

---

---

**Hardmetals — Determination of sulfur  
and carbon contents in cobalt metal  
powders — Infrared detection method**

*Métaux-durs — Dosage du soufre et du carbone dans les carbures au  
cobalt — Méthode par détection infrarouge*

STANDARDSISO.COM : Click to view the full PDF of ISO 11873:2005



**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.

STANDARDSISO.COM : Click to view the full PDF of ISO 11873:2005

© ISO 2005

The reproduction of the terms and definitions contained in this International Standard is permitted in teaching manuals, instruction booklets, technical publications and journals for strictly educational or implementation purposes. The conditions for such reproduction are: that no modifications are made to the terms and definitions; that such reproduction is not permitted for dictionaries or similar publications offered for sale; and that this International Standard is referenced as the source document.

With the sole exceptions noted above, no other 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](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## 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 11873 was prepared by Technical Committee ISO/TC 119, *Powder metallurgy*, Subcommittee SC 4, *Sampling and testing methods for hardmetals*.

STANDARDSISO.COM : Click to view the full PDF of ISO 11873:2005



# Hardmetals — Determination of sulfur and carbon contents in cobalt metal powders — Infrared detection method

## 1 Scope

This International Standard specifies the method to be used for the determination of sulfur and carbon in cobalt metal powders in the range of 0,001 % (*m/m*) to 0,1 % (*m/m*) by combustion in oxygen and infrared (IR)-detection of carbon dioxide (CO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>).

## 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 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

## 3 Reagents

Reagents of the highest purity shall be used.

**3.1 Oxygen**, purity according to the specification of the supplier.

**3.2 Tungsten granules**, or an equivalent shape or form of tungsten as a combustion aid. The particle size shall not be less than 0,2 mm.

**3.3 Iron chips**, as required for combustion.

## 4 Procedure

### 4.1 Test portion

Weigh, to the nearest 0,001 g, 0,5 g to 1,5 g of the sample into a suitable crucible. The mass is dependent on the carbon and sulfur content. There may be a risk of contamination if samples/materials are stored in plastic containers.

### 4.2 Analysis

Add the combustion aid (3.2 and 3.3) and carry out the analysis according to the instructions of the manufacturer.

### 4.3 Calibration

Perform at least three blank tests with a crucible and combustion aid (3.2 and 3.3). Proceed if the blank values are within the specification of the instrument manufacturer. Perform at least three calibration tests with reference materials.

## 5 Expression of the results

### 5.1 Calculation

Calculate the mass fraction of sulfur,  $w_S$ , or carbon,  $w_C$ , expressed as a percentage, using the following formulae:

$$w_S = \frac{(m_S - B) \times P \times 100}{M}$$

$$w_C = \frac{(m_C - B) \times P \times 100}{M}$$

where

$m_S$  is the mass, in grams, of sulfur determined in the test portion;

$m_C$  is the mass, in grams, of carbon determined in the test portion;

$P$  is the calibration factor;

$m$  is the mass, in grams, of the test portion;

$B$  is the average blank value (see 4.3).

### 5.2 Permissible tolerances

The repeatability standard deviations between three independent determinations shall not exceed the following values:

	Lower limit	Upper limit
C	0,005 0 % (m/m) ± 50 %	0,200 0 % (m/m) ± 10 %
S	0,005 0 % (m/m) ± 50 %	0,200 0 % (m/m) ± 10 %

### 5.3 Final result

Report the arithmetical mean of acceptable determinations of mass fractions rounded to 0,001 %.

## 6 Test report

The test report shall include the following information:

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