
International Standard



4693

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Iron ores — Determination of copper content — Flame atomic absorption spectrometric method

Minerais de fer — Dosage du cuivre — Méthode par spectrométrie d'absorption atomique dans la flamme

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Foreword

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International Standard ISO 4693 was prepared by Technical Committee ISO/TC 102, *Iron ores*.

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 copper content — Flame atomic absorption spectrometric method

1 Scope and field of application

This International Standard specifies a flame atomic absorption spectrometric method for the determination of the copper content of iron ores.

This method is applicable to a concentration range of 0,003 to 1,0 % (m/m) of copper 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*.¹⁾

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 treatment with hydrochloric, nitric and hydrofluoric acids. Evaporation with perchloric acid, dilution and filtration of any insoluble residue.

Measurement of the copper content of the solution by atomic absorption spectrometry using an air-acetylene flame.

4 Reagents

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

NOTE — The distillation apparatus used should not contain any copper, and deionized water should not come into contact with copper tubing or taps.

4.1 Iron metal powder, copper content < 0,001 % (m/m).

4.2 Sodium carbonate (Na₂CO₃), anhydrous.

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

4.4 Nitric acid, ρ 1,4 g/ml.

4.5 Hydrochloric acid, ρ 1,16 to 1,19 g/ml, diluted 1 + 2.

4.6 Nitric acid, ρ 1,4 g/ml, diluted 1 + 1.

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

4.8 Hydrofluoric acid, 40 % (m/m) solution, ρ 1,13 g/ml or 48 % (m/m) solution, ρ 1,185 g/ml.

4.9 Background solution.

Dissolve 15 g of iron metal powder (4.1) in 150 ml of hydrochloric acid (4.5). Cool the solution to room temperature, add 10 ml of nitric acid (4.4). Heat carefully to eliminate nitrous gases, add 250 ml of perchloric acid solution (4.7) and evaporate the solution to fumes. Allow to fume for 10 min, cool and dilute to 1 000 ml with water.

4.10 Copper standard solutions.

4.10.1 Stock solution

Dissolve 1,000 g of pure metallic copper in 30 ml of nitric acid solution (4.6), heat to remove nitrous gases, cool and transfer to a 1 000 ml volumetric flask. Dilute to the mark with water and mix.

1 ml of the stock solution contains 1,00 mg of copper.

4.10.2 Standard solution A

Transfer 100 ml of the stock solution (4.10.1) to a 1 000 ml volumetric flask. Dilute to the mark with water and mix.

1 ml of this standard solution contains 0,10 mg of copper.

1) At present at the stage of draft.