
International Standard



4522/2

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Metallic coatings — Test methods for electrodeposited silver and silver alloy coatings — Part 2 : Adhesion tests

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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 4522/2 was prepared by Technical Committee ISO/TC 107, *Metallic and other non-organic coatings*.

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

Part 2 : Adhesion tests

1 Scope and field of application

This part of ISO 4522 specifies methods for assessing the adhesion of electrodeposited silver and silver alloy coatings for engineering, and decorative and protective purposes.

NOTE — Other methods are described in ISO 2819, *Metallic coatings on metallic substrates — Electrodeposited and chemically deposited coatings — Review of methods available for testing adhesion*.

2 Reference

ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method*.

3 Burnishing test

Select an area of not more than 6 cm² of the significant surface, and rub rapidly and firmly for 15 s with a suitable burnishing tool. Apply a pressure sufficient to burnish the coating metal at every stroke, but not so great as to cut the coating. Examine the specimen for signs of blistering of the coating under a magnification of X 8, or X 4 under an illuminated viewer.

NOTES

- 1 This test will only detect extremely poor adhesion and is not recommended if the electroplated items are required for severe engineering environments. It is not applicable to coatings thicker than 40 µm.
- 2 An agate dental spatula with a handle 60 to 100 mm long and agate blade 30 to 50 mm long, 5 to 10 mm wide, and sharpened to a slightly radiused edge has been found satisfactory.

4 Barrel burnishing test

Wet burnish, unless dry burnishing is specified, the sample for 40 min in a suitable burnishing machine, for example a hexagonal rubber-lined burnishing barrel about 250 mm across the flats, at about 25 r/min. Examine the sample for signs of blistering or peeling of the coating under a magnification of X 8, or X 4 under an illuminated viewer.

NOTE — An advantage of this method, provided that a burnished finish is acceptable, is that complete batches of electroplated articles may be tested, if it is required to have 100 % inspection for adhesion and that only those individual articles failing the test need be rejected.

5 Peel test (for coating thicknesses of 10 µm or greater)

Solder a strip of tinned steel or brass of dimensions approximately 10 mm × 75 mm × 0,5 mm, at not more than the normal soldering temperature, flat to the silver-electroplated surface so that a length of about 15 mm is included in the joint. The solder shall contain approximately 60 % of tin, 38 % of lead and 2 % of silver; a non-corrosive rosin-based flux shall be used. The soldering heat shall not produce blistering of the coating. Then apply a force to the soldered strip at right angles to the test piece sufficient to detach the strip. Examine the specimen for signs of detachment of the coating under a magnification of X 8, or X 4 under an illuminated viewer.

6 Bend test

Place the sample in a bend testing machine with a bending radius of 4 mm (or in the jaws of a suitable vice). Bend the sample through 90° and back to its original position. Carry out this procedure three times. Examine the specimen for signs of detachment of the coating under a magnification of X 8, or X 4 under an illuminated viewer.

7 Shear test

Cut through the sample using a hacksaw (1 1/4 tooth/mm), with the blade set to cut on the outward push stroke. Position the sample so that the cutting stroke pushes the coating away from the basis metal. File the cut edge smooth using a second cut mill file, moving the file from the basis metal towards the coating. Examine the coating for separation from the basis metal and signs of blistering, flaking and peeling under a magnification of X 8, or X 4 under an illuminated viewer.

8 Shot peening test

8.1 General

This test method is used to evaluate the adhesion on steel of silver deposits of thicknesses between 100 and 600 µm. The results refer to qualitative tests only. The method does not destroy the parts on which the adhesion of the coating is satisfactory.