Designation: D4180 – 23

Standard Test Method for Vibratory Packing Density of Formed Catalyst Particles and Catalyst Carriers[1]

This standard is issued under the fixed designation D4180; 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 vibratory packing density of formed catalyst and catalyst carriers. For the purpose of this test, catalyst particles are defined as extrudates, spheres, or formed pellets of 0.8-mm to 4.8-mm (1/32-in. to 3/16-in.) nominal diameter.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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, health, and environmental 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]

B215 Practices for Sampling Metal Powders
D3766 Terminology Relating to Catalysts and Catalysis
E105 Guide for Probability Sampling of Materials
E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process
E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
E456 Terminology Relating to Quality and Statistics
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
E1272 Specification for Laboratory Glass Graduated Cylinders

3. Terminology

3.1 *Definitions*—See Terminology D3766.

4. Summary of Test Method

4.1 A preconditioned sample of formed catalyst or catalyst carrier is vibrated in a cylinder. The vibratory packing density is determined from a known mass and vibrated volume.

5. Significance and Use

5.1 This test method is to be used for measuring the vibratory packing density of formed particles that will not break up during sampling, filling, or vibrating of the measuring cylinder under test conditions.

6. Apparatus

6.1 *Glass Cylinders,* capacity 250 mL, feed and measuring, conforming to Specification E1272, Class A.

6.2 *Vibrator,* [3] conventional handheld, with hard rubber or metal impactor.

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

6.4 *Ring Stand, Vibrator Holder and Clamps* as shown in Figs. 2 and 3.

6.5 *Desiccator,* with a desiccant grade molecular sieve such as a No. 4A.

6.6 *Balance* having sensitivity of 0.1 g.

6.7 *Drying Oven.*

7. Sampling

7.1 Test sample(s) shall be obtained from larger composites by riffling or splitting in accordance with subsection 5.12 of

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

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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] The sole source of supply of the vibrator known to the committee at this time is Wahl Clipper Corp., Sterling, IL. Model 4120 used at low speed is recommended to replace Model 4180, which is discontinued. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.