
INTERNATIONAL STANDARD



1810

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Copper alloys — Determination of nickel (low contents) — Dimethylglyoxime spectrophotometric method

Alliages de cuivre — Dosage du nickel (faibles teneurs) — Méthode spectrophotométrique à la diméthylglyoxime

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Descriptors : copper alloys, chemical analysis, determination of content, nickel, spectrophotometric analysis.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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.

Prior to 1972, the results of the work of the technical committees were published as ISO Recommendations; these documents are in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 26, *Copper and copper alloys*, has reviewed ISO Recommendation R 1810-1971 and found it technically suitable for transformation. International Standard ISO 1810 therefore replaces ISO Recommendation R 1810-1971, to which it is technically identical.

ISO Recommendation R 1810 had been approved by the member bodies of the following countries :

Australia	Greece	Peru
Belgium	Hungary	Poland
Brazil	India	South Africa, Rep. of
Canada	Iran	Spain
Chile	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
Finland	Netherlands	United Kingdom
France	New Zealand	U.S.A.
Germany	Norway	Yugoslavia

No member body had expressed disapproval of the Recommendation.

The member bodies of the following countries disapproved the transformation of the Recommendation into an International Standard :

Hungary
Italy

Copper alloys — Determination of nickel (low contents) — Dimethylglyoxime spectrophotometric method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a dimethylglyoxime spectrophotometric method for the determination of the nickel content of copper alloys.

The method is applicable to the determination of nickel contents up to 2,5 % (m/m) in any of the copper alloys listed in ISO publications.

2 REFERENCE

ISO/R 1811, *Chemical analysis of copper and copper alloys — Sampling of copper refinery shapes*.

3 PRINCIPLE

Extraction of the nickel in a test portion as a yellow-coloured dimethylglyoxime complex with chloroform, and spectrophotometric measurement of the complex at a wavelength of approximately 405 nm.

4 REAGENTS

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

4.1 Chloroform.

4.2 Sodium sulphate, anhydrous.

4.3 Hydrochloric acid, ρ approximately 1,19 g/ml, diluted 1 + 1 (V + V).

4.4 Hydrogen peroxide, 30 % (m/m) solution.

4.5 Hydroxylammonium chloride (HONH₃CL), 10 g/l solution, adjusted to pH 7 with ammonia solution.

4.6 Complexing solution.

Mix 240 ml of sodium tartrate solution (100 g/l), 90 ml of sodium hydroxide solution (40 g/l), 480 ml of sodium acetate trihydrate (CH₃·COONa·3H₂O) solution (200 g/l) and 200 ml of sodium thiosulphate pentahydrate (Na₂S₂O₃·5H₂O) solution (200 g/l).

4.7 Dimethylglyoxime, 10 g/l solution in methanol.

Dissolve 10 g of dimethylglyoxime [(CH₃CNOH)₂] in methanol and dilute to 1 l with methanol.

4.8 Nickel, 1 g/l standard solution.

Dissolve 1,000 g of nickel (nickel content at least 99,8 %) in 10 ml of nitric acid, ρ 1,38 g/ml. Remove the oxides of nitrogen by boiling and evaporate the solution to syrupy consistency. Cool and dilute to 1 l.

5 APPARATUS

Ordinary laboratory apparatus and

5.1 Spectrophotometer, fitted with cells of optical path length 2 and 4 cm.

6 SAMPLING

Sampling shall be carried out in accordance with the procedure given in ISO/R 1811.

7 PROCEDURE

7.1 Test portion

7.1.1 For expected nickel contents up to 0,5 % (m/m), weigh, to the nearest 0,001 g, 1 g of the test sample.

7.1.2 For expected nickel contents between 0,5 and 2,5 % (m/m), weigh, to the nearest 0,001 g, 0,4 g of the test sample, and add 0,6 ± 0,001 g of nickel-free pure copper.

7.2 Blank test

In parallel with the determination, carry out a blank test following the same procedure and using the same quantities of all the reagents as used in the determination but omitting the test portion.

7.3 Determination

7.3.1 Dissolve the test portion (7.1) in 20 ml of the hydrochloric acid (4.3) and 10 ml of the hydrogen peroxide solution (4.4) added in small portions. Cool until the violent reaction has ceased. When the test portion is completely dissolved, heat the solution to boiling and continue boiling for approximately 1 min to remove the excess hydrogen peroxide, then cool to room temperature. Transfer the solution to a 500 ml volumetric flask, dilute to the mark and mix.