Designation: D 4512 – 99

Standard Test Method for Vibrated Apparent Packing Density of Fine Catalyst and Catalyst Carrier Particles and Powder[1]

This standard is issued under the fixed designation D 4512; 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 the determination of the apparent packing density of fine catalyst and catalyst carrier powders smaller than 0.8 mm in diameter.

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:*

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods[2]

E 456 Terminology Relating to Quality and Statistics[2]

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method[2]

3. Significance and Use

3.1 This test method is for measuring the apparent packing density of catalyst or catalyst carrier powders that are smaller than 0.8 mm in diameter.

4. Apparatus

4.1 *Glass Cylinders*, capacity 100 mL, feed[3,4] and measuring.[3,5]

4.2 *Vibrator*,[3,6] conventional hand-held, with hard rubber or metal impactor.

4.3 *Feed Funnel*, plastic, glass, or metal as shown in Fig. 1.

4.4 *Ring Stand*, vibrator holder and clamps as shown in Figs. 2 and 3.

4.5 *Desiccator*, with a desiccant grade molecular sieve such as 4A.

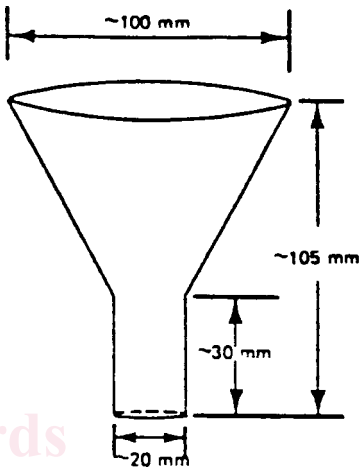

FIG. 1 Feed Funnel

4.6 *Balance*, having sensitivity of 0.1 g.

4.7 *Drying Oven*.

5. Procedure

5.1 Heat an adequate amount of sample(s) at 673 K(400°C) ± 15 K for not less than 3 h. Normally, this treatment can take place in air; however, in the case of materials that might react with air at elevated temperatures (such as, prereduced catalysts) the heat treatment shall take place in an inert atmosphere. After heating, cool the test sample(s) in a desiccator or other suitable container to eliminate the possibility of moisture adsorption prior to testing.

NOTE 1—These conditions may not be appropriate for all materials.

NOTE 2—Since many catalyst formulations are strong adsorbents, the use of 4A indicating (cobalt-treated) molecular sieve as a desiccating medium is suggested. The desiccant should be regenerated at 493 K (220°C) to 533 K (260°C), as required.

5.2 Fill a feed glass cylinder with 100 mL of loosely packed, dried sample.

5.3 Turn on the vibrator and carefully add sample(s) to the tared, measuring cylinder through the feed funnel.

5.4 Transfer all of the sample to the measuring cylinder at a uniform rate not less than 2 mL or exceeding 3 mL/s. The entire transfer time shall be between 35 and 50 s.

5.5 After 60 additional seconds turn off the vibrator. Read the vibrated volume, *V*, to the nearest millilitre by estimating the average level of the sample surface in the cylinder.

[1] This test method is under the jurisdiction of ASTM Committee D-32 on Catalysts and is the direct responsibility of Subcommittee D32.02 on Physical-Mechanical Properties.

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[2] *Annual Book of ASTM Standards*, Vol 14.02.

[3] If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

[4] Example: Kimble 20024.

[5] Example: Corning 3062, Kimble 20026.

[6] Example: Wahl, Model 4180, 4 in 1, 120 V60 Hz 11 W, Wahl Clipper Corp., Sterling, IL.