



Standard Practice for Porosity in Gold and Palladium Alloy Coatings on Metal Substrates by Vapors of Sodium Hypochlorite Solution¹

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1. Scope

1.1 This test practice covers equipment and methods for revealing the porosity of gold and palladium coatings, particularly electrodeposits and clad metals used on electrical contacts.

1.2 This test practice is suitable for coatings containing gold or 75 % by mass of palladium on substrates of copper, nickel, and their alloys, which are commonly used in electrical contacts.

1.3 A variety of full porosity testing methods is described in the literature.^{2,3} These porosity Test Methods are B735, B741, B798, B799, and B809. An ASTM Guide to the selection of porosity tests for electrodeposits and related metallic coatings is available as Guide B765.

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazards, see Section 6.

2. Referenced Documents

2.1 ASTM Standards:⁴

B374 Terminology Relating to Electroplating

B542 Terminology Relating to Electrical Contacts and Their Use

¹ This practice is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.11 on Electrical Contact Test Methods.

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² For example see: Nobel, F. J., Ostrow, B. D., and Thompson, D. W., “Porosity Testing of Gold Deposits,” *Plating*, Vol 52, 1965, p. 1001.

³ Krumbien, S. J., Porosity Testing of Contact Platings, Proceedings, Connectors and Interconnection Technology Symposium, Oct. 1987, p. 47.

⁴ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

B735 Test Method for Porosity in Gold Coatings on Metal Substrates by Nitric Acid Vapor

B741 Test Method for Porosity In Gold Coatings On Metal Substrates By Paper Electrography (Withdrawn 2005)⁵

B765 Guide for Selection of Porosity and Gross Defect Tests for Electrodeposits and Related Metallic Coatings

B798 Test Method for Porosity in Gold or Palladium Coatings on Metal Substrates by Gel-Bulk Electrography

B799 Test Method for Porosity in Gold and Palladium Coatings by Sulfurous Acid/Sulfur-Dioxide Vapor

B809 Test Method for Porosity in Metallic Coatings by Humid Sulfur Vapor (“Flowers-of-Sulfur”)

3. Terminology

3.1 *Definitions*—Many terms used in this practice are defined in Terminology B542 and terms relating to metallic coatings are defined in Terminology B374.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *corrosion products, n*—those reaction products emanating from the pores that protrude from, or are otherwise attached to, the coating surface after a vapor test exposure.

3.2.2 *metallic coatings, n*—include platings, claddings, or other metallic layers applied to the substrate. The coatings can comprise a single metallic layer or a combination of metallic layers.

3.2.3 *porosity, n*—the presence of any discontinuity, crack, or hole in the coating that exposes a different underlying metal.

3.2.4 *underplate, n*—a metallic coating layer between the substrate and the topmost layer or layers. The thickness of an underplate is usually greater than 0.8 μm (30 $\mu\text{in.}$).

4. Summary of Practice

4.1 The test practice employs a solution of sodium hypochlorite, a material readily available as household bleach. The test is recommended primarily as a qualitative means for assessing the plating quality in electrical connectors and is desirable because it uses readily available reagents and equipment and is extremely inexpensive, simple, and fast. In the test,

⁵ The last approved version of this historical standard is referenced on www.astm.org.