Designation: D7060 – 12 (Reapproved 2014)

Standard Test Method for Determination of the Maximum Flocculation Ratio and Peptizing Power in Residual and Heavy Fuel Oils (Optical Detection Method)[1]

This standard is issued under the fixed designation D7060; 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 procedure for quantifying the maximum flocculation ratio of the asphaltenes in the oil and the peptizing power of the oil medium, by an automatic instrument using an optical device.

1.2 This test method is applicable to atmospheric or vacuum distillation residues, thermally cracked residue, intermediate and finished residual fuel oils, containing at least 1 mass % asphaltenes. This test method has not been developed for asphalts.

NOTE 1—An optical probe detects the formation of flocculated asphaltenes. The start of flocculation is interpreted when a significant and sustained increase in rate-of-change of signal, as measured by the optical probe, ensures flocculation is in progress. The start of flocculation can be detected unambiguously when the sample contains at least 1 % mass asphaltenes as measured by Test Method D6560.

NOTE 2—This test method is applicable to products typical of Specification D396—Grades 5L, 5H, and 6, and Specification D2880—Grades 3-GT and 4-GT.

1.3 This test method was evaluated in an interlaboratory study in the nominal range of 32 to 76 for the maximum flocculation ratio and in the nominal range of 36 to 95 for peptizing power.

NOTE 3—The nominal range is determined by (min. sample mean—Reproducibility) to (max. sample mean + Reproducibility).

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

1.5 *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:*[2]

D396 Specification for Fuel Oils

D2880 Specification for Gas Turbine Fuel Oils

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

D4870 Test Method for Determination of Total Sediment in Residual Fuels

D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants

D6560 Test Method for Determination of Asphaltenes (Heptane Insolubles) in Crude Petroleum and Petroleum Products

D6792 Practice for Quality System in Petroleum Products and Lubricants Testing Laboratories

3. Terminology

3.1 *Definitions:*

3.1.1 *asphaltenes, n*—(rarely used in the singular), *in petroleum technology*, represent an oil fraction that is soluble in a specified aromatic solvent but separates upon addition of an excess of a specified paraffinic solvent.

3.1.1.1 *Discussion*—In this test method, the aromatic solvent is 1-methylnapthalene, and the paraffinic solvent is n-hexadecane.

3.1.2 *compatibility, n— of crude oils or of heavy fuel oils*, the ability of two or more crude oils or fuel oils to blend together within certain concentration ranges without evidence of separation, such as the formation of multiple phases.

3.1.2.1 *Discussion*—Incompatible heavy fuel oils or crude oils, when mixed or blended, result in the flocculation or precipitation of asphaltenes. Some oils may be compatible

[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 D02.14 on Stability and Cleanliness of Liquid Fuels.

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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.

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