



Designation: B662/B662M – 20

Standard Specification for Silver-Molybdenum Electrical Contact Material¹

This standard is issued under the fixed designation B662/B662M; 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 specification covers electrical contact components made from silver-molybdenum by powder metallurgical procedures.

1.2 This specification covers compositions within the silver-molybdenum system for electrical contact applications.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.4 *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) for this product/material as provided by the manufacturer, to establish appropriate safety, health, and environmental practices, and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

B328 Test Method for Density, Oil Content, and Interconnected Porosity of Sintered Metal Structural Parts and Oil-Impregnated Bearings (Withdrawn 2009)³

¹ 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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² 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.

³ The last approved version of this historical standard is referenced on www.astm.org.

B542 Terminology Relating to Electrical Contacts and Their Use

3. Terminology

3.1 For terms related to electrical contacts and their use, refer to Terminology B542.

4. Ordering Information

4.1 Include the following information when placing orders for product under this specification:

4.1.1 Dimensions and tolerances,

4.1.2 Alloy composition,

4.1.3 Physical properties,

4.1.4 Certification, and

4.1.5 Other requirements as agreed upon between the manufacturer and purchaser.

5. Materials and Manufacture

5.1 The materials shall be of such purity and soundness so as to be suitable for the intended application.

NOTE 1—Proprietary methods for the manufacture of these materials vary significantly among suppliers, and these methods influence such properties as arc erosion, contact resistance, and the tendency to weld in service. Since the performance of contacts in a device depends on numerous factors outside the contact itself (opening speed, closing speed, contact pressure, contact bounce, environmental variations, assembly technique and variations, etc.), it is recommended that, as part of the qualification on initial samples, the user should functionally and electrically test the materials for all devices applicable to the material's use. This specification provides a means for the contact manufacturer and contact user to reach agreement on the details of the material to be supplied for a specific use, and reasonable assurance that future lots will be similar in properties and microstructure to the initial test or sample contacts supplied.

6. Chemical Composition

6.1 The material shall conform to chemical composition and impurity limits as agreed upon between the manufacturer and the purchaser.

6.2 The compositional requirements are affected by processing. Table 1 covers infiltrated silver-molybdenum contact alloys, and Table 2 covers pressed, sintered, and re-pressed silver-molybdenum contact alloys.

6.3 The chemical analysis of the alloy shall be made in accordance with the methods prescribed in the newest edition

*A Summary of Changes section appears at the end of this standard

**TABLE 1 Chemical Composition of Infiltrated Silver-Molybdenum Contact Alloys**

Alloy	Composition, weight, %		
	Class A1	Class A	Class B
Silver	33 to 37	38 to 42	48 to 52
Molybdenum	balance	balance	balance
Copper, max	0.5	0.5	0.5
Cobalt or nickel, max	0.5	0.5	0.5
Total impurities, max	1	1	1

TABLE 2 Chemical Composition of Pressed, Sintered, and Re-pressed Silver-Molybdenum Contact Alloys

Alloy	Composition, weight, %	
	Class A	Class B
Silver	38 to 42	48 to 52
Molybdenum	balance	balance
Nickel, cobalt, or copper, max	0.5	0.5
Total impurities, max	1	1

of Volume 01.02 of the *Annual Book of ASTM Standards* or by any other approved method agreed upon between the manufacturer and the purchaser.

6.4 These specification limits do not preclude the presence of other unnamed elements, impurities, or additives. Analysis shall be regularly made only for the minor elements listed in the table. However, if a user knows of elements that might be detrimental to their application or has other reasons for requiring analysis for specific elements, then agreement between manufacturer and purchaser for both limits and methods of analysis should be required for elements not specified.

7. Physical Property Requirements

7.1 The manufacturer and the purchaser shall agree on qualification tests for determination of physical properties.

7.2 The tests shall be performed on production parts, wherever practical or applicable. (Small size contacts do not lend themselves to accurate conductivity measurement.)

7.3 The tests shall be determined after consideration of the function of the part.

7.4 The typical properties of two most common types of silver-molybdenum contacts are given in the appendix.

8. Workmanship, Finish, and Appearance

8.1 The material shall be finished by such operations as necessary to meet requirements agreed upon between the manufacturer and the purchaser of the contacts (brazing alloy

backing, tumbling to polish surfaces, special surface finish, silver-rich surface layer, cleaning, etc.).

8.2 The parts shall be free of defects in material or processing that would seriously affect their performance.

9. Dimensions, Mass, and Permissible Variations

9.1 Permissible variations in dimensions shall be within the limits specified on drawings describing the contacts and accompanying the order; or shall be within the limits specified in the purchase order.

10. Sampling

10.1 *Lot*—Unless otherwise specified, a lot shall consist of parts of the same form and dimensions, made of powders of the same particle size range and composition, processed under the same conditions, and submitted for inspection at one time.

10.2 Sampling for Chemical Analysis:

10.2.1 A minimum of one sample for analysis shall be taken from each lot. A representative sample of chips may be obtained by milling, drilling, or crushing at least two pieces with dry tools, without lubrication. In order to obtain oil-free chips, the parts selected for test shall have the oil extracted in accordance with Test Method B328 if necessary.

10.3 *Physical Tests*—The manufacturer and the purchaser shall agree on a representative number of specimens for physical tests including microstructure.

11. Inspection

11.1 Unless otherwise specified, inspection of parts supplied on contract shall be made by the purchaser.

12. Rejection

12.1 Unless otherwise specified, rejections based on tests made in accordance with the specification shall be reported to the manufacturer within 30 days of the receipt of shipment.

13. Certification

13.1 A certification, when requested by the user, based on the manufacturer's quality control that the material conforms to the requirements of this specification, shall be furnished upon request of the purchaser, provided the request is made at the time of cost quotation and at the time of order placement.

14. Keywords

14.1 arcing contacts; contacts; electrical contacts; molybdenum; molybdenum silver; powder metallurgy; silver; silver molybdenum