



## Designation: **B617–98 (Reapproved 2010) B617 – 98 (Reapproved 2016)**

# Standard Specification for Coin Silver Electrical Contact Alloy<sup>1</sup>

This standard is issued under the fixed designation B617; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

## 1. Scope

1.1 This specification covers 90 % silver-10 % copper alloy tubing, rod, wire, strip, and sheet material for electrical contacts.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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 become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet (MSDS)(SDS) for this product/material as provided by the manufacturer; to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

B277 Test Method for Hardness of Electrical Contact Materials

B476 Specification for General Requirements for Wrought Precious Metal Electrical Contact Materials

## 3. 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, or pickling) as are required to produce the prescribed properties.

## 4. Chemical Composition

4.1 Material produced under this specification shall meet the requirements for chemical composition prescribed in Table 1.

## 5. Mechanical Requirements

5.1 Mechanical properties shall conform to the listings of Table 2 or Table 3.

5.2 All test specimens shall be full thickness or diameter when practical.

5.3 All tests are to be conducted at room temperature, about 68°F (20°C).

## 6. General Requirements

6.1 The provisions of Specification B476 shall apply to all materials produced to this specification.

## 7. Inspection and Testing

7.1 Material furnished under this specification shall be inspected by the manufacturer as detailed in the applicable provisions of Specification B476 and as listed as follows:

7.1.1 Visual inspection at 10 $\times$ .

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.05 on Precious Metals and Electrical Contact Materials.

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<sup>2</sup> 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.

**TABLE 1 Chemical Composition<sup>A</sup>**

Element	Weight %
Silver	89.6 to 91.0
Copper	9.0 to 10.4
Zinc	0.06 max
Iron	0.05 max
Cadmium	0.05 max
Lead	0.03 max
Nickel	0.01 max
Aluminum	0.005 max
Phosphorus	0.02 max
Total others	0.06 max

<sup>A</sup> Analysis is regularly made for the elements for which specific limits are listed. If, however, the presence of "other" elements is suspected or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these "other" elements and the listed impurities are not in excess of the total impurities limit.

**TABLE 2 Mechanical Properties of Sheet and Strip**

Temper	Reduction in B & S Numbers (Reference)	Percent Re-Reduction (Ref- (Reference) erence)	Ultimate Tensile Strength, psi (MPa)		Minimum Elongation in 2 in., %	Hardness, Rockwell 30T
			min	max		
A	0	0	36 000 (250)	47 000 (320)	20	42 to 50
½ H	2	21	47 000 (320)	57 000 (390)	4	56 to 64
¾ H	3	29	53 000 (370)	63 000 (430)	2	58 to 67
Hard	4	37	58 000 (400)	68 000 (470)	1	61 to 69
Spring	8	60	67 000 (460)	75 000 (520)	1	64 to 72

**TABLE 3 Mechanical Properties of Wire, Rod, and Tubing**

Temper	Reduction in B & S Numbers (Reference)	Percent Re-Reduction (Ref- (Reference) erence)	Ultimate Tensile Strength, psi (MPa)		Minimum Elongation in 2 in., %	Hardness, Rockwell 30T
			min	max		
A	0	0	36 000 (250)	47 000 (320)	20	42 to 50
⅙ H	½	11	42 000 (290)	52 000 (360)	8	49 to 57
¼ H	1	21	47 000 (320)	57 000 (390)	4	56 to 64
½ H	2	37	56 000 (390)	66 000 (460)	4	58 to 66
¾ H	3	50	61 000 (420)	71 000 (490)	3	61 to 72
Hard	4	60	65 000 (450)	74 000 (510)	2	64 to 72
Spring	8	84	74 000 (510)	82 000 (570)	1	68 to 76

7.1.2 Temper test (hardness or tension, but not both). A tension test is recommended for strip below 0.030-in. (0.8-mm) thickness and for wire of any diameter.

7.1.3 Dimensional tests.

7.1.4 Spectrographic or chemical analysis when indicated by the purchaser order.

## 8. Keywords

8.1 arcing contacts; coin silver alloy; compositions; electrical contacts; impurities; precious metals; silver alloy; silver copper alloy