



Designation: F 311 – 97

Standard Practice for Processing Aerospace Liquid Samples for Particulate Contamination Analysis Using Membrane Filters¹

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1. Scope

1.1 This practice covers the processing of liquids in preparation for particulate contamination analysis using membrane filters and is limited only by the liquid-to-membrane filter compatibility.

1.2 The practice covers the procedure for filtering a measured volume of liquid through a membrane filter. When this practice is used, the particulate matter will be randomly distributed on the filter surface for subsequent contamination analysis methods.

1.3 The practice describes procedures to allow handling particles in the size range between 2 and 50 μm with minimum losses during handling.

2. Referenced Documents

2.1 ASTM Standards:

- D 287 Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)²
- D 1078 Test Method for Distillation Range of Volatile Organic Liquids³
- D 1193 Specification for Reagent Water⁴
- D 1353 Test Method for Nonvolatile Matter in Volatile Solvents for Use in Paint, Varnish, Lacquer, and Related Products³
- D 1836 Specification for Commercial Hexanes³
- D 2021 Specification for Neutral Detergent, 40 Percent Alkylbenzene Sulfonate Type⁵
- F 302 Practice for Field Sampling of Aerospace Fluids in Containers⁶
- F 303 Practices for Sampling Aerospace Fluids from Components⁶
- F 312 Methods for Microscopical Sizing and Counting

Particles from Aerospace Fluids on Membrane Filters⁷

3. Terminology Definition

3.1 *filtered liquid dispenser*—as used in this practice, a dispenser capable of delivering rinse liquid through a filter with pore size no larger than half the size of the smallest particle being considered for measurement.

4. Significance and Use

4.1 This practice provides for the processing of liquid samples obtained in accordance with Practice F 302 and Practices F 303. It will provide the optimum sample processing for visual contamination methods such as Method F 312, and Test Method F 314.

5. Apparatus and Materials

5.1 *Filtration Funnel*—The funnel opening in contact with the membrane shall be approximately 35.0 mm in inside diameter. The effective area shall be calibrated. If the funnel is to be used for measuring the sample volume, the funnel shall be calibrated within $\pm 2\%$ of the required volume.

5.2 *Membrane Filter Support*—Either a fritted-glass, sintered-metal, or stainless steel screen may be used. The support shall be so designed as to enable attachment to a vacuum flask.

5.3 *Vacuum Flask*.

5.4 *Funnel-Holding Device*—A provision should be made for the dissipation of static electricity from the funnel.

5.5 A clean bench or hood, supplied with unidirectional flow filtered air, in which uncovered components may be placed.

5.6 *Vacuum Source*—Minimum vacuum gage reading of 61 kPa (or other metric units acceptable to ASTM).

5.7 *Forceps*, unserrated tips.

5.8 *Filtered Liquid Dispenser*.

5.9 *Membrane Filter*, pore size no greater than half the size of the smallest particle being considered for measurement. The filter shall have an imprinted grid on 3.10 ± 0.02 -mm centers. The color shall be chosen to provide maximum contrast with the particulate contamination to be observed.

NOTE 1—When testing military hydraulic fluids, a white cellulose

¹ This practice is under the jurisdiction of ASTM Committee E-29 on Particle Size Measurement and is the direct responsibility of Subcommittee E29.02 on Subsieve Testing.

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² *Annual Book of ASTM Standards*, Vol 05.01.

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

⁴ *Annual Book of ASTM Standards*, Vol 11.01.

⁵ *Annual Book of ASTM Standards*, Vol 15.04.

⁶ *Annual Book of ASTM Standards*, Vol 10.05.

⁷ *Annual Book of ASTM Standards*, Vol 14.02.