



Designation: D8392 – 22

Standard Practice for Calibration and Verification of Direct Imaging Analyzers Used for Particle Size and Shape Analysis of Catalytic Materials¹

This standard is issued under the fixed designation D8392; 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 practice covers the calibration and verification of Dynamic Imaging Analyzers (analyzers) using catalytic and non-catalytic reference materials. The measurement range of analyzers covers from 500 μm to 20 000 μm.

1.2 This practice may also be used to analyze catalytic materials once the analyzer has been calibrated and verified.

1.3 *Units*—The values stated in SI units are to be regarded as standard; however, English and mesh units are also acceptable with conversions provided in [Appendix X3](#).

1.4 *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.*

1.5 *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

[D3766 Terminology Relating to Catalysts and Catalysis](#)

[D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance](#)

[E105 Guide for Probability Sampling of Materials](#)

[E2589 Terminology Relating to Nonsieving Methods of Powder Characterization](#)

2.2 *DIN Standard:*³

[66141 Representation of Particle Size Distributions – Basic Standard](#)

2.3 *ISO Standards:*⁴

[9276-6 Representation of Results of Particle Size Analysis – Part 6: Descriptive and Quantitative Representation of Particle Shape and Morphology](#)

[13322-1 Particle Size Analysis – Image Analysis Methods – Part 1: Static Image Analysis Methods](#)

3. Terminology

3.1 Reference Terminologies [D3766](#) and [E2589](#) for standard definitions.

3.2 *Non-standard Particle Shape Definitions and Definitions of Terms Specific to This Standard*

3.2.1 *aspect ratio, n*—equal to the particle width divided by the particle length (see [Appendix X1](#)).

3.2.2 *particle convexity, n*—a measurement, from 0 to 1, of the actual particle area to the area within the convex perimeter (see [X1.4](#)).

3.3 *Non-standard Particle Size Definitions and Definitions of Terms Specific to This Standard*

3.3.1 *particle length, n*—the maximum feret that is perpendicular to the particle width of the two-dimensionally imaged particle (see [Appendix X1](#)).

3.3.2 *particle width, n*—the minimum area bisector of the two-dimensionally imaged particle and signified by $X_{Ma\ min}$, minimum Martin diameter (see [Appendix X1](#)).

NOTE 1—Imaging terminology is known to have multiple phrasings throughout industry. [Appendix X1](#) and [Appendix X2](#) describe, in detail, what these terms represent with regard to this practice.

4. Summary of Practice

4.1 The general principle of operation of the analyzer is the transport of catalytic material from a loading container through

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

Current edition approved Aug. 1, 2022. Published September 2022. DOI: 10.1520/D8392-22.

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 Deutsches Institut für Normung e.V.(DIN), Am DIN-Platz, Burggrafenstrasse 6, 10787 Berlin, Germany, <http://www.din.de>.

⁴ Available from International Organization for Standardization (ISO), ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <https://www.iso.org>.