
40 C.F.R. § 53.43

Test procedures.

- (a) *Sampling effectiveness*—(1) *Technical definition*. The ratio (expressed as a percentage) of the mass concentration of particles of a given size reaching the sampler filter or filters to the mass concentration of particles of the same size approaching the sampler.
- (2) *Test procedure*. (i) Establish a wind speed specified in table D-2 and measure the wind speed and turbulence intensity (longitudinal component and macroscale) at a minimum of 12 test points in a cross-sectional area of the test section of the wind tunnel. The mean wind speed in the test section must be within ± 10 percent of the value specified in table D-2 and the variation at any test point in the test section may not exceed 10 percent of the mean.
- (ii) Generate particles of a size and type specified in table D-2 using a vibrating orifice aerosol generator. Check for the presence of satellites and adjust the generator as necessary. Calculate the aerodynamic particle size using the operating parameters of the vibrating orifice aerosol generator and record. The calculated aerodynamic diameter must be within the tolerance specified in table D-2.
- (iii) Collect a sample of the particles on a glass slide or other suitable substrate at the particle injection point. If a glass slide is used, it should be pretreated with an appropriate oleophobic surfactant when collecting liquid particles. Use a microscopic technique to size a minimum of 25 primary particles in three viewing fields (do not include multipliants). Determine the geometric mean aerodynamic diameter and geometric standard deviation using the bulk density of the particle type (and an appropriate flattening factor for liquid particles if collected on a glass slide). The measured geometric mean aerodynamic diameter must be within 0.5 μm or 10 percent of the aerodynamic diameter calculated from the operating parameters of the vibrating orifice aerosol generator. The geometric standard deviation must not exceed 1.1.
- (iv) Determine the population of multipliants (doublets and triplets) in the collected sample by counting a minimum of 100 particles in three viewing fields. The multipliant population of the particle test atmosphere must not exceed 10 percent.
- (v) Introduce the particles into the wind tunnel and allow the particle concentration to stabilize.
- (vi) Install an array of five or more evenly spaced isokinetic samplers in the sampling zone (see § 53.42(d)) of the wind tunnel. Collect particles on appropriate filters (e.g., glass fiber) over a time period such that the relative error of the measured particle concentration is less than 5 percent. Relative error is defined as $(p \times 100\%)/(X)$, where p is the precision of the fluorometer on the appropriate range, X is the measured concentration, and the units of p and X are the same.
- (vii) Determine the quantity of material collected with each isokinetic sampler in the array using a calibrated fluorometer. Calculate and record the mass concentration for each isokinetic sampler as:

This document is only available to subscribers. Please log in or purchase access.

Purchase Login