
International Standard



4524/3

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Metallic coatings — Test methods for electrodeposited gold and gold alloy coatings — Part 3 : Electrographic tests for porosity

Revêtements métalliques — Méthodes d'essai des dépôts électrolytiques d'or et d'alliages d'or — Partie 3 : Détermination électrographique de la porosité

First edition — 1985-04-01

Corrected and reprinted — 1986-03-01

UDC 669.218.7 : 620.192.47

Ref. No. ISO 4524/3-1985 (E)

Descriptors : coatings, metal coatings, electrodeposited coatings, gold plating, decorative coatings, protective coatings, tests, determination, porosity.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4524/3 was prepared by Technical Committee ISO/TC 107, *Metallic and other non-organic coatings*.

Metallic coatings — Test methods for electrodeposited gold and gold alloy coatings —

Part 3 : Electrographic tests for porosity

1 Scope and field of application

This part of ISO 4524 specifies five electrographic tests for assessing the porosity of electrodeposited gold and gold alloy coatings for engineering, and decorative and protective purposes.

2 Cadmium sulfide paper test

2.1 Applicability

This method is suitable for the examination of gold coatings on copper.

2.2 Materials

During the test, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

2.2.1 Cadmium sulfide paper.

Use filter or duplicating paper of adequate wet strength, with a texture that will produce sharp and uniform electrograms. Soak the paper for 10 min in a fresh 10 % (*m/m*) solution of cadmium chloride hemipentahydrate ($\text{CdCl}_2 \cdot 2,5 \text{ H}_2\text{O}$) containing 0,1 % (*V/V*) of hydrochloric acid (HCl , ρ 1,16 to 1,18 g/ml). Remove the excess solution with blotting paper.

Allow the paper to dry partially and then immerse it in a fresh 50 g/l solution of sodium sulfide (Na_2S) for 30 s, after which time the paper should be a uniform yellow colour (indicating complete precipitation of cadmium sulfide, CdS). Wash the paper in running water for approximately 1 h, then hang it up to dry.

2.2.2 Moistened blotting paper.

Soak a good quality white blotting paper in water and dry it to a degree that consistently produces sharply defined electrograms.

2.3 Procedure

Lightly brush the electroplated coating to remove loose dust and debris, then degrease it in 1,1,1-trichloroethane vapour or other suitable solvent.

Place a piece of the cadmium sulfide paper on the electroplated specimen (which acts as the anode). On the other face of the cadmium sulfide paper, place a piece of the moistened blotting paper (2.2.2), followed by a high purity clean aluminium or stainless steel platen (which acts as the cathode). Compress the assembly so that the pressure between the cadmium sulfide paper and the specimen is uniform and between 1,4 and 1,7 MPa. While under compression, pass a smooth ripple-free d.c. current from a source not exceeding 12 V. Set the current density initially at 7,5 mA/cm² of anode area and pass for 30 s.

Allow the electrogram produced on the cadmium sulfide paper to dry. The presence of any defect in the electroplated coating is revealed by a corresponding brown stain on the paper.

NOTE — If an overall black stain is obtained in this test, either the electrolyte content of the papers or the current density is too high.

3 Nioxime paper test

3.1 Applicability

This method is suitable for the examination of gold coatings on undercoats of nickel or tin-nickel alloy.

3.2 Materials

During the test, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

Nioxime paper.

Soak filter or duplicating paper for 10 min in an 8 g/l solution of nioxime (cyclohexan-1,2-dione dioxime).

Remove the excess solution by blotting and hang the paper up to dry.