



Designation: B692 – 18 (Reapproved 2023)

Standard Specification for 75 % Silver-25 % Graphite Sliding Contact Material¹

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1. Scope

1.1 This specification defines the criteria for composition and other requirements for brushes with a nominal silver content of 75 weight % with the balance being substantially graphite.

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 Safety Data Sheet (SDS) 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.*

1.4 *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

B613 Guide for Preparing Specifications for Miniature Brushes of Composite Materials for Sliding Electric Contacts

E18 Test Methods for Rockwell Hardness of Metallic Materials

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 and Test Methods.

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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.

2.2 NEMA Standard:

CB-1 Brushes for Electrical Machines³

3. Requirements

3.1 *Chemical Composition* shall be as follows:

Silver	75 ± 3 % (weight)
Graphite	balance
Total metal impurities	1 % max
Percent ash in graphite (NEMA CB-1)	5 % max

3.2 *Physical Properties*—The following lot average properties must be met. Unless otherwise agreed between the producer and the user, the number of samples shall be five.

3.2.1 *Density*—The minimum acceptable density shall be 4.6 g/cm³ as determined by the measurement and weight method defined by NEMA CB-1.

3.2.2 Shear Strength:

3.2.2.1 The shear strength for the normal and transverse directions shall be measured for rectangular parallelepipeds and shall be 2000 psi (14 MPa), minimum.

3.2.2.2 The shear strength for the longitudinal shear direction shall be measured for cylinders and shall be 1000 psi (6.9 MPa), minimum.

3.3 *Microstructure*—Parts shall be visually free of structural defects, cracks, etc., upon examination at 50 \times . The press direction, as evidenced by laminations, shall be as defined by the purchase order. Also the brush material shall not contain abrasive particles that will sliver a metal-alloy ring with a hardness ≥ 110 HK₁₀₀ when the brush force is equal to 30 g or that necessary for 5.0 psi (34 kPa) pressure, whichever is greater. A sliver is defined as a loose wear particle with one dimension $\geq 50\times$ the next smaller dimension. Although slivering can be caused by coarse abrasive particles, other parameters can contribute to slivering (for example, very high brush force).

3.4 *Source or Grade of Raw Materials* (for example, graphite) or methods of manufacture shall not be changed without notifying users.

³ Available from National Electrical Manufacturers Association (NEMA), 1300 N. 17th St., Suite 1752, Rosslyn, VA 22209, <http://www.nema.org>.

4. Reference Properties

4.1 Because of their size, the following properties can not always be determined. However, these properties are typical for larger parts.

4.1.1 *Superficial Hardness*—The typical superficial hardness for this material is Rockwell 15W50 as determined by Test Methods E18 with a 1/8 in. (3.2 mm) steel ball.

4.1.2 *Specific Resistance*—The typical specific resistance for the material is $6 \times 10^{-6} \Omega\text{-in.}$ ($1.5 \times 10^{-7} \Omega\text{-m}$) as determined by the method detailed in NEMA CB-1.

5. Certification

5.1 Material supplied under this specification shall be certified as meeting the requirements of this specification by the producer of the material.

6. Keywords

6.1 electrical contacts; graphite; silver; sliding contacts

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