



Designation: B 765 – 93 (Reapproved 1997)

AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Guide for Selection of Porosity Tests for Electrodeposits and Related Metallic Coatings¹

This standard is issued under the fixed designation B 765; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide describes some of the available standard methods for the detection, identification, and measurement of porosity in electrodeposited and related metallic coatings and provides some laboratory-type evaluations and acceptances. Some applications of the test methods are tabulated in Table 1 and Table 2.

1.2 This guide does not apply to coatings that are produced by thermal spraying, ion bombardment, sputtering, and other similar techniques where the coatings are applied in the form of discrete particles impacting on the substrate.

1.3 This guide does not apply to beneficial or controlled porosity, such as that present in microdiscontinuous chromium coatings.

1.4 Porosity test results occur as chemical reaction end products. Some occur in situ, others on paper, or in a gel coating. Observations are made that are consistent with the test method, the items being tested, and the requirements of the purchaser. These may be visual inspection (unaided eye) or by 10× magnification (microscope). Other methods may involve enlarged photographs or photomicrographs.

1.5 The test methods are only summarized. The individual standards must be referred to for the instructions on how to perform the tests.

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

1.7 *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.*

2. Referenced Documents

2.1 ASTM Standards:

B 246 Specification for Tinned Hard-Drawn and Medium-

Hard-Drawn Copper Wire for Electrical Purposes²

B 276 Test Method for Apparent Porosity in Cemented Carbides³

B 374 Terminology Relating to Electroplating³

B 537 Practice for Rating of Electroplated Panels Subjected to Atmospheric Exposure³

B 542 Terminology Relating to Electrical Contacts and Their Use⁴

B 545 Specification for Electrodeposited Coatings of Tin³

B 605 Specification for Electrodeposited Coatings of Tin-Nickel Alloy³

B 650 Specification for Electrodeposited Engineering Chromium Coatings of Ferrous Substrates³

B 689 Specification for Electroplated Engineering Nickel Coatings³

B 733 Specification for Autocatalytic Nickel-Phosphorous Coatings on Metals³

B 734 Specification for Electrodeposited Copper for Engineering Uses³

B 735 Test Method for Porosity in Gold Coatings on Metal Substrates by Nitric Acid Vapor⁴

B 741 Test Method for Porosity in Gold Coatings on Metal Substrates by Paper Electrography⁴

B 798 Test Method for Porosity in Gold or Palladium Coatings on Metal Substrates by Gel-Bulk Electrography⁴

B 799 Test Method for Porosity in Gold and Palladium Coatings by Sulfurous Acid/Sulfur-Dioxide Vapor⁴

B 809 Test Method for Porosity in Metallic Coatings by Humid Sulfur Vapor ("Flowers-of-Sulfur")³

3. Terminology

3.1 *Definitions*—Many terms used in this guide are defined in Terminology B 374 or B 542.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *porosity*—for the purpose of this guide, porosity in a coating is defined as any hole, crack, or other defect that exposes the underlying metal to the environment.

3.2.2 *underplate*—a metallic coating layer between the basis metal and the topmost metallic coating. The thickness of

¹ This guide is under the jurisdiction of ASTM Committee B-8 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.10 on General Test Methods.

Current edition approved Jan. 15, 1993. Published March 1993. Originally published as B 765 – 86. Last previous edition B 765 – 86.

² Annual Book of ASTM Standards, Vol 02.03.

³ Annual Book of ASTM Standards, Vol 02.05.

⁴ Annual Book of ASTM Standards, Vol 03.04.