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Standard Test Method for Thermal Oxidation Stability of Aviation Turbine Fuels (JFTOT Procedure)[1]

This standard is issued under the fixed designation D 3241; 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.

This test method has been approved by the sponsoring committee and accepted by the cooperating organizations in accordance with established procedures.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the procedure for rating the tendencies of gas turbine fuels to deposit decomposition products within the fuel system.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound values given in parentheses are for information only. The differential pressure values in mm Hg are defined only in terms of this test method.

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.* For specific hazard statements, see 6.1.1, 7.2, 7.2.1, 7.3, 11.1.1, and Annex A3.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1655 Specification for Aviation Turbine Fuels[2]

D 4306 Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination[3]

E 128 Test Method for Maximum Pore Diameter and Permeability of Rigid Porous Filters for Laboratory Use[4]

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods[4]

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method[4]

2.2 ASTM Adjuncts:

Color Standard for Tube Deposit Rating[5]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *deposits*—oxidative products laid down on the test area of the heater tube or caught in the test filter, or both.

3.1.1.1 *Discussion*—Fuel deposits will tend to predominate at the hottest portion of the heater tube which is between the 30 mm and 50 mm position.

3.1.2 *heater tube*—an aluminum coupon controlled at elevated temperature, over which the test fuel is pumped.

3.1.2.1 *Discussion*—The tube is resistively heated and controlled in temperature by a thermocouple positioned inside. The critical test area is the thinner portion, 60 mm in length, between the shoulders of the tube. Fuel inlet to the tube is at the 0 mm position, and fuel exit is at 60 mm.

3.2 *Abbreviations:*

3.2.1 Δ P—differential pressure.

4. Summary of Test Method

4.1 This test method for measuring the high temperature stability of gas turbine fuels uses the Jet Fuel Thermal Oxidation Tester (JFTOT) that subjects the test fuel to conditions that can be related to those occurring in gas turbine engine fuel systems. The fuel is pumped at a fixed volumetric flow rate through a heater after which it enters a precision stainless steel filter where fuel degradation products may become trapped.

4.1.1 The apparatus uses 450 mL of test fuel ideally during a 2.5 h test. The essential data derived are the amount of deposits on an aluminum heater tube, and the rate of plugging of a 17µ nominal porosity precision filter located just downstream of the heater tube.

5. Significance and Use

5.1 The test results are indicative of fuel performance during gas turbine operation and can be used to assess the level of deposits that form when liquid fuel contacts a heated surface

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricantsand is the direct responsibility of Subcommittee D02.Jon Aviation Fuels.

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

[3] *Annual Book of ASTM Standards*, Vol 05.02.

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

[5] Available from ASTM Headquarters. Order Adjunct No. ADJD3241.

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