UDC 669.5 : 543.42 : 546.72

Ref. No. : ISO/R 1055-1969 (E)

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 1055

CHEMICAL ANALYSIS OF ZINC AND ZINC ALLOYS

SPECTROPHOTOMETRIC DETERMINATION OF IRON

1st EDITION

April 1969

For each individual country the only valid standard is the national standard of that country.

Printed in Switzerland

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

BRIEF HISTORY

The ISO Recommendation R 1055, *Chemical analysis of zinc and zinc alloys – Spectrophotometric determination of iron,* was drawn up by Technical Committee ISO/TC 18, *Zinc and zinc alloys,* the Secretariat of which is held by the Institut Belge de Normalisation (IBN).

Work on this question led, in 1966, to the adoption of a Draft ISO Recommendation.

In November 1967, this Draft ISO Recommendation (No. 1288) 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 :

Australia	Iran	Spain
Belgium	Israel	Sweden
Brazil	Italy	Turkey
Canada	Korea, Dem. P. Rep. of	U.A.R.
Chile	Korea, Rep. of	United Kingdom
Czechoslovakia	New Zealand	U.S.A.
Germany	Norway	U.S.S.R.
Greece	Poland	Yugoslavia
India	South Africa, Rep. of	

One Member Body opposed the approval of the Draft :

France

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in April 1969, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 1055 April 1969

CHEMICAL ANALYSIS OF ZINC AND ZINC ALLOYS

SPECTROPHOTOMETRIC DETERMINATION OF IRON

1. SCOPE

This ISO Recommendation describes a spectrophotometric method for the determination of iron in zinc and zinc alloys.

2. FIELD OF APPLICATION

The method applies to zinc alloys defined in ISO Recommendation R 301, *Zinc alloy ingots*, and to die castings made from these alloys, and to zinc containing more than 0.01 % of copper.

It is suitable for the determination of iron content between 0.01 and 0.08 %.

3. PRINCIPLE OF THE METHOD

Spectrophotometric determination of the yellow colour of the sulphosalicylic acid ferric complex formed in an ammoniacal solution after elimination of copper.

4. REAGENTS

All the reagents should be of the analytical-reagent grade.

Distilled or demineralized water should be used for preparing the solutions and during the actual determination.

4.1 *Hydrochloric acid*, $d = 1.19$.

4.2 *Hydrochloric acid*, $d = 1.19$, 50 % (v/v) (approximately 6 N).

4.3 *Hydrogen peroxide*, 30 % H_2O_2 (m/m).

4.4 *Pure granulated cadmium*, free from iron.

4.5 *Sulphosalicylic acid solution* containing 400 g per litre.

4.6 *Ammonia solution*, $d = 0.91$.

4.7 *Standard iron solution*

Weigh 0.250 g of pure iron to ± 0.001 g and attack with a few millilitres of hydrochloric acid (4.1). Oxidize with a few drops of hydrogen peroxide (4.3). Decompose the excess hydrogen peroxide by boiling. Cool. Transfer quantitatively to a 1 litre volumetric flask. Make up to volume with water. Mix. Transfer 100 ml of the solution to a 500 ml volumetric flask. Make up to volume with water. Mix.

1 ml of this solution contains 0.050 mg of iron.

5. APPARATUS

5.1 *Ordinary laboratory equipment.*

5.2 *Spectrophotometer* (wavelength 425 nm and 1 cm cells).*

6. SAMPLING

The requirements of ISO Recommendation R . . .,** *Selection and preparation of samples for analysis*, should apply.

7. PROCEDURE

7.1 Test portion

Weigh a 10 g test portion to ± 0.01 g.

7.2 Blank test

Simultaneously with the actual determination, carry out a blank test using the same quantities of each reagent and following the same procedure.

7.3 Plotting of the calibration curve***

7.3.1 Into a series of 100 ml volumetric flasks, introduce 0, 2, 5, 10 and 20 ml respectively of standard iron solution (4.7). Dilute to about 50 ml.

7.3.2 Add successively

- 5 ml of sulphosalicylic acid solution (4.5),
- ammonia solution (4.6) until the solution has a yellow colour, then 20 ml in excess.

7.3.3 Cool. Make up the volume to 100 ml with water. Mix.

7.3.4 Measure the optical density of the solutions against the solution to which no iron has been added at a wavelength of 425 nm.

---

* The dilutions and aliquot parts defined in this ISO Recommendation only apply if 1 cm cells are used. It is necessary to apply the appropriate modifications in the case of cells with other dimensions.

** To be prepared later.

*** Valid for 1 cm cells and a range of contents of 0, 0.1, 0.25, 0.5 and 1 mg of iron corresponding to contents of 0, 0.01, 0.025, 0.05 and 0.1 %. It is necessary to apply the appropriate modifications in the case of cells with other dimensions.