
International Standard



7587

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

Electroplated coatings of tin-lead alloys — Specification and test methods

Dépôts électrolytiques d'alliage étain-plomb — Spécifications et méthodes d'essai

First edition — 1986-12-15

UDC 669.65'4.87

Ref. No. ISO 7587-1986 (E)

Descriptors : metal coatings, electrodeposited coatings, tin coatings, lead coating, classifications, specifications, tests, determination, thickness, adhesion, determination of content, tin.

Foreword

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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 7587 was prepared by Technical Committee ISO/TC 107, *Metallic and other non-organic coatings*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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0 Introduction

Tin-lead alloy coatings are used extensively in the telecommunications industry and their use has improved the integrity and reliability of soldered electrical circuits. Tin-lead alloy coatings are also known to be more resistant to whisker growth and allotropic change than pure tin.

Annex D gives additional information as guidance to the user.

It is essential that the purchaser should state the information itemized in 4.1 and, if appropriate, 4.2. Specifying ISO 7587 without this information is insufficient.

1 Scope and field of application

This International Standard specifies requirements for electroplated coatings of tin-lead alloy containing between 50 % (m/m) and 70 % (m/m) of tin (see 10.3). It may be used for tin-lead alloys of other compositions but the properties of such coatings may be different from those of the alloy range quoted.

A classification scheme is included by which the nature of the basis metal and the coating composition, within these limits, can be defined and which also contains provision for flow-melting and bright deposited coatings.

The coatings are intended for use on fabricated metal articles and on printed circuit boards.

It does not apply to

- a) threaded components;
- b) bearing overlays;
- c) coatings on sheet, strip or wire in unfabricated form, or of articles made from them;
- d) electroplating of steels with tensile strength greater than 1 000 MPa¹⁾ (or of corresponding hardness), because

such steels are subject to hydrogen embrittlement (see 8.2).

2 References

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

ISO 2064, *Metallic and other non-organic coatings — Definitions and conventions concerning the measurement of thickness.*

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 2859, *Sampling procedures and tables for inspection by attributes.*²⁾

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

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

ISO 3768, *Metallic coatings — Neutral salt spray test (NSS test).*

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

ISO 6988, *Metallic and other non-organic coatings — Sulfur dioxide test with general condensation of moisture.*

IEC Publication 68-2-20, *Basic environmental testing procedures — Test T: Soldering.*

1) 1 MPa = 1 N/mm²

2) At present at the stage of draft. (Revision of ISO 2859-1974.)

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1 significant surface: The part of the article covered or to be covered by the coating and for which the coating is essential for serviceability and/or appearance.

(Definition taken from ISO 2064.)

3.2 flow-melting; fusing; flow-brightening; reflowing: A process by which a coating is melted in order to impart desirable properties such as brightness or improved solderability (see clause D.4).

4 Information to be supplied by the purchaser to the electroplater

4.1 Essential information

The following information shall be supplied by the purchaser to the electroplater:

- a) the number of this International Standard;
- b) the nature of the basis material (see clause 5);
- c) the service condition number (see 7.1) or the classification code of the coating required (see 7.2) and the requirements for alloy composition (see 10.3);
- d) whether verification of the coating composition is required (see 10.3);
- e) the significant surface of the article to be electroplated indicated, for example, by drawings or by the provision of suitably marked samples;
- f) the sampling procedure to be adopted (see clause 6);
- g) the positions where unavoidable contact marks and other defects are acceptable (see 10.1);
- h) the method of adhesion testing to be used (see 10.4);
- i) any special post-plating treatment (see D.3.1).

4.2 Additional information

The following additional information may be required and, if so, shall be specified by the purchaser:

- a) any heat treatment required (see clause 8);
- b) any requirements for porosity testing (see 10.5);
- c) any requirement for solderability testing and the test methods and conditions to be applied (see 10.6);
- d) any special requirements for undercoats (see clause 9);
- e) a sample showing the required finish;
- f) any special pretreatment required;
- g) any special packaging requirements for plated components.

5 Basis material

This International Standard specifies no requirements for the condition, finish or surface roughness of the basis material prior to electroplating (see D.2.1).

6 Sampling

Sampling procedures are specified in ISO 2859 and ISO 4519.

The method of sampling and acceptance levels shall be agreed between purchaser and supplier.

7 Classification

7.1 Service condition number

The service condition number indicates the severity of the service conditions in accordance with the following scale:

- 4: exceptionally severe — for example service outdoors in severe corrosive conditions (see clause D.1)
- 3: severe — for example service outdoors in typical temperate conditions
- 2: moderate — for example service indoors with some condensation
- 1: mild — for example service indoors in dry atmospheres and also where solderability is the primary requirement

NOTE — See 10.2, which gives guidance on the relation between service condition number and minimum thickness.

When specifying the service condition number or coating classification code, it should be noted that tin-lead alloys are susceptible to damage in abrasive environments or in those containing certain organic vapours. See also annex D.

7.2 Coating classification code

The coating classification code shall consist of four parts, the first two of which shall be separated by an oblique stroke, as follows:

a/b c d

where

- a** indicates the chemical symbol for the basis metal (or for the main constituent if an alloy);
- b** indicates the chemical symbol for the undercoat metal (or for the main constituent if an alloy) followed by a figure for its minimum coating thickness, in micrometres, and is omitted if no undercoat is required [see 4.2 c)];
- c** indicates the composition of the coating by means of the symbol, Sn, with the percentage by mass of tin in the coating, followed by a hyphen and the symbol, Pb, followed by a figure for its minimum thickness, in micrometres;
- d** indicates the surface finish, by the symbol **m** if the coating is matt, or **b** if it is bright electroplated or **f** if it is flow-melted.