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Sequential-Sampling Plan for Use in Classification of the Particulate Cleanliness of Air in Cleanrooms and Clean Zones

INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY
Arlington Place One
2340 S. Arlington Heights Road, Suite 620
Arlington Heights, IL 60005-4510
Phone: (847) 981-0100 • Fax: (847) 981-4130
E-mail: iest@iest.org • Web: www.iest.org

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[This guide is based on a paper by Cooper and Maynard (reference 7a).]

1 Application

This guide provides background and support for the use of sequential-sampling plans for the classification of air cleanliness in cleanrooms and clean zones. Such plans are generally most appropriate for environments where air cleanliness is expected to qualify as ISO Class 4 or cleaner.

The sequential-sampling plan described herein has been developed to match the operating characteristic (OC) curve of the traditional single-stage-sampling plan. As a result, the probability of passing or failing a given classification is about the same for both plans.

When compared to sampling times required by traditional single-stage-sampling methods, however, sequential sampling is found to be capable of saving about 80 percent of the sampling time when the air sampled is very clean, 35 percent when the air just meets the class limit, and more than 80 percent when the concentration of particles in the air exceeds 2.5 times the class limit.

Sequential sampling is especially applicable as an alternative to a single-stage-sampling scheme in cases where the upper confidence limit (UCL) on the grand mean of the particle concentration is not required or when, with some further development, it can be used to provide an equivalent estimate of the UCL.

NOTE: The statistical validity of data from long-term sampling of very clean air at a given location is based upon the assumption that the particle concentration will remain relatively constant or will vary only in a random manner during the sampling period. Statistical validity may be degraded, however, if unique phenomena are present that can cause significant variations in concentration.