

INTERNATIONAL STANDARD

ISO
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Second edition
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Steel and iron — Determination of molybdenum content — Thiocyanate spectrophotometric method

*Aciers et fontes — Dosage du molybdène — Méthode
spectrophotométrique au thiocyanate*



Reference number
ISO 4941:1994(E)

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.

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.

International Standard ISO 4941 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*.

This second edition cancels and replaces the first edition (ISO 4941:1978), which has been technically revised. The method is now applicable to molybdenum contents between 0,005 % (*m/m*) and 0,125 % (*m/m*). The reason for the upper limit being reduced (from 9 % (*m/m*) in the first edition) is that an international cooperative test showed that the method does not fully comply with the precision criteria suggested for the assessment of a method in an International Standard. A graphical representation of the data obtained in the precision test is given in annex B.

Annexes A and B of this International Standard are for information only.

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Steel and iron — Determination of molybdenum content — Thiocyanate spectrophotometric method

1 Scope

This International Standard specifies a thiocyanate spectrophotometric method for the determination of the molybdenum content in steel and iron.

The method is applicable to molybdenum contents between 0,005 % (*m/m*) and 0,125 % (*m/m*).

Vanadium and tungsten interfere with the measurement if, because of their contents, the V/Mo ratio is greater than 16 or the W/Mo ratio is greater than 8 (see note 1).

NOTE 1 Greater V/Mo or W/Mo ratios (up to 300) may, however, be permitted, but in such cases it is necessary to carry out the measurement very quickly after the extraction.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 377-2:1989, *Selection and preparation of samples and test pieces of wrought steels — Part 2: Samples for the determination of the chemical composition*.

ISO 385-1:1984, *Laboratory glassware — Burettes — Part 1: General requirements*.

ISO 648:1977, *Laboratory glassware — One-mark pipettes*.

ISO 1042:1983, *Laboratory glassware — One-mark volumetric flasks*.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*.

ISO 4800:1977, *Laboratory glassware — Separating funnels and dropping funnels*.

ISO 5725:1986, *Precision of test methods — Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests*.

3 Principle

Dissolution of a test portion in an appropriate mixture of acids and decomposition of the carbides by oxidation.

Quantitative formation of a coloured compound of molybdenum, in the presence of thiocyanate, iron(II) and/or copper(II) ions and extraction of this compound using butyl acetate.

Spectrophotometric measurement of the coloured compound at a wavelength of about 470 nm.

4 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and grade 2 water as specified in ISO 3696.

4.1 Pure iron, in flake or powder form, with a molybdenum content less than 0,000 5 % (*m/m*) and free from tungsten and vanadium.

4.2 Butyl acetate.

4.3 Nitric acid, ρ about 1,40 g/ml.