



Standard Test Method for Sizing and Counting Particulate Contaminant In and On Clean Room Garments¹

This standard is issued under the fixed designation F51/F51M; 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.

^{ε1} NOTE—Editorial changes were made throughout in March 2013.

1. Scope

1.1 This test method covers the determination of detachable particulate contaminant 5 μm or larger, in and on the fabric of clean room garments.

1.2 This test method does not apply to nonporous fabrics such as Tyvek (trademarked) or Gortex (trademarked). It only applies to fabrics that are porous such as cotton or polyester.

1.3 This test method provides not only the traditional optical microscopic analysis but also a size distribution and surface obscuration analysis for particles on a fine-textured membrane filter or in a tape lift sample. It utilizes transmitted illumination to render all particles darker than the background for gray level detection. Particles collected on opaque plates must be transferred to a suitable membrane filter.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

¹ This test method is under the jurisdiction of ASTM Committee E21 on Space Simulation and Applications of Space Technology and is the direct responsibility of Subcommittee E21.05 on Contamination.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E1216 Practice for Sampling for Particulate Contamination by Tape Lift

F25/F25M Test Method for Sizing and Counting Airborne Particulate Contamination in Cleanrooms and Other Dust-Controlled Areas

2.2 *Institute of Environmental Sciences and Technology (IEST) Document:*³

IEST-RP-CC003.2, Garment System Considerations for Cleanrooms and Other Controlled Environments

3. Terminology

3.1 Definitions:

3.1.1 *fiber, n*—particle longer than 100 μm and with a length-to-width ratio exceeding 10:1.

3.1.2 *micrometre (μm), n*—SI unit of length which is 10⁻⁶ of a metre or approximately 0.00004 in.

3.1.3 *particle size (L) (μm)*—major projected dimension of a particle.

4. Summary of Test Method

4.1 Filtered air is drawn through five designated 0.01-m² [1.5-in.² or approximately 0.01-ft²] areas of a single thickness of the garment fabric at a rate of 14 L/min [0.5 cfm] for a period of 1 min for each area.

4.2 The air drawn through the garment subsequently passes through a membrane filter disk, impinging the entrained particles upon the filter surface.

4.3 The filter disk is then examined microscopically for particles removed from the garment.

4.4 For particles larger than 5 μm, use optical analysis. For particles smaller than 5 μm, use automated image analysis.

4.5 Cleaning and counting techniques are in accordance with those established in Section 10.

³ Available from Institute of Environmental Sciences and Technology (IEST), Arlington Place One, 2340 S. Arlington Heights Rd., Suite 100, Arlington Heights, IL 60005-4516, <http://www.iest.org>.