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An American National Standard

Standard Test Method for Compatibility of Fuel Oil Blends by Spot Test¹

This standard is issued under the fixed designation D 2781; 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 two spot test procedures for rating a residual fuel oil with respect to its compatibility with a specific distillate fuel oil. Procedure A indicates the degree of asphaltene deposition that may be expected in blending the components. This procedure is used when wax deposition is not considered a fuel application problem. Procedure B indicates the degree of wax and asphaltene deposition in the mixture at room temperature. This procedure is used when wax deposition is considered a fuel application problem.

1.2 This test method is applied to a 50-50 blend of the component fuel oils where the viscosity of the blend is between approximately 15 and 45 cSt (1 cSt = 1 mm²/s) at 38°C (100°F).

NOTE 1—This blend approaches the most severe conditions for measuring compatibility and its viscosity is in the proper range for satisfactory development of the spot under the conditions of the test.

1.3 This test method is valid for predicting the compatibility of the two components for blending into intermediate marine diesel fuels.

NOTE 2—Components that are compatible in the 50-50 test blend may not be compatible when marine diesel fuel is diluted with a higher percentage of distillate fuel oil.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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.*

1.5 The value stated in SI Units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

D 396 Specification for Fuel Oils²

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³

2.2 ASTM Adjunct:

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.05 on Properties of Fuels, Petroleum Coke, and Oil Shale.

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² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 05.03.

Reference Spot Sheet (D 2781)

3. Summary of Test Method

3.1 *Procedure A*—Equal volumes of the residual fuel oil and the distillate fuel oil are blended at 65°C (149°F). A drop of the blend is allowed to spread on chromatographic paper of a specified grade rated at 65°C (149°F). The spot thus formed is compared with a series of numbered reference spots. The compatibility of the components is rated on the basis of this comparison.

3.2 *Procedure B*—This procedure is the same as Procedure A except the spot is developed at a temperature of 20°C (68°F).

4. Significance and Use

4.1 Two fuels, each of which is stable alone, when mixed together may make a fuel that is not stable. An unstable blend will contain precipitated material that was soluble in one of the component fuels. When the blend is unstable the fuels are incompatible. The unstable fuel will cause deposits to be formed.

4.2 This test method is used as a pass/fail test method.

5. Descriptions of Terms Specific to This Standard

5.1 *compatibility*—the absence of suspended solids in fuel oil blends under the conditions of the test.

5.2 *compatibility rating*—the assigned numerical value of the reference spot which most closely resembles the spot produced under the conditions of the test.

5.3 *distillate fuel oil*—a virgin, a cracked, or a blend of virgin and cracked distillate, generally but not necessarily conforming to the requirements for Grade No. 2 Fuel Oil given in Table 1 of Specification D 396.

5.4 *intermediate marine diesel fuels*—blends of residual fuel oil and distillate fuel oil, usually containing 5 to 50 % distillate fuel oil.

5.5 *residual fuel oil*—Grade No. 6 Fuel Oil or any fuel oil containing residual components.

NOTE 3—When the residual fuel oil has a viscosity between 50 and 200 cSt at 50°C (122°F), the resulting blend may be too low in viscosity for satisfactory application of the test.

6. Interferences

6.1 Water in concentrations normally encountered does not interfere.

⁴ Reference spot sheets are available at a nominal cost from ASTM Headquarters, 1916 Race St., Philadelphia, PA 19103. Request Adjunct No. 12-427810-00.