Designation: F862 – 11 (Reapproved 2022)

Standard Practice for pH and Chloride-ion Concentration of Aerospace Hydraulic Fluids[1]

This standard is issued under the fixed designation F862; 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 the measurement of the pH and chloride ion of water extraction of aerospace hydraulic fluids.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D512 Test Methods for Chloride Ion In Water (Withdrawn 2021)[3]

D1193 Specification for Reagent Water

E70 Test Method for pH of Aqueous Solutions With the Glass Electrode

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 chloride selective ion electrode and a selective 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 *Combination pH Selective Ion Meter,*

5.2 *Glass Electrode*—The pH response shall be ±0.05 pH.

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

5.4 *Chloride Selective Ion Electrode.*

5.5 *Double Junction Reference Electrode,* sleeve-type

5.6 *Separatory Funnel,* 250 mL.

6. Reagents

6.1 *Water,* reagent grade, Type IV, in accordance with Specification D1193.

6.2 *Reference Buffer Solutions,* SRM/RM 185, 186, and 187—Materials supplied by the National Institute of Standards and Technology with pH values.

7. Standardization of pH Meter

7.1 Standardize the pH meter in accordance with Test Method E70.

PART A—pH MEASUREMENT

8. Procedure

8.1 Add a 50-mL sample of hydraulic fluid and 50 mL of reagent water to a 250-mL separatory funnel.

[1] This practice is under the jurisdiction of ASTM Committee F07 on Aerospace and Aircraft and is the direct responsibility of Subcommittee F07.07 on Qualification Testing of Aircraft Cleaning Materials.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

8.2 Mix thoroughly. Allow for the water and oil layers to separate completely.

8.3 Drain the water layer from the funnel into a 100-mL beaker.

8.4 Standardize the pH-meter assembly with two reference buffer solutions as described in section 7.1. Wash the electrodes with three changes of water. Equip the beaker with a small laboratory-type mechanical stirrer having a glass agitator or with a magnetic stirring unit having an inert, plastic-covered impeller. Insert the electrodes and determine the pH value; measure the water sample until two readings 30 s apart do not differ by more than 0.05-pH unit. Record the pH values.

9. Calculation

9.1 The pH of the sample is the average of the last two readings.

10. Report

10.1 Report the pH of the water extraction of hydraulic fluid to the nearest 0.1 unit.

11. Precision and Bias

11.1 See Test Method E70 for Precision and Bias information.

PART B—CHLORIDE-ION CONCENTRATION MEASUREMENT

12. Procedure

12.1 Add a 100-mL sample of hydraulic fluid and 100 mL of reagent water to a 250-mL separatory funnel.

12.2 Mix thoroughly. Allow for the water and oil layers to separate completely.

12.3 Drain the water layer from the funnel into a 250-mL beaker.

12.4 Prepare a calibration curve and determine the chloride ion concentration on the water layer in accordance with D512 Test Method C.

13. Calculation

13.1 Read the chloride ion concentration directly from the calibration curve prepared in section 12.4.

14. Report

14.1 Report the chloride-ion concentration to the nearest whole integer.

15. Precision and Bias

15.1 See D512 for Precision and Bias information.

16. Keywords

16.1 chloride ion; hydraulic fluid; pH