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**Contamination Control Division  
Technical Guide 1003**

**IEST-G-CC1003**

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**Measurement of Airborne  
Macroparticles**

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**INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY**

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# Measurement of Airborne Macroparticles

## IEST-G-CC1003

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# Measurement of Airborne Macroparticles

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### 1 Application

This guide describes procedures for measurement of the concentration and size of airborne *macroparticles* (i.e., particles that are larger than 5  $\mu\text{m}$  in diameter). The numerical value of the concentration of such particles, expressed in terms of macroparticles per cubic meter, is the *M descriptor*. This term may refer to a specified concentration of macroparticles or to measurement of the concentration of macroparticles in a given sample of air.

The procedures contained herein are suitable for use in conjunction with related cleanroom standards such as ISO 14644-1, for defining air cleanliness, and ISO 14644-2, for monitoring. The procedures are applicable to cleanrooms and clean zones in any of three occupancy states, as defined in ISO 14644-1.

In relation to standard air cleanliness classifications, as defined in ISO 14644-1, this document is typically most appropriate for use with cleanroom and clean zone environments that qualify as ISO Class 5 or less clean. It may also be used in any situation where process or product considerations require monitoring or control of airborne contaminants in the macroparticle size range.

*NOTE: For further definitions and explanations of terms in this document, see IEST-RD-CC011.*

### 2 Scope

There are numerous procedures available for counting macroparticles. Since different procedures may not respond to the same particle size parameter(s), the data produced by a given procedure may not correlate with data from another procedure. Therefore, a variety of methods will be discussed herein.

Two general categories of macroparticle measurement operations are considered:

- a) Collection by filtration or inertial effects, followed by microscopic measurement of the number and size, or measurement of the mass of collected particles.
- b) In-situ measurement of the concentration and size of macroparticles with a time-of-flight particle counter or a discrete-particle counter.

The importance of proper sample acquisition and handling in order to minimize losses of macroparticles in the sample handling operations is emphasized. Procedures are provided for calculating macroparticle losses when ideal sample handling procedures cannot be accomplished.