



Standard Guide for Powder Particle Size Analysis¹

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1. Scope

1.1 This guide covers the use of many available techniques for particle size measurement and particle size distribution analysis of solid particulate (powder) materials. It does not apply to analysis of liquid droplets or liquid aerosols. The guide is intended to serve as a resource for powder/particle technologists in characterizing their materials.

1.2 This guide provides more detail regarding the particle size analysis methods listed in Guide E1919, which is a compilation of worldwide published standards relating to particle and spray characterization. Although Guide E1919 and this guide are both extensive, neither is all inclusive.

1.3 The principle of operation, range of applicability, specific requirements (if any), and limitations of each of the included particle size analysis techniques are listed and described, so that users of this guide may choose the most useful and most efficient technique for characterizing the particle size distribution of their particular material(s).

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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:*²

B215 Practices for Sampling Metal Powders

B330 Test Methods for Estimating Average Particle Size of Metal Powders and Related Compounds Using Air Permeability

B821 Guide for Liquid Dispersion of Metal Powders and Related Compounds for Particle Size Analysis

B859 Practice for De-Agglomeration of Refractory Metal Powders and Their Compounds Prior to Particle Size Analysis

C322 Practice for Sampling Ceramic Whiteware Clays

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E1617 Practice for Reporting Particle Size Characterization Data

E1638 Terminology Relating to Sieves, Sieving Methods, and Screening Media

E1919 Guide for Worldwide Published Standards Relating to Particle and Spray Characterization (Withdrawn 2014)³

E2589 Terminology Relating to Nonsieving Methods of Powder Characterization

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this guide, refer to Terminologies E1638 and E2589.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *powder, n*—a collection of solid particles that are usually less than 1000 μm (1 mm) in size.

4. Significance and Use

4.1 The myriad array of particle size analysis techniques available to the modern-day powder technologist is both daunting and confusing. Many of the techniques are applicable only to certain types of materials, and all have limited ranges of applicability with respect to powder particle size. This guide is an attempt to describe and define the applicability of each of the available techniques, so that powder technologists, and others interested in powders, may make informed and appropriate choices in characterizing their materials.

4.2 This guide is intended to be used to determine the best and most efficient way of characterizing the particle size distribution of a particular powder material. It may also be used to determine whether a reported powder particle size, or size distribution, was obtained in an appropriate and meaningful way.

¹ This guide is under the jurisdiction of ASTM Committee E29 on Particle and Spray Characterization and is the direct responsibility of Subcommittee E29.02 on Non-Sieving Methods.

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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 last approved version of this historical standard is referenced on www.astm.org.