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# INTERNATIONAL STANDARD



# 551

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

## Manganese ores — Determination of zinc content — Zinc mercurithiocyanate gravimetric method

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*Minerais de manganèse — Dosage du zinc — Méthode gravimétrique à l'état de thiocyanatomercurate de zinc*

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## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 65 has reviewed ISO Recommendation R 551 and found it technically suitable for transformation. International Standard ISO 551 therefore replaces ISO Recommendation R 551-1966 to which it is technically identical.

ISO Recommendation R 551 was approved by the Member Bodies of the following countries :

Australia	Hungary	Poland
Austria	India	Romania
Chile	Iran	Spain
Czechoslovakia	Ireland	United Kingdom
Egypt, Arab Rep. of	Italy	U.S.S.R.
France	Japan	Yugoslavia

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

Germany\*

The Member Bodies of the following countries disapproved the transformation of ISO/R 551 into an International Standard :

Bulgaria  
Poland  
United Kingdom

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\* Subsequently, this Member Body approved the Recommendation.

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## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a zinc mercurithiocyanate gravimetric method for the determination of the zinc content of manganese ores.

## 2 REFERENCES

ISO 310, *Manganese ores — Determination of hygroscopic moisture content in analytical samples — Gravimetric method.*

ISO . . ., *Manganese ores and concentrates — Sampling and sample preparation for chemical analysis and determination of moisture content.*<sup>1)</sup>

## 3 PRINCIPLE

Separation of zinc from the accompanying elements in the form of sulphide in formic medium, followed by its precipitation in the form of the complex salt zinc mercurithiocyanate,  $Zn[Hg(CNS)_4]$ .

## 4 REAGENTS

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

4.1 Potassium pyrosulphate.

4.2 Iron(II) sulphide (FeS) (for the production of hydrogen sulphide).

4.3 Nitric acid,  $\rho$  1,40 g/ml.

4.4 Hydrochloric acid,  $\rho$  1,19 g/ml.

4.5 Hydrochloric acid, diluted 1 : 1.

4.6 Sulphuric acid, diluted 1 : 1.

4.7 Sulphuric acid, diluted 1 : 9.

4.8 Sulphuric acid, diluted 1 : 20.

4.9 Sulphuric acid, diluted 1 : 50.

4.10 Hydrofluoric acid, 40 % (m/m).

4.11 Citric acid, 200 g/l solution.

4.12 Ammonia solution,  $\rho$  0,91 g/ml.

4.13 Formic mixture.

To 200 ml of formic acid ( $\rho$  1,22 g/ml), add 250 g of ammonium sulphate dissolved in 500 ml of water, and 30 ml of ammonia solution (4.12) and dilute with water to 1 l.

4.14 Mercury(II) chloride, 50 g/l solution.

4.15 Ammonium mercurithiocyanate,  $(NH_4)_2[Hg(CNS)_4]$ , solution.

Dissolve 39 g of ammonium thiocyanate in 200 ml of water. Dissolve 27 g of mercury(II) chloride in 200 ml of water heated to 50 °C. Mix the solutions obtained, dilute with water to 1 l, allow to stand for 2 days and then filter.

4.16 Washing solution.

Dilute 4 ml of formic acid with water to 1 l.

4.17 Washing solution.

Dilute 15 ml of the ammonium mercurithiocyanate solution (4.15) with water to 1 l.

4.18 Methyl orange, 1 g/l solution.

## 5 APPARATUS

Ordinary laboratory apparatus and

5.1 Platinum crucible.

5.2 Hot-plate.

5.3 Filter crucible (pore size 10 to 20  $\mu$ m).

1) This document, at present at the stage of draft proposal, is intended to complete and replace ISO/R 309, *Methods of sampling manganese ores — Part 1 — Ore loaded in freight wagons.*