure

5.1 Test portion

Weigh, to the nearest 0,001 g, approximately 0,5 g of the test sample and transfer it to a 100 ml polypropylene flask.

5.2 Dissolution of the test portion

The test sample is dissolved in 10 ml of nitric acid and 2 ml of hydrochloric acid. When the sample is completely dissolved, allow the flask to cool and then fill up to 100 ml with double-distilled water.

6 Calibration

0,500 g of ultrapure cobalt powder is dissolved in the same way as the test sample (see 5.2). The resulting solutions are spiked with 0 µg of Si, 5 µg of Si, 10 µg of Si, 20 µg of Si and 40 µg of Si and filled up to 100 ml with water. With these calibrated solutions, a calibration curve is prepared.

7 Calculation

Calculate the mass fraction of silicon in the sample using the calibration curve prepared in Clause 6. Compensate for the actual weight of the sample analysed.

8 Precision

No definite statement on the precision and bias can be made at this time. These values shall be calculated using the results of a round-robin analysis.

9 Test report

The test report shall include the following information:

- a) a reference to this International Standard;
- b) all details necessary for identification of the test sample;
- c) the test results obtained;
- d) all operations not specified in this International Standard, or regarded as optional;
- e) details of any occurrence which may have affected the result.

Bibliography

- [1] ISO 3252, *Powder metallurgy — Vocabulary*
- [2] ASTM B 243, *Standard Terminology of Powder Metallurgy*

ICS 77.160

Price based on 4 pages