Designation: F 318 – 78 (Reapproved 1996)

Standard Practice for Sampling Airborne Particulate Contamination in Clean Rooms for Handling Aerospace Fluids[1]

This standard is issued under the fixed designation F 318; 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.

1. Scope

1.1 This practice covers a procedure for sampling airborne particulate matter larger than 5 µm in size. The method is designed to be used in specific areas, commonly called "clean rooms" in the aerospace industry where aerospace fluids are handled.

NOTE 1—Practice F 50 is an alternative procedure.

1.2 *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:*

D 1193 Specification for Reagent Water[2]

D 1836 Specification for Commercial Hexanes[3]

D 2021 Specification for Neutral Detergent, 40 Percent Alkylbenzene Sulfonate Type[4]

F 50 Practice for Continuous Sizing and Counting of Airborne Particles in Dust-Controlled Areas and Clean Rooms Using Instruments Capable of Detecting Single Sub-Micrometre and Larger Particles[5]

F 312 Methods for Microscopical Sizing and Counting Particles from Aerospace Fluids on Membrane Filters[6]

3. Terminology

3.1 *Definitions:*

3.1.1 *clean room*—an area in which the temperature, humidity, and the airborne particulate contamination are controlled as required.

3.1.2 *uninterrupted airflow pattern*—the pattern of airflow that exists in a given area, when no personnel or equipment are present to interrupt the airflow.

4. Summary of Practice

4.1 This practice is based on the impingement of particles on a filter membrane using a vacuum technique. The number of air samples required in a given area will be based upon the geometric floor area, the disturbance to the "uninterrupted airflow pattern," and the room volume.

5. Apparatus

5.1 *Filter Holder*—Aerosol open-type for a filter membrane.

5.2 *Vacuum Pump or Aspirator*—Minimum capacity 25 in. (635 mm) Hg at 10 standard L/min.

5.3 *Flowmeter*—Orifice-type, rotameter-type or equivalent positive flow-indicating device, capable of being calibrated to a ±5 % flow accuracy under sample area ambient conditions. Calibration must be at a given vacuum using a given diameter and length of line from the vacuum source to the filter holder containing a filter membrane of the same pore size as used in the test sample.

5.4 *Membrane Filter*—A nominal overall diameter with grid lines, in dimensional accord with the filter holder, may be used. The pore size should be selected with regard to pertinent particle ranges and a specified flow rate across an effective sampling area of 1000 mm^2 ± 5 %. Color contrast is recommended to aid in identification of particulate matter.

5.5 *Forceps*—Stainless steel, nonmagnetic, unserrated tips.

5.6 *Microscope and Associated Apparatus*—For a description of a suitable apparatus, refer to Methods F 312.

5.7 *Wash Bottle*, fitted with an in-line filtration capability.

6. Reagents and Materials

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[7] Other grades may be

[1] This practice is under the jurisdiction of ASTM Committee E-21 on Space Simulation and Applications of Space Technology and is the direct responsibility of Subcommittee E21.05 on Contamination.

Current edition approved Aug. 25, 1978. Published October 1978. Originally published as D 2407 – 65 T. Last previous edition F 318 – 69 (1976). Designated F 318 in 1970.

[2] *Annual Book of ASTM Standards*, Vol 11.01.

[3] *Annual Book of ASTM Standards*, Vol 06.04.

[4] *Annual Book of ASTM Standards*, Vol 15.04.

[5] *Annual Book of ASTM Standards*, Vol 10.05.

[6] *Annual Book of ASTM Standards*, Vol 14.02.

[7] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.