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Standard Test Method for Determination of Total Sediment in Residual Fuels^{1,2}

This standard is issued under the fixed designation D4870; 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 determination of total sediment up to 0.40 % m/m for distillate fuel oils containing residual components and to 0.50 % m/m in residual fuel oils having a maximum viscosity of 55 cSt (mm²/s) at 100 °C. Some fuels can exceed the maximum filtration time specified in this test method due to factors other than the presence of significant quantities of insoluble organic or inorganic material. This test method can be used for the assessment of total sediment after regimes of fuel pretreatment designed to accelerate the aging process.

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

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific warning statements, see 7.2, 7.3, Annex A1, and X1.6.1.

1.4 *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.*

¹ This test method is under the jurisdiction of ASTM International Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of ASTM Subcommittee D02.14 on Stability, Cleanliness and Compatibility of Liquid Fuels. The technically equivalent standard as referenced is under the jurisdiction of the Energy Institute Subcommittee SC-B-5.

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² This test method has been developed through the cooperative effort between ASTM and the Energy Institute, London. ASTM and IP standards were approved by ASTM and EI technical committees as being technically equivalent but that does not imply both standards are identical.

2. Referenced Documents

2.1 ASTM Standards:³

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

E1 Specification for ASTM Liquid-in-Glass Thermometers

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology D4175.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *total sediment, n*—the sum of the insoluble organic and inorganic material that is separated from the bulk of the residual fuel oil by filtration through a Whatman GF/A filter medium, and that is also insoluble in a predominantly paraffinic solvent.

4. Summary of Test Method

4.1 A weighed quantity (10 g) of the oil sample is filtered through the prescribed apparatus at 100 °C. After solvent washing and drying the total sediment on the filter medium is weighed. The test is to be carried out in duplicate.

5. Significance and Use

5.1 Appreciable amounts of sediment in a residual fuel oil can cause fouling of facilities for handling, and give problems in burner mechanisms. Sediment can accumulate in storage tanks, on filter screens, or on burner parts, resulting in obstruction of the flow of oil from the tank to the burner.

³ 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

6. Apparatus

6.1 *Filtration Apparatus*, constructed of brass, with copper steam coils attached, suitably supported above a vacuum flask appropriately protected against the effects of implosion. See Figs. 1 and 2.

6.2 *Temperature Measuring Device*, capable of measuring the temperature in the range from 95 °C to 105 °C with an accuracy of 0.5 °C.

6.3 *Oven*, electric, capable of maintaining a temperature of 110 °C ± 1 °C. The oven should be capable of safely evaporating the solvent without risk of fire.

6.4 *Stirring Rod*, glass or polytetrafluoroethylene (PTFE) approximately 150 mm in length and 3 mm in diameter.

6.5 *Beaker*, glass, 30 mL capacity, either squat form with lip or conical.

6.6 *Small Dishes*, such as watch glasses or Petri dishes.

6.7 *Hotplate*, electric.

6.8 *Steam Generator*, to provide steam at 100 °C ± 1 °C.

6.9 *Vacuum Source*, capable of providing the specified vacuum.

6.10 *Vacuum Gauge*, capable of measuring the specified vacuum.

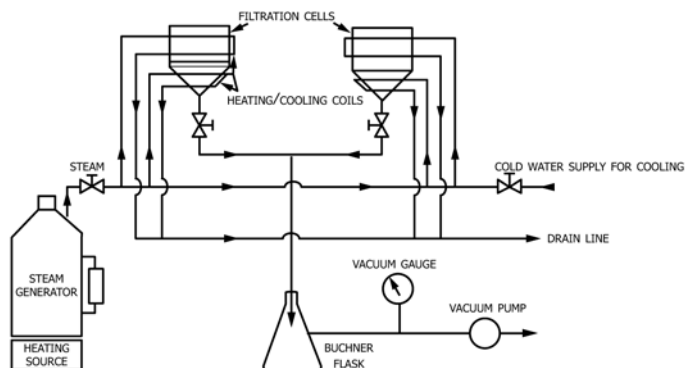


FIG. 2 Arrangement of Filtration Apparatus

6.11 *Filter Medium*, Whatman glass fiber filter medium, Grade GF/A, 47 mm diameter.

6.12 *High Speed Mixer*, any convenient type, minimum speed 400 r/min.

6.13 *Desiccator*.

6.14 *Cooling Vessel*, a desiccator or other type of tightly covered vessel for cooling the filter media before weighing. The use of a drying agent is not recommended.

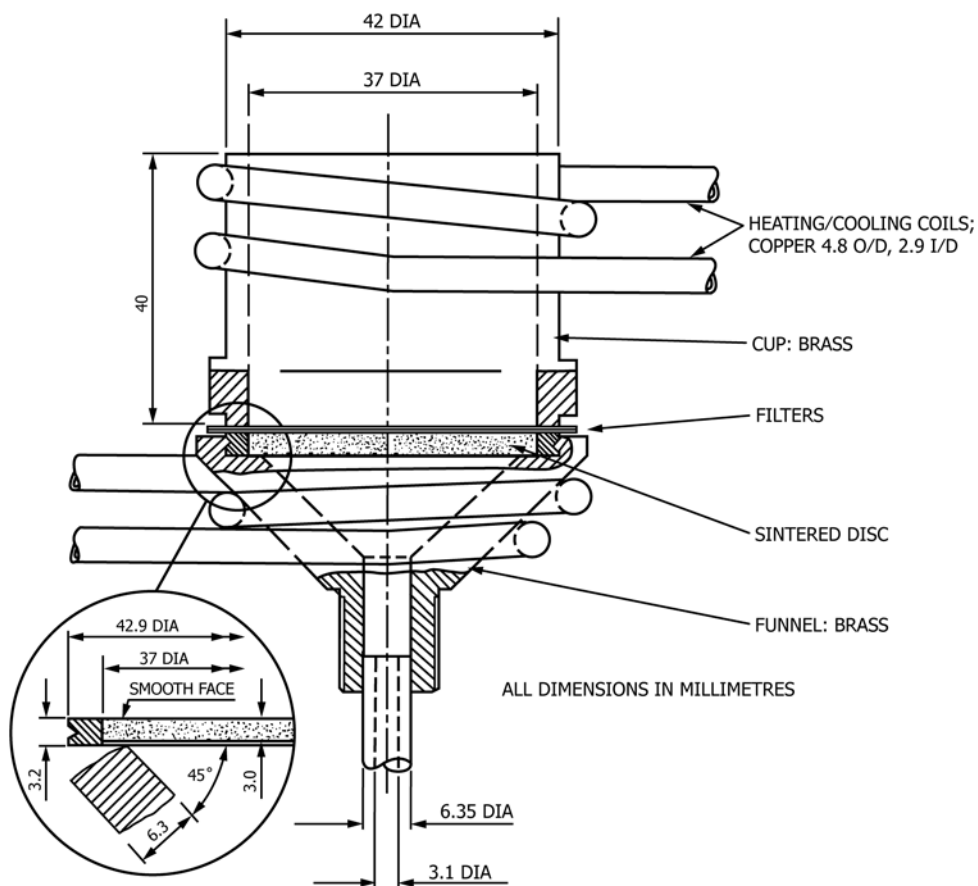


FIG. 1 Detail of Filtration Cell