# INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY

## Contamination Control Division Technical Guide 1002

# IEST-G-CC1002

# Determination of the Concentration of Airborne Ultrafine Particles

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## CONTENTS

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## 1 Application

This guide describes standardized procedures for determination of the concentration of airborne particles in the ultrafine size range (i.e., particles with a size distribution having a threshold [lower limit] particle size smaller than 0.1 µm). The numerical value of the concentration of such particles, expressed in terms of particles per cubic meter, is the *U descriptor*. This term may refer to a specified concentration of ultrafine particles or to measurement of the concentration of ultrafine particles in a given sample of air.

The procedures described herein are suitable for use in conjunction with related cleanroom standards such as ISO 14644-1 for determination of airborne particulate 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.

This document is most appropriate for use with cleanroom and clean zone environments that qualify as ISO Class 4 or cleaner, as defined in ISO 14644-1.

## 2 Definitions

### 2.1 condensation nucleus counter (CNC)

An instrument for counting airborne particles, in the nanometer size range and larger, by optically detecting droplets formed by condensation of a vapor upon those particles.

### 2.2 discrete-particle counter (DPC)

An instrument, such as an optical particle counter or a modified condensation nucleus counter, capable of counting and sizing individual airborne particles within a particle population. A DPC used for counting ultrafine particles shall be able to discriminate threshold sizes smaller than 0.1 µm equivalent diameter.

### 2.3 inlet device

A size cutoff device which, when attached to the sample inlet of a DPC or CNC, will remove particles smaller than the defined ultrafine particle size. The device is chosen so that its particle retention by diffusion effects will meet the defined par-