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Standard Guide for Preparing Specifications for Miniature Brushes of Composite Materials for Sliding Electric Contacts[1]

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1. Scope

1.1 This guide defines the criteria for composition, properties, and other requirements for brushes containing a matrix of one or more conducting metallic elements or alloys and one or more lubricating lamellar solids.

1.2 The resulting specification is intended for use where the size (for example, 5 by 3 by 2 mm), shape, or other factors preclude the determination of properties on specimens of the bulk material from which individual brushes are made.

1.3 The requirements recommended herein have been found to be desirable for most brush material composites. Care must be taken in preparing a specification for a pre-existing material that imposition of one or more provisions herein does not alter the material or its performance.

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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials [2]

E 384 Test Method for Microhardness of Materials [2]

2.2 *ANSI Standard:*

C64.1 Brushes for Electrical Machines [3]

3. Requirements

3.1 *Composition*—Each constituent should be listed individually by weight percent including tolerances if mutually agreed upon by producer and user. Any analytical technique may be used as agreed upon between the producer and user.

3.2 *Density*—An apparent density for the material should be defined. The measurement and weight method defined by ANSI C64.1 is preferred.

3.3 *Resistivity*—The resistivity should be defined for at least one axis. The procedure defined by ANSI C64.1 may need to be modified, as agreed upon between the producer and user, for very small brushes.

3.4 *Hardness*—The bulk hardness of the brush material should be defined. Rockwell superficial hardness tests, ⅛ or ¼ in.-ball, (Test Methods E 18) and Knoop, 500-g load (Test Method E 384) have been used.

3.5 *Strength*—The strength of the brush material should be defined. Transverse strength (ANSI C64.1) may be used when the brushes are sufficiently large. Small brushes (for example, 5 by 3 by 2 mm) will require that other test procedures be used (for example, shear strength).

3.6 *Microstructure*—All should be visually free of structural defects, cracks, etc., upon examination at 50×. The pressing direction, as evidenced by laminations, should be as defined by the purchase order.

4. Keywords

4.1 brushes; composite materials; electrical contacts; sliding contacts

[1] This guide is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B2.05 on Precious Metals.

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[2] Annual Book of ASTM Standards, Vol 03.01.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.