International Standard 5890

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Manganese ores and concentrates — Determination of silicon content — Gravimetric method

Minerais et concentrés de manganèse — Dosage du silicium — Méthode gravimétrique

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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.

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

Australia	Germany, F.R.	Romania
Austria	Hungary	South Africa, Rep. of
China	India	United Kingdom
Czechoslovakia	Italy	USSR
Egypt, Arab Rep. of	Korea, Dem. P. Rep. of	
France	Poland	

No member body expressed disapproval of the document.

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Manganese ores and concentrates — Determination of silicon content — Gravimetric method

1 Scope and field of application

This International Standard specifies a gravimetric method for the determination of the silicon content of manganese ores and concentrates.

The method is applicable to products having a silicon content greater than 0,5 % (m/m) and a fluorine content not more than 0,1 % (m/m).

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

2 Reference

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

3 Principle

Decomposition of a test portion by treatment with hydrochloric, nitric and perchloric acids. Filtration of the residue containing the silicon and reservation of the filtrate as the main solution. Ignition of the filter paper with the residue. Fusion of the residue with sodium carbonate; leaching of the melt with hydrochloric acid and combination with the main solution.

Separation of the silica by evaporation of the solution with perchloric acid and weighing of the silica with impurities. Volatilization of the silica with hydrofluoric and sulphuric acids, weighing of the residue and calculation of the silica content by the difference in mass.

4 Reagents

4.1 Sodium carbonate, anhydrous.

4.2 Nitric acid, ϱ 1,40 g/ml.

4.3 Sulphuric acid, diluted 1 + 1.

4.4 Hydrochloric acid, ϱ 1,19 g/ml.

4.5 Hydrochoric acid, diluted 1 + 4.

4.6 Hydrochloric acid, diluted 1 + 9.

4.7 Hydrofluoric acid, ϱ 1,14 g/ml.

4.8 Perchloric acid, ϱ 1,51 g/ml.

4.9 Hydrogen peroxide, 30 g/l solution.

5 Apparatus

Ordinary laboratory apparatus and

5.1 Muffle furnace, capable of being controlled at a temperature between 1 000 and 1 100 °C.

5.2 Platinum crucibles.

6 Procedure

6.1 Test portion

Weigh a mass of the test sample, chosen from table 1 in accordance with the expected silicon content.

Table 1

Expected silicon content	Mass of test portion
% (m/m)	g
From 0,5 to 2	2,0
From 2 to 10	1,0
From 10 to 20	0,5

6.2 Decomposition of test portion

Place the test portion (6.1) in a 250 or 300 ml beaker, moisten with a few drops of water, add 15 to 30 ml of the hydrochloric acid (4.4) and heat gently to decompose the ore. Add 2 to 3 ml of the nitric acid (4.2), heat until nitrous fumes cease to be evolved, and allow to cool. Add 10 ml of the perchloric acid (4.8), and heat gently until dense white fumes of perchloric acid appear.

Allow the solution to cool, add 30 to 40 ml of hot water and a few drops of the hydrogen peroxide solution (4.9). Heat to clear the solution and filter it through a medium-texture filter paper containing a small amount of paper pulp. Transfer the residue from the beaker to the filter using a rubber-tipped glass rod.