

INTERNATIONAL STANDARD

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Steel — Determination of manganese content — Inductively coupled plasma atomic emission spectrometric method

*Acier — Dosage du manganèse — Méthode par spectrométrie
d'émission atomique de plasma avec couplage inductif*



Reference number
ISO 10278:1995(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 10278 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*.

Annex A forms an integral part of this International Standard. Annexes B and C are for information only.

Steel — Determination of manganese content — Inductively coupled plasma atomic emission spectrometric method

1 Scope

This International Standard specifies an inductively coupled plasma atomic emission spectrometric method for the determination of the manganese content in unalloyed steels.

The method is applicable to manganese contents between 0,002 % (m/m) and 1,5 % (m/m).

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 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 a mixture of hydrochloric and nitric acids and dilution of the solution to a known volume. If necessary, addition of scandium or yttrium as an internal standard. Nebulization of the solution into an inductively coupled plasma atomic emission spectrometer and measurement of the intensity of the emitted light from manganese at 257,61 nm and, optionally, emitted light from scandium at 361,38 nm or yttrium at 371,03 nm, simultaneously.

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.

4.1 Pure iron, containing less than 0,000 1 % (m/m) of manganese.

4.2 Hydrochloric acid, ρ about 1,19 g/ml, diluted 1 + 1.

4.3 Nitric acid, ρ about 1,40 g/ml, diluted 1 + 1.

4.4 Manganese standard solution.

4.4.1 Manganese standard solution A, corresponding to 0,5 g of Mn per litre.

Weigh, to the nearest 0,1 mg, 0,500 g of manganese metal [purity > 99,9 % (m/m)] (see note 1) and transfer to a 200 ml beaker. Add 30 ml of hydrochloric acid