

**Designation: F 862 – 93 (Reapproved 1998)**

## **Standard Test Method for pH and Chloride-ion Concentration of Aerospace Hydraulic Fluids<sup>1</sup>**

This standard is issued under the fixed designation F 862; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### **1. Scope**

1.1 This test method covers the measurement of the pH and chloride ion of water extraction of aerospace hydraulic fluids.

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<sup>2</sup>

### **3. Summary of Method**

3.1 The aerospace hydraulic fluid sample is shaken with water, and the pH and the quantity of chloride ion are determined from the water layer.

3.1.1 The pH is measured using a glass electrode and pH meter.

3.1.2 The quantity of the chloride ion is determined using a silver/sulfide electrode and a specific ion meter.

### **4. Significance and Use**

4.1 On application of the hydraulic fluid within the mechanical fluidic system, the fluid may become contaminated with acid and chloride ion. Mechanical shearing of the hydraulic fluid in the presence of the minute quantity of water and residual amount of organic solvents, used in cleaning, may initiate formation of acid and chloride ion. Measurements are desired to control and maintain the cleanliness and noncorrosiveness of the fluidic system.

### **5. Apparatus**

5.1 *pH Meter*, with expanded millivolt scale and a sensitivity of 1 mV. The method can be adopted for use with a selective-ion meter.<sup>3</sup>

5.2 *Glass Electrode*—The pH response shall be  $\pm 0.05$  pH.

5.3 *Reference Electrode*—A calomel, silver/silver chloride, or other reference electrode of constant potential.

5.4 *Silver/Silver Sulfide Electrode*.<sup>4</sup>

5.5 *Double Junction Reference Electrode*, sleeve-type.<sup>5</sup>

5.6 *Separatory Funnel*, 250 mL.

5.7 *Buret*, 10-mL capacity.

5.8 *Titration Stand*, preferably built as an integral part of the meter housing and provided with support for the electrodes and electrical stimer, all connected to ground.

5.9 *Gran's Plot Paper*.<sup>6</sup>

### **6. Reagents**

6.1 *Water*, reagent grade, Type IV, in accordance with Specification D 1193.

6.2 *Reference Buffer Solutions*, Standards 185, 186, and 187—Materials supplied by the National Bureau of Standards with pH values.

6.3 *Silver Nitrate Solution, Standard* ( $2.82 \times 10^{-3}$  M)—Dissolve 4.7909 g of silver nitrate dissolved in 1 L of water and diluted 1:10.

### **7. Standardization of pH Meter**

7.1 Turn on the instrument, allow it to warm up thoroughly, and bring it to electrical balance in accordance with the manufacturer's instructions. Wash the glass and reference electrodes with three changes of water. Form a fresh liquid junction if a sleeve-type reference junction is used.

7.2 Fill the sample cup with the first reference buffer solution and immerse the electrodes. If the pH meter is of the zero-null type, set the dial of the meter to equal pH value of the reference buffer solution. Engage the operating button and rotate the standardization knob until the meter is brought to balance. If the pH meter is of the direct-reading type, engage the operating button, turn the range switch to the proper position, and rotate the asymmetry-potential knob until the reading corresponds to the pH of the reference buffer. Empty the sample cup and repeat until two successive readings are obtained without adjustment of the controls.

7.3 Wash the electrodes and the sample cup three times with water. Place the second reference buffer solution in the sample

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee F-7 on Aerospace and Aircraft and is the direct responsibility of Subcommittee F07.07 on Qualification Testing of Aircraft Cleaning Materials.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 11.01.

<sup>3</sup> The Orion Model 901 has been found satisfactory.

<sup>4</sup> The Orion Research Model has been found satisfactory.

<sup>5</sup> The Orion Model 90-01 has been found satisfactory.

<sup>6</sup> Gran's plot paper is available from Orion Research, Inc., 380 Putnam Ave., Cambridge, MA 02139.