
International Standard



315

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Manganese ores and concentrates — Determination of nickel content — Dimethylglyoxime spectrometric method and flame atomic absorption spectrometric method

Minerais et concentrés de manganèse — Dosage du nickel — Méthode spectrométrique à la diméthylglyoxime et méthode par spectrométrie d'absorption atomique dans la flamme

First edition — 1984-06-01

UDC 553.32 : 543.422 : 546.74

Ref. No. ISO 315-1984 (E)

Descriptors : minerals and ores, metalliferous minerals, manganese ores, concentrates, chemical analysis, determination of content, nickel, spectrophotometric analysis, atomic absorption method.

Price based on 6 pages

Foreword

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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.

International Standard ISO 315 was developed by Technical Committee ISO/TC 65, *Manganese and chromium ores*, and was circulated to the member bodies in February 1983.

It has been approved by the member bodies of the following countries:

Austria	Italy	South Africa, Rep. of
Bulgaria	Japan	Thailand
China	Mexico	United Kingdom
Czechoslovakia	Netherlands	USSR
France	Poland	
Germany, F.R.	Romania	

The member body of the following country expressed disapproval of the document on technical grounds:

Australia

This International Standard cancels and replaces ISO Recommendation R 315-1963, of which it constitutes a technical revision.

Manganese ores and concentrates — Determination of nickel content — Dimethylglyoxime spectrometric method and flame atomic absorption spectrometric method

1 Scope and field of application

This International Standard specifies two methods for the determination of the nickel content of manganese ores and concentrates

method A: dimethylglyoxime spectrometric method, applicable to products having a nickel content of 0,01 to 1,0 % (m/m);

method B: flame atomic absorption spectrometric method, applicable to products having a nickel content of 0,005 to 1,0 % (m/m).

This International Standard should be read in conjunction with ISO 4297.

2 References

ISO 4296/1, *Manganese ores — Sampling — Part 1: Increment sampling.*

ISO 4296/2, *Manganese ores — Sampling — Part 2: Preparation of samples.*

ISO 4297, *Manganese ores and concentrates — Methods of chemical analysis — General instructions.*

3 Method A: Dimethylglyoxime spectrometric method

3.1 Principle

Decomposition of test portion by treatment with sulfuric acid in the presence of hydrogen peroxide.

Separation of the insoluble residue, the filtrate being reserved as the main solution.

Ignition of the filter containing the residue and treatment with sulfuric and hydrofluoric acids.

Fusion of the ignited residue with potassium disulfate.

Dissolution of the melt in sulfuric acid and combination of the solution obtained with the main solution.

Separation of manganese in the form of manganese dioxide.

Spectrometric determination at 460 to 470 nm in the presence of tartaric acid, sodium hydroxide, ammonium persulfate and dimethylglyoxime.

3.2 Reactions

The method is based on the interaction of nickel ions with dimethylglyoxime in an alkaline medium (pH 10 to 11) in the presence of ammonium persulfate with the formation of a coloured complex. Iron and other elements are prevented from interfering with the reaction by the formation of soluble complexes with tartaric acid. Manganese is separated in the form of manganese dioxide.

3.3 Reagents

3.3.1 Potassium bromate (KBrO₃).

3.3.2 Potassium disulfate (K₂S₂O₇).

3.3.3 Hydrochloric acid, ρ 1,19 g/ml.

3.3.4 Sulfuric acid, diluted 1 + 4.

3.3.5 Sulfuric acid, diluted 1 + 20.

3.3.6 Hydrofluoric acid, ρ 1,14 g/ml, 40 % (m/m) solution.

3.3.7 Tartaric acid (HOOC — CHOH — CHOH — COOH), 200 g/l solution.

3.3.8 Hydrogen peroxide, 30 % (m/m).

3.3.9 Sodium hydroxide, 50 g/l solution.

3.3.10 Ammonium persulfate [(NH₄)₂S₂O₈], 30 g/l solution.

3.3.11 1,2-dimethylglyoxal dioxime [Dimethylglyoxime] (C₄H₈O₂N₂), 10 g/l solution.

Dissolve 1 g of dimethylglyoxime in 100 ml of sodium hydroxide (3.3.9).