Designation: B855 – 11

Standard Test Method for Volumetric Flow Rate of Metal Powders Using the Arnold Meter and Hall Flowmeter Funnel[1]

This standard is issued under the fixed designation B855; 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 test method covers a laboratory procedure for the quantitative determination of the flow rate of a specific volume of a free-flowing metal powder or lubricated powder mixture.

1.2 With the exceception of the values for mass, volume and density, for which the use of the gram and the cubic centimeter unit is long-standing industry practice, the values stated in inch-pound units are to be regarded as standard. The values given in parenthesis 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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

B213 Test Methods for Flow Rate of Metal Powders Using the Hall Flowmeter Funnel
B215 Practices for Sampling Metal Powders
B243 Terminology of Powder Metallurgy
B703 Test Method for Apparent Density of Metal Powders and Related Compounds Using the Arnold Meter
E456 Terminology Relating to Quality and Statistics

2.2 *MPIF Standard*[3]

MPIF Standard 48 Determination of Apparent Density of Metal Powders using the Arnold Meter

3. Terminology

3.1 *Definitions*—Useful definitions of terms for metal powders and powder metallurgy used in this standard are found in Terminology B243. Additional descriptive PM information is available in the Related Material section of Vol 02.05 of the *Annual Book of ASTM Standards*.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *volumetric flow rate*—the relation between time and volume of a free-flowing metal powder determined by measuring the time for a specific volume to flow through the orifice in a Hall Flowmeter Funnel and expressing the ratio in seconds per 20 cubic centimetres. (s/20 cm^3).

4. Summary of Test Method

4.1 A 20 cm^3 test portion of powder is prepared from the lot to be tested following the procedures in Test Methods B215 and B703.

4.2 This 20 cm^3 test portion is timed as it flows through the orifice in a Hall Flowmeter Funnel following the procedure in Test Method B213.

4.3 The volumetric flow rate is calculated and reported in seconds per 20 cubic centimetres. (s/20 cm^3)

5. Significance and Use

5.1 The volumetric flow rate is a measure of the flow characteristics of a metal powder. Measuring flow by volume as compared with flow per unit mass eliminates the variable of the powder density and relates to the production practice of die filling by volume.

5.2 The ability of a powder to flow and pack is a function of interparticle friction. As the surface area increases, the amount of friction in a powder mass also increases. Consequently, the friction between particles increases, giving less efficient flow and packing.

5.3 Knowledge of the volumetric flow rate permits the part producer to estimate the number of parts that can be compacted per hour.

5.4 This test may be part of the purchase agreement between metal powder manufacturers and powder metallurgy (PM) part

[1] This test method is under the jurisdiction of ASTM Committee B09 on Metal Powders and Metal Powder Productsand is the direct responsibility of Subcommittee B09.02 on Base Metal Powders.

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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] Available from ASTM or Metal Powder Industries Federation, 105 College Road East, Princeton, NJ 08540 and initially reported in MPIF Standard 48

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