



Standard Practice for Determining Data Criteria and Processing for Liquid Drop Size Analysis¹

This standard is issued under the fixed designation E799; 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 gives procedures for determining appropriate sample size, size class widths, characteristic drop sizes, and dispersion measure of drop size distribution. The accuracy of and correction procedures for measurements of drops using particular equipment are not part of this practice. Attention is drawn to the types of sampling (spatial, flux-sensitive, or neither) with a note on conversion required (methods not specified). The data are assumed to be counts by drop size. The drop size is assumed to be the diameter of a sphere of equivalent volume.

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

1.3 The analysis applies to all liquid drop distributions except where specific restrictions are stated.

2. Referenced Documents

2.1 ASTM Standards:²

E1296 Terminology for Liquid Particle Statistics (Withdrawn 1997)³

2.2 ISO Standards:⁴

13320-1 Particle Size Analysis-Laser Diffraction Methods
9276-1 Representation of Results of Particle Size Analysis-Graphical Representation
9272-2 Calculation of Average Particle Sizes/Diameters and Moments from Particle Size Distribution

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

¹ This practice 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.

Current edition approved March 1, 2015. Published March 2015. Originally approved in 1981. Last previous edition approved in 2009 as E799 – 03 (2009). DOI: 10.1520/E0799-03R15.

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.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

3.1.1 *spatial, adj*—describes the observation or measurement of drops contained in a volume of space during such short intervals of time that the contents of the volume observed do not change during any single observation. Examples of spatial sampling are single flash photography or laser holography. Any sum of such photographs would also constitute spatial sampling. A spatial set of data is proportional to concentration: number per unit volume.

3.1.2 *flux-sensitive, adj*—describes the observation of measurement of the traffic of drops through a fixed area during intervals of time. Examples of flux-sensitive sampling are the collection for a period of time on a stationary slide or in a sampling cell, or the measurement of drops passing through a plane (gate) with a shadowing on photodiodes or by using capacitance changes. An example that may be characterized as neither flux-sensitive nor spatial is a collection on a slide moving so that there is measurable settling of drops on the slide in addition to the collection by the motion of the slide through the swept volume. Optical scattering devices sensing continuously may be difficult to identify as flux-sensitive, spatial, or neither due to instantaneous sampling of the sensors and the measurable accumulation and relaxation time of the sensors. For widely spaced particles sampling may resemble temporal and for closely spaced particles it may resemble spatial. A flux-sensitive set of data is proportional to flux density: number per (unit area $\times$ unit time).

3.1.3 *representative, adj*—indicates that sufficient data have been obtained to make the effect of random fluctuations acceptably small. For temporal observations this requires sufficient time duration or sufficient total of time durations. For spatial observations this requires a sufficient number of observations. A spatial sample of one flash photograph is usually not representative since the drop population distribution fluctuates with time. 1000 such photographs exhibiting no correlation with the fluctuations would most probably be representative. A temporal sample observed over a total of periods of time that is long compared to the time lapse between extreme fluctuations would most probably be representative.

3.1.4 *local, adj*—indicates observations of a very small part (volume or area) of a larger region of concern.

3.2 Symbols—Representative Diameters: