INTERNATIONAL STANDARD 3110

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Copper alloys — Determination of aluminium as alloying element — Volumetric method

Alliages de cuivre — Dosage de l'aluminium comme élément d'alliage — Méthode volumétrique

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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 3110 was drawn up by Technical Committee ISO/TC 26, *Copper and copper alloys*, and circulated to the Member Bodies in April 1973.

It has been approved by the Member Bodies of the following countries :

Australia	Hungary	South Africa, Rep. of
Austria	Iran	Sweden
Belgium	Ireland	Switzerland
Bulgaria	Italy	Thailand
Canada	Japan	Turkey
Chile	Korea, Rep. of	United Kingdom
Egypt, Arab Rep. of	Mexico	U.S.A.
Finland	Norway	U.S.S.R.
France	Poland	
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No Member Body expressed disapproval of the document.

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Copper alloys — Determination of aluminium as alloying element — Volumetric method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a volumetric method for the determination of aluminium in copper alloys.

The method is applicable for the determination of aluminium as an alloying element in all types of copper alloys listed in ISO Recommendations or International Standards.

2 PRINCIPLE

Determination of aluminium by chelatometric titration at pH about 6, following a sodium fluoride demasking procedure, and using a voltametric indication.

3 REAGENTS

All the reagents shall be of the analytical grade. Distilled or deionized water shall be used.

3.1 Nitric acid

Mix 50 ml of nitric acid (ρ 1,40 g/ml) with 50 ml of water.

3.2 Disodium salt of ethylenediaminetetra-acetic acid (EDTA), 0,2 M solution.

3.3 Hexamethylentetramine.

3.4 Copper, 0,05 M solution.

Dissolve 3,177 g of copper (copper content > 99,9 %) in 20 ml of nitric acid (3.1) and dilute to 1 l.

3.5 Sodium fluoride, 25 g/l solution.

3.6 Manganese solution containing 4,55 g of $Mn(NO_3)_2 \cdot 4H_2O$ per litre (1 ml contains 1 mg of manganese).

3.7 Hydrochloric acid

Mix 50 ml of hydrochloric acid (ρ 1,19 g/ml) with 50 ml of water.

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

3.9 Cupferron solution.

Dissolve 10 g of cupferron with 100 ml water.

3.10 Chloroform.

3.11 Perchloric acid (ρ 1,74 g/ml).

3.12 Nitric acid (ρ 1,40 g/ml).

4 APPARATUS

4.1 Normal laboratory apparatus.

4.2 Potentiometer in connection with a device for a voltametric indication, i.e. for polarizing the electrodes with a constant current (2 to 10 μA).

This attachment can be made in a simple way using for example an accumulator or a storage battery of 2 V in series with a 1 MΩ resistor and the electrodes. The potentiometer shall be in parallel with the electrodes.

4.3 Double platinum electrode, made of 1 mm diameter platinum wire, sealed in a glass tube directly or after welding on a copper wire in such a way that each wire electrode is about 0,4 cm long with a free geometric surface of about 10 mm².

5 SAMPLING

Carry out the sampling in accordance with the requirements of ISO . . .[1)]

6 PROCEDURE

6.1 For alloys free of titanium and zirconium

6.1.1 *For aluminium contents of 4 to 12 % (m/m)*

6.1.1.1 Weigh 0,200 0 g of the finely divided sample into a 250 ml tall-form beaker, add 5 ml of water and 3 ml of the nitric acid (3.1) and heat gently until the test portion has dissolved. Evaporate the solution obtained to about 1 to 2 ml and dilute with 25 ml of water.

1) In preparation.