
International Standard



4194

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Magnesium alloys — Determination of zinc content — Flame atomic absorption spectrometric method

Alliages de magnésium — Dosage du zinc — Méthode par spectrométrie d'absorption atomique dans la flamme

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Foreword

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International Standard ISO 4194 was developed by Technical Committee ISO/TC 79, *Light metals and their alloys*, and was circulated to the member bodies in December 1980.

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

Australia	Germany, F. R.	South Africa, Rep. of
Austria	Hungary	Spain
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The member body of the following country expressed disapproval of the document on technical grounds :

Netherlands

Magnesium alloys — Determination of zinc 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 zinc content of magnesium alloys.

The method is applicable to products having zinc (Zn) contents between 0,1 and 6 % (*m/m*).

2 Principle

Dissolution of a test portion in hydrochloric acid solution in the presence of hydrogen peroxide and hydrofluoric acid. Aspiration of the solution into an air-acetylene flame and comparison of the absorbance of resonance energy of zinc by the test solution (wavelength of 213,9 nm normally) with that of standard solutions.

3 Reagents

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

3.1 Magnesium, extra pure (purity 99,99 %), free from zinc.

3.2 Hydrochloric acid, ρ approximately 1,19 g/ml, about 38 % (*m/m*) or approximately 12 mol/l solution.

3.3 Hydrogen peroxide, about 30 % (*m/m*) solution.

3.4 Hydrofluoric acid, ρ approximately 1,13 g/ml, about 40 % (*m/m*) solution.

3.5 Magnesium, 1 g/l solution.

Weigh, to the nearest 0,001 g, 1 g of the extra pure magnesium (3.1), transfer it to a 250 ml beaker and cover with a watch glass. Add 50 ml of water and, in small portions, 20 ml of the hydrochloric acid solution (3.2), warming, if necessary, in order to complete the dissolution. Add 5 drops of the hydrogen peroxide solution (3.3) and boil for 5 min. After cooling, quantitatively transfer the solution so obtained to a 1 000 ml volumetric flask, dilute to the mark and mix.

3.6 Zinc, standard solution corresponding to 1 g of Zn per litre.

Prepare this standard solution by one of the following methods :

3.6.1 Weigh, to the nearest 0,1 mg, 1 g of extra pure zinc (purity $\geq 99,99$ %), transfer it to a 400 ml beaker and cover with a watch glass. Add, in small portions, 25 ml of the hydrochloric acid solution (3.2) and heat gently, if necessary, to complete the dissolution. After cooling, quantitatively transfer it to a 1 000 ml volumetric flask, dilute to the mark and mix.

1 ml of this solution contains 1 mg of zinc.

3.6.2 Weigh, to the nearest 0,1 mg, 1,26 g of zinc oxide (ZnO), previously calcinated at 1 000 °C for 1 h and cooled in a desiccator. Transfer it to a 400 ml beaker, and dissolve it in 25 ml of the hydrochloric acid solution (3.2). Dilute the solution, quantitatively transfer it to a 1 000 ml volumetric flask, dilute to the mark and mix.

1 ml of this solution contains 1 mg of zinc.

3.7 Zinc, standard solution corresponding to 0,050 g of Zn per litre.

Transfer 50,0 ml of the standard zinc solution (3.6) to a 1 000 ml volumetric flask, dilute to the mark and mix.

1 ml of this solution contains 0,05 mg of zinc.

3.8 Zinc, standard solution corresponding to 0,020 g of Zn per litre.

Transfer 20,0 ml of the standard zinc solution (3.6) to a 1 000 ml volumetric flask, dilute to the mark and mix.

1 ml of this solution contains 0,020 mg of zinc.

4 Apparatus

Normal laboratory apparatus and

4.1 Burette, graduated in 0,05 ml.

4.2 Atomic absorption spectrometer, fitted with an air-acetylene burner.