

SVENSK STANDARD

SS-EN ISO 27874:2008

Fastställt/Approved: 2008-09-25

Publicerad/Published: 2008-10-16

Utgåva/Edition: 1

Språk/Language: engelska/English

ICS: 25.220.40

Oorganiska ytbeläggningar – Elektrolytiska beläggningar av guld och guldlegeringar för elektriska, elektroniska och tekniska ändamål – Specifikation och provningsmetoder (ISO 27874:2008)

Metallic and other inorganic coatings - Electrodeposited gold and gold alloy coatings for electrical, electronic and engineering purposes – Specification and test methods (ISO 27874:2008)



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Denna standard ersätter SS-ISO 4523, utgåva 1, SS-ISO 4524-1, utgåva 1, SS-ISO 4524-4, utgåva 1 och SS-ISO 4524-5, utgåva 1.

The European Standard EN ISO 27874:2008 has the status of a Swedish Standard. This document contains the official English version of EN ISO 27874:2008.

This standard supersedes the Swedish Standard SS-ISO 4523, edition 1, SS-ISO 4524-1, edition 1, SS-ISO 4524-4, edition 1 and SS-ISO 4524-5, edition 1.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 27874

September 2008

ICS 25.220.40

English Version

Metallic and other inorganic coatings - Electrodeposited gold and gold alloy coatings for electrical, electronic and engineering purposes - Specification and test methods (ISO 27874:2008)

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 (ISO 27874:2008)

Metallische Überzüge - Galvanische Gold- und Goldlegierungsüberzüge für elektrische, elektronische und technische Zwecke - Anforderungen und Prüfverfahren (ISO 27874:2008)

This European Standard was approved by CEN on 13 September 2008.

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Foreword

This document (EN ISO 27874:2008) has been prepared by Technical Committee ISO/TC 107 "Metallic and other inorganic coatings" in collaboration with Technical Committee CEN/TC 262 "Metallic and other inorganic coatings" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2009, and conflicting national standards shall be withdrawn at the latest by March 2009.

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Endorsement notice

The text of ISO 27874:2008 has been approved by CEN as a EN ISO 27874:2008 without any modification.

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/dm^2 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.

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

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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*

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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);