



Designation: B 417 – 00

Standard Test Method for Apparent Density of Non-Free-Flowing Metal Powders Using the Carney Funnel¹

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1. Scope

1.1 This test method covers a procedure for determining the apparent density of non-free-flowing metal powders. It is designed for those metal powders that do not freely flow through the Hall flowmeter funnel.

1.2 *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:

- B 215 Practices for Sampling Finished Lots of Metal Powders²
- B 243 Terminology of Powder Metallurgy²
- B 873 Test Method for Measuring the Volume of Apparent Density Cup Used in Test Methods B 212, B 329, and B 417²

3. Terminology

3.1 *Definitions*—Terms in Terminology B 243 are applicable to this test method.

4. Summary of Test Method

4.1 A container of definite volume is filled with non-free-flowing powder under controlled conditions. The mass of powder per unit volume is determined and reported as apparent density, Carney.

5. Significance and Use

5.1 This test method provides a guide for evaluation of the apparent density physical characteristic of powders. The density measured bears a relationship to the mass of powder that will fill a fixed volume die cavity when parts are being made.

The degree of correlation between the results of this test method and the quality of powders in use will vary with each particular application.

6. Apparatus

6.1 *Powder Funnel*³—A Carney funnel (Fig. 1).

6.2 *Density Cup*³—A cylindrical brass cup (Fig. 2) having a capacity of 25 cm³. The actual cup volume shall be determined according to Test Method B 873.

6.3 *Stand*—A stand (Fig. 1) to support the powder funnel concentric with the density cup so that the bottom of the powder funnel is approximately 25 mm (1 in.) above the top of the density cup when the apparatus is assembled as shown in Fig. 1.

6.4 *Base*—A level, vibration-free base to support the powder flowmeter.

6.5 *Balance*, having a capacity of at least 200 g and a sensitivity of 0.01 g.

6.6 *Wire*, approximately 2.5 mm (0.10 in.) in diameter by 150 mm (6 in.) in length.

7. Test Specimen

7.1 The test specimen shall consist of a volume of approximately 30 to 40 cm of metal powder obtained in accordance with Practice B 215.

7.2 The test specimen shall be tested as sampled. Note, however, that temperature, moisture, oils, stearic acid, stearates, waxes, and so forth may alter the characteristics of the powder.

8. Procedure

8.1 Weigh the empty density cup to the nearest 0.1 g or, alternatively, place the empty density cup on the balance and tare the balance to zero.

8.2 Load the test specimen carefully into the flowmeter funnel and permit it to run into the density cup through the discharge orifice. If necessary, it may be agitated or pushed by use of the length of wire but take care to prevent the wire from

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 Products.

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² *Annual Book of ASTM Standards*, Vol 02.05.

³ The flowmeter funnel, density cup, and stand are available from Acu Powder International, LLC.