

INTERNATIONAL STANDARD

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Steel and iron — Determination of nickel, copper and cobalt contents — Inductively coupled plasma atomic emission spectrometric method —

Part 3: Determination of copper content

*Aciers et fontes — Dosage du nickel, du cuivre et du cobalt — Méthode
par spectrométrie d'émission atomique avec plasma induit par haute
fréquence —*

Partie 3: Dosage du cuivre



Reference number
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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 13898-3 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*.

ISO 13898 consists of the following parts, under the general title *Steel and iron — Determination of nickel, copper and cobalt contents — Inductively coupled plasma atomic emission spectrometric method*.

- *Part 1: General requirements and sample dissolution*
- *Part 2: Determination of nickel content*
- *Part 3: Determination of copper content*
- *Part 4: Determination of cobalt content*

Annexes A and B of this part of ISO 13898 are for information only.

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Steel and iron — Determination of nickel, copper and cobalt contents — Inductively coupled plasma atomic emission spectrometric method —

Part 3: Determination of copper content

1 Scope

This part of ISO 13898 specifies an inductively coupled plasma atomic emission spectrometric method for the determination of copper content in unalloyed steel and unalloyed iron.

The method is applicable to copper contents between 0,001 % (m/m) and 0,40 % (m/m).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 13898. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 13898 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 3696:1987, *Water for analytical laboratory use - Specification and test methods*.

ISO 5725-2:1994, *Accuracy (trueness and precision) of measurement methods and results - Part 2: Determination of repeatability and reproducibility of a standard measurement method*.

ISO 5725-3:1994, *Accuracy (trueness and precision) of measurement methods and results - Part 3: Intermediate measures of the precision of a standard measurement method*.

ISO 13898-1:1997, *Steel and iron - Determination of nickel, cobalt and copper contents - Inductively coupled plasma atomic emission spectrometric method - Part 1: General requirements and sample dissolution*.

ISO 14284:1996, *Steel and iron - Sampling and preparation of samples for the determination of chemical composition*.

3 Principle

The principle is described in clause 3 of ISO 13898-1:1997.

4 Reagents

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

In addition to the reagents given in clause 4 of ISO 13898-1:1997, the following are required.

4.1 Copper, standard solution.

4.1.1 Stock solution, corresponding to 0,80 g of copper per litre.

Weigh, to the nearest 0,1 mg, 0,800 g of copper metal [purity >99,99 % (*m/m*)] and transfer to a 200 ml beaker. Add 50 ml of nitric acid (4.3 of ISO 13898-1:1997) cover with a watch-glass and heat to dissolve gently. Cool to ambient temperature, transfer into a 1 000 ml one-mark volumetric flask quantitatively and dilute to the mark with water and mix.

1 ml of this stock solution contains 0,80 mg Cu.

4.1.2 Standard solution A, corresponding to 0,08 g of copper per litre.

Transfer 20,0 ml of the copper stock solution (4.1.1) to a 200 ml one-mark volumetric flask, dilute to the mark with water and mix.

Prepare this standard solution immediately before use.

1 ml of this standard solution contains 0,08 mg Cu.

4.1.3 Standard solution B, corresponding to 0,016 g of copper per litre.

Transfer 10,0 ml of the copper stock solution (4.1.1) to a 500 ml one-mark volumetric flask, dilute to the mark with water and mix.

If the calibration graph is found to be non-linear, an additional calibration series may be used.

Prepare this standard solution immediately before use.

1 ml of this standard solution contains 0,016 mg Cu.

5 Apparatus

The apparatus required is given in clause 5 of ISO 13898-1:1997.

6 Sampling

Carry out sampling in accordance with ISO 14284.

7 Procedure

7.1 Test portion

Weigh, to the nearest 1 mg, approximately 1,00 g of the test sample.

7.2 Blank test (corresponding to the zero member)

Proceed as directed in 7.2 of ISO 13898-1:1997.