

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1553

CHEMICAL ANALYSIS OF COPPER AND COPPER ALLOYS

**ELECTROLYTIC DETERMINATION OF COPPER
IN UNALLOYED COPPER CONTAINING
NOT LESS THAN 99.90 % OF COPPER**

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1553, *Chemical analysis of copper and copper alloys – Electrolytic determination of copper in unalloyed copper containing not less than 99.90 %*, was drawn up by Technical Committee ISO/TC 26, *Copper and copper alloys*, the Secretariat of which is held by the Deutscher Normenausschuss (DNA).

Work on this question led to the adoption of Draft ISO Recommendation No. 1553, which was circulated to all the ISO Member Bodies for enquiry in March 1968.

The Draft was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Iran	Spain
Belgium	Israel	Sweden
Canada	Italy	Switzerland
Cuba	Japan	Thailand
Czechoslovakia	Netherlands	Turkey
Finland	New Zealand	U.A.R.
France	Norway	United Kingdom
Germany	Peru	U.S.A.
Hungary	Poland	Yugoslavia
India	South Africa, Rep. of	

No Member Body opposed the approval of the Draft.

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

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1. SCOPE

This ISO Recommendation describes an electrolytic method for the determination of copper in unalloyed copper containing not less than 99.90 % of copper. Silver, if present, is deposited with the copper and is reported as copper.

The copper should not contain elements which leave insoluble residues in the solution for electrolysis, and should be low in content of impurities which can be deposited electrolytically together with the copper.

2. PRINCIPLE

Electrolytic determination of copper from sulphuric/nitric acid solution.

3. REAGENTS

All the reagents should be of the analytical grade. Use distilled or de-ionized water.

3.1 *Sulphuric/nitric acid* solution, prepared as follows :

Add slowly, while stirring, 300 ml of sulphuric acid (H_2SO_4), $d = 1.83$ to 750 ml of water. Cool, and add 210 ml of nitric acid (HNO_3), $d = 1.38$.

4. APPARATUS

Ordinary laboratory and electrolysis equipment.

NOTE. — Preference should be given to a 6 V accumulator as current source. If a rectifier is to be used, an additional buffer battery is recommended.

4.1 *Cathode*. It is recommended that a platinum cathode (Winkler electrode)* be used. It should be made preferably from gauze containing approximately 400 meshes per square centimetre (50 meshes per linear inch). Gauze for cathodes should be woven from wire of approximately 0.20 mm diameter. The cathode should be stiffened by doubling the gauze for about 3 mm at the top and the bottom of the cylinder or by reinforcing the gauze at the top and bottom with a platinum band or ring. The cylinder should be approximately 30 to 50 mm in diameter and 40 to 60 mm in height. The stem should be made from a platinum alloy wire, such as platinum-iridium, platinum-rhodium, or platinum-ruthenium, having a diameter of approximately 1.30 mm. It should be flattened and welded the entire length of the gauze. The overall height of the cathode should be approximately 130 mm. The cathode should be sandblasted.

4.2 *Anode*. It is recommended that a spiral anode be used. It should be made from 1 mm diameter or larger platinum alloy wire, formed into a spiral of seven turns, having a height of approximately 50 mm and a diameter of 12 mm, the overall height being approximately 130 mm. The spiral section should be sandblasted.

* Platinum cathodes formed from plain or perforated sheets may also be used.