



Designation: D7827 – 19

Standard Test Method for Measuring n-Heptane Induced Phase Separation of Asphaltene from Heavy Fuel Oils as Separability Number by an Optical Device¹

This standard is issued under the fixed designation D7827; 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 the quantitative measurement, either in the laboratory or in the field, of how easily asphaltene-containing heavy fuel oils diluted in toluene phase separate upon addition of heptane. The result is a separability number (%). See also Test Method [D7061](#).

1.2 The test method is limited to asphaltene-containing heavy fuel oils. ASTM specification fuels that generally fall within the scope of this test method are Specification [D396](#), Grade Nos. 4, 5, and 6, Specification [D975](#), Grade No. 4-D, and Specification [D2880](#), Grade Nos. 3-GT and 4-GT. Refinery fractions from which such blended fuels are made also fall within the scope of this test method.

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

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

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

[D396](#) Specification for Fuel Oils

[D975](#) Specification for Diesel Fuel

[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

[D7061](#) Test Method for Measuring n-Heptane Induced Phase Separation of Asphaltene-Containing Heavy Fuel Oils as Separability Number by an Optical Scanning Device

3. Terminology

3.1 Definitions:

3.1.1 *asphaltenes* (rarely used in the singular), *n*—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 toluene and the paraffinic solvent is heptane.

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 within certain concentration ranges in specific mixtures, but incompatible outside those ranges.

3.1.3 *flocculation*, *n*—of *asphaltenes from crude oils* or *heavy fuel oils*, the aggregation of colloiddally dispersed asphaltenes into visibly larger masses that may or may not settle.

3.1.4 *peptization*, *n*—of *asphaltenes in crude oils* or *heavy fuel oils*, the dispersion of asphaltenes to produce a colloiddal dispersion.

3.1.5 *stability reserve*, *n*—of *crude oils*, *heavy fuel oils*, and *residual streams containing asphaltenes*, the property of an oil to maintain asphaltenes in a peptized (colloiddally dispersed) state and prevent flocculation of the asphaltenes.

3.1.5.1 *Discussion*—An oil with a low stability reserve is likely to undergo flocculation of asphaltenes when stressed (for example, extended heated storage) or blended with a range of

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, Cleanliness and Compatibility 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.

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