
International Standard



4140

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Ferrochromium and ferrosilicochromium — Determination of chromium content — Potentiometric method

Ferro-chrome et ferro-silico-chrome — Dosage du chrome — Méthode potentiométrique

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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.

International Standard ISO 4140 was developed by Technical Committee ISO/TC 132, *Ferroalloys*, and was circulated to the member bodies in January 1978.

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

Australia	India	South Africa, Rep. of
Austria	Iran	Spain
Bulgaria	Italy	Sweden
Canada	Japan	Turkey
Czechoslovakia	Mexico	United Kingdom
Egypt, Arab Rep. of	Norway	USA
France	Poland	USSR
Germany, F. R.	Romania	Yugoslavia

No member body expressed disapproval of the document.

Ferrochromium and ferrosilicochromium — Determination of chromium content — Potentiometric method

1 Scope and field of application

This International Standard specifies a potentiometric method for the determination of the chromium content of ferrochromium and ferrosilicochromium.

The method is applicable to all grades of these ferroalloys.

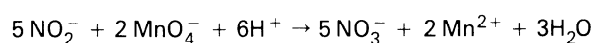
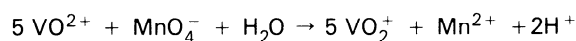
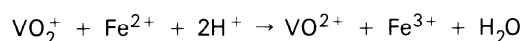
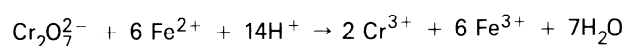
2 Reference

ISO 3713, *Ferroalloys — Sampling and preparation of samples — General rules*.¹⁾

3 Principle

Fusion of a test portion with sodium peroxide, dissolution of the melt in water, and acidification of the aqueous solution with sulphuric acid; alternatively, for some ferroalloys, dissolution of a test portion by direct acid attack. Oxidation of chromium with ammonium persulphate in the presence of silver ions as catalyst. Determination of the sum of chromium and vanadium by potentiometric titration with ammonium iron(II) sulphate. Reoxidation of vanadium with potassium permanganate; destruction of the excess of permanganate by nitrite, and destruction of the excess of nitrite by urea. Determination of vanadium by potentiometric titration with ammonium iron(II) sulphate, and determination of the chromium content by difference.

The reactions are the following :



4 Reagents

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

4.1 Sodium peroxide.

4.2 Sodium carbonate.

4.3 Ammonium persulphate $[(\text{NH}_4)_2\text{S}_2\text{O}_8]$.

4.4 Urea.

4.5 Phosphoric acid, ρ 1,7 g/ml.

4.6 Nitric acid, ρ 1,42 g/ml.

4.7 Hydrofluoric acid, ρ 1,14 g/ml.

4.8 Sulphuric acid, 50 % (V/V) solution.

To 400 ml of water, add cautiously 500 ml of sulphuric acid (ρ 1,84 g/ml), mix, cool, dilute to 1 000 ml and mix.

4.9 Hydrochloric acid, 40 % (V/V) solution.

To 600 ml of water, add 400 ml of hydrochloric acid (ρ 1,19 g/ml), and mix.

4.10 Silver nitrate solution.

Dissolve 5 g of silver nitrate in water and dilute to 1 000 ml.

4.11 Potassium permanganate solution.

Dissolve 2,5 g of potassium permanganate in water and dilute to 100 ml.

4.12 Potassium nitrite solution.

Dissolve 1 g of potassium nitrite in water and dilute to 100 ml.

4.13 Potassium dichromate.

Dissolve pure potassium dichromate in water, recrystallize, dry the crystals at 150 °C and melt them at 415 °C. Grind the product to about 8 mesh and store in a glass bottle with a ground glass stopper.

NOTE — The potassium dichromate reagent may be purchased as high grade material for volumetric analysis and dried at 105 °C before use.

1) At present at the stage of draft.