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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 793

CHEMICAL ANALYSIS OF ALUMINIUM AND ITS ALLOYS

PHOTOMETRIC DETERMINATION OF IRON

(Orthophenanthroline method
applicable to iron content between 0.05 and 2.50 %)

1st EDITION

July 1968

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Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 793, *Chemical analysis of aluminium and its alloys - Photometric determination of iron (Orthophenanthroline method applicable to iron content between 0.05 and 2.50 %)*, 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. 966) 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	Israel	Turkey
Brazil	Italy	U.A.R.
Bulgaria	Japan	United Kingdom
Canada	Netherlands	U.S.A.
Chile	Norway	U.S.S.R.
Czechoslovakia	Poland	Yugoslavia
France	South Africa,	
Germany	Rep. of	
Hungary	Spain	

One Member Body opposed the approval of the Draft :

Ireland

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.

CHEMICAL ANALYSIS OF ALUMINIUM AND ITS ALLOYS

PHOTOMETRIC DETERMINATION OF IRON

(Orthophenanthroline method

applicable to iron content between 0.05 and 2.50 %)

1. SCOPE

- 1.1 This ISO Recommendation describes a photometric method for the determination of iron in aluminium and its alloys.
- 1.2 The method is applicable to the determination of iron content between 0.05 and 2.50 %.
- 1.3 The method does not apply completely to the following special cases for which it should be modified as described in Annex A and Annex B :
 - (a) unalloyed aluminium, aluminium-silicon alloys and any other aluminium alloy that is not easily attacked with hydrochloric acid (see Annex A);
 - (b) alloys containing copper (copper content over 5 %), zinc (zinc content over 4 %), nickel (nickel content over 2 %), or alloys with a proportional combination of these elements more than 5 % total (see Annex B).

2. PRINCIPLE

- 2.1 Attack with hydrochloric acid.
- 2.2 Reduction of ferric iron to bivalent iron by hydroxylammonium chloride.
- 2.3 Formation in buffered solution between pH 3.5 and pH 4.5 of the orange-red coloured complex, bivalent iron-orthophenanthroline.
- 2.4 Photometric measurement at a wavelength of about 510 nm.*

3. REAGENTS

- 3.1 *Hydrochloric acid*, $d = 1.1$ (approximately 6 N).
Take 500 ml of hydrochloric acid, $d = 1.19$ (approximately 12 N), and make up the volume to 1000 ml with water.
- 3.2 *Sodium hydroxide solution* (5 N)
Dissolve 200 g of sodium hydroxide (NaOH) in a nickel basin with about 400 ml of water. After cooling, transfer the solution to a 1000 ml volumetric flask, rinsing the basin, and make up the volume to 1000 ml. (Store in polythene containers.)
- 3.3 *Hydrochloric acid*, $d = 1.16$ (approximately 10 N)
Dilute 820 ml of hydrochloric acid, $d = 1.19$, with water and, after cooling to 20 °C, make up the volume to 1000 ml. Check the relative density and, if necessary, adjust the strength of the solution.

* Copper, which may interfere if present in appreciable amounts, is largely eliminated in the attack. Of the elements normally present in aluminium and its alloys, some do not interfere, while others form colourless soluble complexes with orthophenanthroline, which do not absorb at the wavelength at which the photometric measurement is performed.