
International Standard



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**Iron ores — Determination of manganese content —
Periodate spectrophotometric method**

Minerais de fer — Dosage du manganèse — Méthode spectrophotométrique au periodate

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ISO 3886-1986 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3886 was prepared by Technical Committee ISO/TC 102, *Iron ores*.

This second edition cancels and replaces the first edition (ISO 3886-1977), clauses 6, 7 and 8 and annex A of which have been technically revised.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Iron ores — Determination of manganese content — Periodate spectrophotometric method

1 Scope and field of application

This International Standard specifies a spectrophotometric method using sodium periodate for the determination of the manganese content of iron ores.

This method is applicable to a concentration range of 0,02 to 8 % (*m/m*) of manganese in natural iron ores, and iron ore concentrates and agglomerates including sinter products.

2 References

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

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

ISO 3081, *Iron ores — Increment sampling — Manual method.*

ISO 3082, *Iron ores — Increment sampling and sample preparation — Mechanical method.*

ISO 3083, *Iron ores — Preparation of samples — Manual method.*

ISO 7764, *Iron ores — Preparation of predried test samples for chemical analysis.*

3 Principle

Decomposition of a test portion by one of the following methods:

- a) treatment with hydrochloric, nitric and perchloric acids;
- b) sintering with sodium peroxide, followed by treatment with hydrochloric and perchloric acids.

Filtration and ignition of the residue, followed by treatment with hydrofluoric and sulfuric acids and fusion with sodium carbonate. Dissolution of the cooled melt in the main solution.

Oxidation of manganese in an aliquot to permanganate ion, using sodium periodate in sulfuric acid - phosphoric acid medium.

Spectrophotometric measurement of the absorbance due to the permanganate ion at a wavelength of about 535 nm.

4 Reagents

During the analysis, use only reagents of recognized analytical grade, and only distilled water or water of equivalent purity, except that water free from organic matter (4.1) shall be used for the spectrophotometric measurement.

4.1 Water, free from organic matter.

Add 20 ml of sulfuric acid (4.9) to 1 litre of water, bring to the boil, add several crystals of sodium periodate, continue boiling for 10 min, then cool.

4.2 Sodium peroxide (Na_2O_2), powder.

NOTE — Sodium peroxide should be kept away from humidity and should be not used once it has begun to agglomerate.

4.3 Sodium carbonate (Na_2CO_3), anhydrous.

4.4 Hydrochloric acid, ρ 1,16 to 1,19 g/ml.

4.5 Hydrochloric acid, ρ 1,16 to 1,19 g/ml, diluted 1 + 9.

4.6 Nitric acid, ρ 1,4 g/ml.

4.7 Perchloric acid, 60 % (*m/m*) (ρ 1,54 g/ml) or 70 % (*m/m*) (ρ 1,67 g/ml).