



Designation: B855 – 17

Standard Test Method for Volumetric Flow Rate of Metal Powders Using the Arnold Meter and Hall Flowmeter Funnel¹

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 exception of the values for mass, volume and density, for which the use of the gram and the cubic centimetre 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.*

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

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

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

Current edition approved April 1, 2017. Published April 2017. Originally approved in 1994. Last previous edition approved in 2011 as B855 – 11. DOI: 10.1520/B0855-17.

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 *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. ($s/20\text{ cm}^3$).

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. ($s/20\text{ cm}^3$)

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.

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