



Designation: D7959 – 16

Standard Test Method for Chloride Content Determination of Aviation Turbine Fuels using Chloride Test Strip¹

This standard is issued under the fixed designation D7959; 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 test method covers a rapid means of determining chloride content of aviation turbine fuel. This methodology is applicable for chloride concentrations between 0 mg/L to 0.3 mg/L. This methodology will not detect chlorine originating from chlorinated organic compounds (that is, covalent bond).

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

2. Referenced Documents

- 2.1 *ASTM Adjuncts:*
Distillate Fuel Bar Chart²

3. Summary of Test Method

3.1 A 3 L sample of aviation turbine fuel is extracted with pH 7 buffer solution by a magnetic stir plate and stir bar. The chloride in the aviation turbine fuel sample transfers to the buffer solution. A portion of the aqueous extract solution is then removed and analyzed with a chloride test strip. Silver ions within the test strip combine with chloride ions in the extract as it is drawn up by capillary action to form a white column of silver chloride. The chloride concentration of the extract, determined by the height of the column, is then related back to the chloride content of the aviation turbine fuel sample.

4. Significance and Use

4.1 Chloride present in aviation turbine fuel can originate from refinery salt drier carryover or possibly from seawater

contamination (for example, product transferred by barge). Elevated chloride levels have caused corrosive and abrasive wear of aircraft fuel control systems leading to engine failure.³

5. Interferences

5.1 Some pH 7 buffer solution can contain trace levels of chloride compounds and therefore produce a false positive reading on the chloride test strip. Prior to using a new batch of pH 7 buffer solution, a sample should be confirmed to produce no reading on the chloride test strip.

5.2 The test strip⁴ will react with halides other than chloride (for example, bromide, iodide). The concentration of chloride in salt used in refinery salt driers (predominantly NaCl and CaCl₂) and in seawater, however, is in great excess compared to that of other halides.

6. Apparatus

6.1 *Magnetic Stir Plate and Stir Bar*—The magnetic stir plate shall be capable of producing the stirring energy described in Section 11.11. A magnetic stir bar in the form of a cross or “starburst” approximately 32 mm by 32 mm has proven to be more stable than the traditional bar shape. The stir bar shall have a chemically inert coating such as polytetrafluoroethylene (PTFE).

6.2 *Distillate Fuel Bar Chart*.²

7. Reagents and Materials

7.1 *Isooctane* (2,2,4-trimethylpentane, CAS #540-84-1)—Minimum ACS reagent grade purity.

7.2 *pH 7 Buffer Solution*—Some pH 7 buffer solution can contain trace levels of chloride compounds and therefore produce a false positive reading on the chloride test strip. Prior

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.J0.05 on Fuel Cleanliness.

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² Available from ASTM International Headquarters. Order Adjunct No. ADJD417601. Original adjunct produced in 1991.

³ *Guidelines for Sodium Chloride Contamination Troubleshooting and Decontamination of Airframe and Engine Fuel Systems*, International Air Transport Association, 2nd Ed., February 1998, pg. 1.

⁴ The sole source of supply of the apparatus (Chloride QuanTab (trademarked) Test Strips, 30 – 600 mg/L) known to the committee at this time is Hach Company, P.O. Box 389, Loveland, Colorado 80539-0389, <http://www.hach.com>. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

*A Summary of Changes section appears at the end of this standard