



Designation: F 658 – 00a

An American National Standard

Standard Practice for Calibration of a Liquid-Borne Particle Counter Using an Optical System Based Upon Light Extinction¹

This standard is issued under the fixed designation F 658; 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 procedures for calibrating and determining performance of an optical liquid-borne particle counter (LPC) which uses an optical system based upon light extinction measurement. This practice is directed towards determination of accuracy and resolution of the LPC for characterizing the size and number of particles, which have been passed into the sample inlet of the LPC. Consideration of inlet sampling efficiency is not part of this practice.

1.2 The procedures covered in this practice include those to measure sample volume and flow rate, zero count level, particle sizing and counting accuracy, particle sizing resolution, particle counting efficiency, and particle concentration limit.

1.3 The particle size parameter reported in this practice is the equivalent optical diameter based on projected area of calibration particles with known physical properties dispersed in liquid. The manufacturer normally specifies the minimum diameter that can be reported by an LPC; the dynamic range of the LPC being used determines the maximum diameter that can be reported for a single sample. Typical minimum reported diameters are approximately 2 μm, and a typical dynamic range specification will be approximately from 50 to 1.

1.4 The counting rate capability of the LPC is limited by temporal coincidence of particles in the sensing volume of the LPC and by the saturation level or maximum counting rate capability of the electronic sizing and counting circuitry. Coincidence is defined as the simultaneous presence of more than one particle within the LPC optically defined sensing zone at any time. The coincidence limit is a statistical function of particle concentration in the sample and the sensing zone volume when particle size is insignificant in comparison to the sensing volume dimensions². This limitation may be modified by the presence of particles with

¹ This practice is under the jurisdiction of ASTM Committee E-29 on Particle and Spray Characterization and is the direct responsibility of Subcommittee E29.02 on Non-Sieving Methods.

Current edition approved April 10, 2000. Published June 2000. Originally published as F 658 – 99. Last previous edition F 658 – 9900.