

INTERNATIONAL STANDARD

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Iron ores — Determination of nickel and/or chromium contents — Flame atomic absorption spectrometric method

*Minerais de fer — Dosage du nickel et/ou du chrome — Méthode par
spectrométrie d'absorption atomique dans la flamme*



Reference number
ISO 9685:1991(E)

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Foreword

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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 9685 was prepared by Technical Committee ISO/TC 102, *Iron ores*, Sub-Committee SC 2, *Chemical analysis*.

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

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Iron ores — Determination of nickel and/or chromium contents — Flame atomic absorption spectrometric method

1 Scope

This International Standard specifies a flame atomic absorption spectrometric method for the determination of nickel and/or chromium contents of iron ores.

This method is applicable to nickel and/or chromium contents between 0,003 % (m/m) and 0,1 % (m/m)¹⁾ in natural iron ores, iron ore concentrates and agglomerates, including sinter products.

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

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

ISO 3081:1986, *Iron ores — Increment sampling — Manual method.*

ISO 3082:1987, *Iron ores — Increment sampling and sample preparation — Mechanical method.*

ISO 3083:1986, *Iron ores — Preparation of samples — Manual method.*

ISO 7764:1985, *Iron ores — Preparation of predried test samples for chemical analysis.*

3 Principle

Decomposition of the test portion by treatment with hydrochloric and nitric acids.

Removal of the major portion of iron in the filtrate by extraction with 4-methylpentan-2-one.

Ignition of the insoluble residue, removal of silicon dioxide by evaporation with hydrofluoric and sulfuric acids. Fusion of the residue with a mixture of sodium carbonate and sodium tetraborate, followed by dissolution with hydrochloric acid. Combination with the main solution.

Aspiration into the flame of an atomic absorption spectrometer using an air-acetylene burner for nickel and a dinitrogen oxide-acetylene burner for chromium.

Comparison of the absorbance values obtained with those obtained from the calibration solutions.

4 Reagents

During the analysis, use only reagents of recognized analytical grade, and only distilled water or water of equivalent purity.

4.1 Sodium carbonate (Na_2CO_3), anhydrous powder.

4.2 Sodium tetraborate ($\text{Na}_2\text{B}_4\text{O}_7$), anhydrous powder.

4.3 Lithium tetraborate ($\text{Li}_2\text{B}_4\text{O}_7$), anhydrous powder.

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

1) This method has not been tested on ores containing more than 0,056 % (m/m) of chromium. (See annex B.)