
**Metallic and other inorganic coatings —
Electrodeposited gold and gold alloy
coatings for electrical, electronic and
engineering purposes — Specification
and test methods**

*Revêtements métalliques et autres revêtements inorganiques — Dépôts
électrolytiques d'or et d'alliages d'or pour usages électrique,
électronique et industriels — Spécification et méthodes d'essai*

Sample Document

get full document from standards.iteh.ai



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

Sample Document

get full document from standards.iteh.ai



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Information to be supplied to the electroplater	3
5 Designation	4
6 Requirements and test methods	6
7 Sampling	9
Annex A (normative) Requirements for undercoats	10
Annex B (normative) Methods of measuring the thickness of gold and gold alloy coatings	12
Annex C (normative) Adhesion tests	20
Annex D (normative) Determination of gold content	22
Bibliography	24

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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 27874 was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 3, *Electrodeposited coatings and related finishes*.

This first edition of ISO 27874 cancels and replaces ISO 4523:1985, ISO 4524-1:1985, ISO 4524-4:1985 and ISO 4524-5:1985, of which it constitutes a technical revision.

Introduction

The engineering uses of electrodeposited gold and gold alloy coatings have expanded with the growth of the electrical and electronic industries. Low voltages and currents, dry circuits and microwave frequencies require low-resistance interconnection systems, connectors and waveguides. Non-tarnishing, low-resistance gold coatings were the logical choice for connectors where the stability of contact surfaces was critical. The need to improve the wear resistance of gold coatings led to the development of new electroplating solutions containing controlled amounts of metallic and non-metallic additives that either changed the composition or altered the crystal structure of the coating. The special needs of the printed-circuit industry led to the development of acid gold electroplating solutions that contained no free cyanide, yielding coatings that are hard, bright and solderable. Formulations for high-speed electroplating up to current densities of 200 A/dm² were introduced for continuous strip, stripe or spot gold and gold alloy coatings.

The high cost of gold metal has led to the development of selective and thickness profile plating techniques to limit the use of the metal to the active areas only of the components, where the gold is required. Designers will therefore often specify the area requiring gold electroplating as well as the thickness profile, if required, by reference to suitably marked drawings.

With the introduction of many new gold electroplating formulations and the proliferation of engineering applications, the need for technical standards that specify the requirements of electrodeposited gold and gold alloy coatings, as well as the test methods to ensure that the specified requirements are met, is critical. Composition, appearance, hardness, thickness, purity, porosity, wear resistance, solderability, electrical contact resistance, infrared reflectivity and other properties must be controlled to produce high-quality gold and gold alloy coatings for engineering purposes.

get full document from standards.iteh.ai

Sample Document

get full document from standards.iteh.ai

Metallic and other inorganic coatings — Electrodeposited gold and gold alloy coatings for electrical, electronic and engineering purposes — Specification and test methods

WARNING — This International Standard may not be compliant with some countries' health, safety and environmental legislations. It calls for the use of substances and/or procedures that may be injurious to health if adequate safety measures are not taken. This International Standard does not address any health hazards, safety or environmental matters, or legislation associated with its use. It is the responsibility of the user of this International Standard to establish appropriate health, safety and environmentally acceptable practices and take appropriate action to comply with any national, regional and/or international regulations. Compliance with this International Standard does not, of itself, confer immunity from legal obligations.

1 Scope

This International Standard specifies the requirements for electrodeposited gold and gold alloy coatings for electrical, electronic and other engineering applications on metallic and non-metallic substrates. It also specifies test methods for measuring the properties of the coatings.

Although this International Standard does not specify the condition, finish or surface roughness of the basis material prior to electroplating, the appearance and serviceability of electroplated gold or gold alloy coatings depends on the condition of the basis material. It is essential that the purchaser specify the surface finish and roughness of the basis material in order to conform to the product requirements.

This International Standard does not apply to coatings on threaded articles or to coatings on sheet or strip in non-fabricated form.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1463, *Metallic and oxide coatings — Measurement of coating thickness — Microscopical method*

ISO 2064, *Metallic and other inorganic coatings — Definitions and conventions concerning the measurement of thickness*

ISO 2080, *Metallic and other inorganic coatings — Surface treatment, metallic and other inorganic coatings — Vocabulary*

ISO 2177, *Metallic coatings — Measurement of coating thickness — Coulometric method by anodic dissolution*

ISO 2819, *Metallic coatings on metallic substrates — Electrodeposited and chemically deposited coatings — Review of methods available for testing adhesion*

ISO 3497, *Metallic coatings — Measurement of coating thickness — X-ray spectrometric methods*

ISO 3543, *Metallic and non-metallic coatings — Measurement of thickness — Beta backscatter method*

ISO 3868, *Metallic and other non-organic coatings — Measurement of coating thicknesses — Fizeau multiple-beam interferometry method*

ISO 3882, *Metallic and other inorganic coatings — Review of methods of measurement of thickness*

ISO 4516, *Metallic and other inorganic coatings — Vickers and Knoop microhardness tests*

ISO 4518, *Metallic coatings — Measurement of coating thickness — Profilometric method*

ISO 4519, *Electrodeposited metallic coatings and related finishes — Sampling procedures for inspection by attributes*

ISO 4524-2, *Metallic coatings — Test methods for electrodeposited gold and gold alloy coatings — Part 2: Mixed flowing gas (MFG) environmental tests*

ISO 4524-3:1985, *Metallic coatings — Test methods for electrodeposited gold and gold alloy coatings — Part 3: Electrographic tests for porosity*

ISO 4524-6, *Metallic coatings — Test methods for electrodeposited gold and gold alloy coatings — Part 6: Determination of the presence of residual salts*

ISO 9587, *Metallic and other inorganic coatings — Pretreatment of iron or steel to reduce the risk of hydrogen embrittlement*

ISO 9588, *Metallic and other inorganic coatings — Post-coating treatments of iron or steel to reduce the risk of hydrogen embrittlement*

ISO 10289, *Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates — Rating of test specimens and manufactured articles subjected to corrosion tests*

ISO 10308, *Metallic coatings — Review of porosity tests*

ISO 12687, *Metallic coatings — Porosity tests — Humid sulfur (flowers of sulfur) test*

ISO 14647, *Metallic coatings — Determination of porosity in gold coatings on metal substrates — Nitric acid vapour test*

IEC 60068-2-20, *Environmental testing — Part 2-20: Tests — Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2064 and ISO 2080 and the following apply.

3.1

gold or gold alloy coating

electrodeposited gold or gold alloy having intentional alloying elements in its composition

3.2

double-layer gold or gold alloy coating

gold or gold alloy coating consisting of two discrete layers of differing gold contents

3.3

multilayer gold or gold alloy coating

gold or gold alloy coating consisting of more than two discrete layers of differing gold contents

4 Information to be supplied to the electroplater

4.1 Essential information

The following information shall be supplied by the purchaser to the electroplater in writing in the purchase order or contract, or on engineering drawings:

- a) the designation (see Clause 5);
- b) the significant surface of the article, indicated, for example, as dimensioned areas on drawings or by the provision of suitably marked samples;
- c) the nature, condition and finish of the basis metal if they are likely to affect the serviceability and/or the appearance of the coating (see Clause 1);
- d) the position on the surface of any unavoidable defects, such as rack marks (see 6.2);
- e) the finish required, for example bright, dull or another type, preferably accompanied by approved samples of the finish (see 6.2);
- f) the method of porosity testing to be used and the permitted number and location of acceptable pores (see 6.4);
- g) the tensile strength of the part and the requirements for any heat treatment prior to, or after, electroplating (see 6.7 and 6.8);
- h) sampling methods, acceptance levels and any other inspection requirements if different from those specified in ISO 4519 (see Clause 7);
- i) the requirements for coating thickness, including positions of measurement as indicated on dimensioned drawings (see 6.3);
- j) the requirements for adhesion testing (see 6.9).

4.2 Additional information

The following additional information may be required and, if so, shall be specified by the purchaser in writing, for example in the contract or purchase order, or on drawings:

- a) the composition of the coating and details of intentional alloying elements and undesirable impurities (see 6.6);
- b) any special cleaning procedures to be used;
- c) any special requirements for undercoats (see 6.15 and Annex A);
- d) any requirements for the composition and thickness of each layer in double or multilayer coatings (see Clause 3);
- e) the electrical properties of the coating and the methods of test to be used (see 6.10);
- f) the microhardness of the coating and the test method to be used (see 6.11);
- g) any requirements for solderability and the test method to be used (see 6.12);
- h) any requirements for wear resistance and the test method to be used (see 6.13);
- i) the ductility of the coating and the method of test to be used (see 6.14);