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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 795

CHEMICAL ANALYSIS OF ALUMINIUM AND ITS ALLOYS

PHOTOMETRIC DETERMINATION OF COPPER
(Oxalyldihydrazide method
applicable to copper content between 0.002 and 0.8 %)

1st EDITION

July 1968

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Printed in Switzerland

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BRIEF HISTORY

The ISO Recommendation R 795, *Chemical analysis of aluminium and its alloys – Photometric determination of copper (Oxalyldihydrazide method applicable to copper content between 0,002 and 0,8 ‰*, was drawn up by Technical Committee ISO/TC 79, *Light metals and their alloys*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1956 and led, in 1963, to the adoption of a Draft ISO Recommendation.

In June 1966, this Draft ISO Recommendation (No. 968) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Korea, Rep. of	Sweden
Austria	India	Switzerland
Belgium	Ireland	Turkey
Brazil	Israel	U.A.R.
Bulgaria	Italy	U.S.A.
Canada	Netherlands	U.S.S.R.
Chile	Norway	Yugoslavia
Czechoslovakia	Poland	
France	South Africa,	
Germany	Rep. of	
Hungary	Spain	

One Member Body opposed the approval of the Draft :

United Kingdom

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in July 1968, to accept it as an ISO RECOMMENDATION.

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PHOTOMETRIC DETERMINATION OF COPPER

(Oxalyldihydrazide method
applicable to copper content between 0.002 and 0.8 %)

1. SCOPE

- 1.1 This ISO Recommendation describes a photometric method for the determination of copper in aluminium and its alloys.
- 1.2 The method is applicable to the determination of copper content between 0.002 and 0.8 %.
- 1.3 The method does not apply completely to the special case of alloys with silicon contents exceeding 1 %, for which it should be modified as described in the Annex.

2. PRINCIPLE

- 2.1 Attack with hydrochloric acid.
- 2.2 Formation between pH 9.1 and pH 9.5, in the presence of acetaldehyde, of the violet-coloured complex, copper-oxalyldihydrazide, the optimum pH range being obtained by adding a controlled amount of ammonia.
- 2.3 Photometric measurement at a wavelength of about 540 nm.*

3. REAGENTS

- 3.1 *Hydrochloric acid*, $d = 1.19$ (approximately 12 N).
- 3.2 *Hydrofluoric acid*, 40 %, $d =$ approximately 1.15.
- 3.3 *Nitric acid*, $d = 1.23$ (approximately 7.4 N).
Take 50 ml of nitric acid, $d = 1.40$ (approximately 15 N), and make up the volume to 100 ml with water.
- 3.4 *Sulphuric acid*, $d = 1.48$ (approximately 17.5 N).
Cautiously pour 50 ml of sulphuric acid, $d = 1.84$ (approximately 35.6 N), into water and after cooling make up the volume to 100 ml.
- 3.5 *Hydrogen peroxide*, 36 %, $d = 1.12$ (approximately 120 volumes).
- 3.6 *Ammonia solution*, $d = 0.90$ (approximately 14.4 N).
- 3.7 *Citric acid solution*, 500 g per litre.
Dissolve 500 g of citric acid ($C_6H_8O_7 \cdot H_2O$) in water and make up the volume to 1000 ml.
- 3.8 *Acetaldehyde solution*, 400 g per litre.
In a 1000 ml volumetric flask place 400 g of acetaldehyde (CH_3CHO), cool to approximately 5 °C, slowly add cooled distilled water (at about 5 °C), and make up the volume to 1000 ml. (Store at a temperature of about 15 °C).

NOTE. — Since heat is produced when water and acetaldehyde are mixed, and since acetaldehyde is very volatile (boiling point 21 °C), it is recommended that the vessel in which the mixing takes place should be cooled by cold water.

* Aluminium is complexed by citric acid. Alloying elements or impurities present in aluminium and its alloys do not interfere.