



Designation: D 2274 – 01a

An American National Standard



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Standard Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)¹

This standard is issued under the fixed designation D 2274; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

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

1. Scope

1.1 This test method measures the inherent stability of middle distillate petroleum fuels under specified oxidizing conditions at 95°C.

NOTE 1—Fuels used in establishing the precision measures for this test method were described as gas oil, diesel fuel, No. 2 heating oil, and DFM, a Navy distillate fuel suitable for diesels, boilers, and gas turbines. While the test method may be used for fuels outside the range of these fuels, the precision measures may not apply.

1.2 This test method is not applicable to fuels containing residual oil or significant amounts of components derived from non-petroleum sources.

1.3 The values given in acceptable SI units are to be regarded as the standard. The values in parentheses are for information only.

1.4 *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 381 Test Method for Gum Content in Fuels by Jet Evaporation²

D 943 Test Method for Oxidation Characteristics of Inhibited Mineral Oils²

D 1193 Specification for Reagent Water³

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products⁴

D 4177 Practice for Automatic Sampling of Petroleum and

Petroleum Products⁴

D 4625 Test Method for Distillate Fuel Storage Stability at 43°C (110°F)⁴

2.2 *Military Specification:*⁵

MIL-F-16884 Fuel, Navy Distillate

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *adherent insolubles* (formerly adherent gum)—material which is produced in the course of stressing distillate fuel under the conditions of this test and which adheres to the glassware after fuel has been flushed from the system.

3.1.2 *filterable insolubles*—material, which is produced in the course of stressing distillate fuel under the conditions of this test, which is capable of being removed from the fuel by filtration. This includes both material suspended in the fuel and material easily removed from the oxidation cell and oxygen delivery tube with hydrocarbon solvent.

3.1.3 *inherent stability*—the resistance to change when exposed to air, but in the absence of other environmental factors such as water, or reactive metallic surfaces and dirt.

3.1.4 *total insolubles*—sum of the adherent and filterable insolubles.

3.1.5 *zero time*—the time the first of a batch of oxidation cells is placed in the heating bath.

3.1.5.1 *Discussion*—This is the time taken as the start of the 16 h of residence in the heating bath.

4. Summary of Test Method

4.1 A 350-mL volume of filtered middle distillate fuel is aged at 95°C (203°F) for 16 h while oxygen is bubbled through the sample at a rate of 3 L/h. After aging, the sample is cooled to approximately room temperature before filtering to obtain the filterable insolubles quantity. Adherent insolubles are then removed from the oxidation cell and associated glassware with trisolvent. The trisolvent is evaporated to obtain the quantity of

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

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 05.02.

⁵ Available from Standardization Documents Order Desk, Bldg. 4, 700 Robbins Ave., Philadelphia, PA 19111-5098. Attn: NPODS

