



Designation: B 540 – 97

Standard Specification for Palladium Electrical Contact Alloy ¹

This standard is issued under the fixed designation B 540; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers an alloy containing palladium, silver, copper, gold, platinum, and zinc in the form of wire, rod, and strip for electrical contacts.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI units may be approximate.

1.3 The following safety hazard caveat pertains only to the test methods portion, Section 6 of this specification. *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.*

1.4 It is the responsibility of the user to become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet for this product/material as provided by the manufacturer.

2. Referenced Documents

2.1 *ASTM Standards:*

B 476 Specification for General Requirements for Wrought Precious Metal Electrical Contact Materials ²

E 8 Test Methods of Tension Testing of Metallic Materials ³

E 384 Test Method for Microhardness of Materials ³

3. Materials and Manufacture

3.1 Raw materials shall be of such quality and purity that the finished product will have the properties and characteristics prescribed in this specification.

3.2 The material shall be finished by such operations (cold working, heat treating, annealing, turning, grinding, pickling) as are required to produce the prescribed properties.

4. Chemical Composition

4.1 Material produced under the specification shall meet the requirements of chemical composition shown in Table 1.

TABLE 1 Chemical Requirements

Element	Composition, weight %
Palladium	34.0–36.0
Silver	29.0–31.0
Copper	13.5–14.5
Gold	9.5–10.5
Platinum	9.5–10.5
Zinc	0.8–1.2
Total platinum group metal impurities (iridium, osmium, rhodium, ruthenium)	0.1 max
Total base metal impurities	0.2 max

5. Mechanical Properties

5.1 The contract or order may specify ultimate tensile strength, elongation, microhardness (Knoop or Vickers), or a combination of these mechanical properties (as listed in Table 2, Table 3, and Table 4) as temper criterion. If the contract or order does not specify a temper criterion, then the criterion for temper designation will be ultimate tensile strength and elongation.

6. Test Methods

6.1 Test methods shall be in accordance with Specification B 476.

6.1.1 Knoop hardness tests shall be in accordance with Test Method E 384. Material 0.005 in. (0.13 mm) in thickness (diameter) and larger shall be tested using a 100-g indenter load. Material less than 0.005 in. (0.13 mm) in thickness (diameter) shall be tested using a 50-g indenter load. A minimum of five hardness indentations shall be made on each specimen. All indentations shall be made so that the long axis of the indenter is parallel to the rolling or drawing direction of the material. The hardness value reported shall be the average of the five indentations.

6.1.2 All tension test specimens shall be full cross-section size when practical (see Test Methods E 8).

6.1.3 All tests shall be conducted in room temperature, 65 to 85°F (18.3 to 29.4°C).

6.2 Chemical analysis shall be performed by spectrochemical or wet analysis methods.

7. Inspection and Testing

7.1 Material furnished under this specification shall be inspected and tested by the manufacturer as listed below:

¹ This specification is under the jurisdiction of ASTM Committee B-2 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B2.05 on Precious Metals.

Current edition approved Dec. 10, 1997. Published October 1998. Originally published as B 540 – 70. Last previous edition B 540 – 91.

² *Annual Book of ASTM Standards*, Vol 02.04.

³ *Annual Book of ASTM Standards*, Vol 03.01.