INTERNATIONAL STANDARD

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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

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Foreword

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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*.

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_2) and sulfur dioxide (SO_2).

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) 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 by this International Standard, or regarded as optional;

e) details of any occurrence which may have affected the result.