



Designation: D7579 – 09

Standard Test Method for Pyrolysis Solids Content in Pyrolysis Liquids by Filtration of Solids in Methanol¹

This standard is issued under the fixed designation D7579; 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 describes a filtration procedure for determining the pyrolysis solids content of pyrolysis liquid. It is intended for the analysis of pyrolysis liquid with all ranges of pyrolysis solids concentrations.

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 and health practices and determine the applicability of regulatory limitations prior to use.* Material Safety Data Sheets are available for reagents and materials. Review them for hazards prior to usage. For specific warning statements, see 7.2, 7.3, and 7.4.

2. Referenced Documents

2.1 ASTM Standards:²

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

2.2 Other Standards:³

ESPOO 2001 A guide to physical property characterisation of biomass-derived fast pyrolysis liquids

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.06 on Analysis of Lubricants.

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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.

³ Available from VTT Energy, New Energy Technologies, Biologinkuja 3–5, P.O. Box 1601, FIN-02044 VTT, Finland. <http://www.vtt.fi/inf/pdf/publications/2001/P450.pdf>

3. Terminology

3.1 Definitions:

3.1.1 See also Terminology D4175.

3.1.2 *char, n*—fine carbonaceous powder that is separated from the vapors of biomass during pyrolysis.

3.1.2.1 *Discussion*—Pyrolysis liquid biofuel contains uniformly suspended char at varying concentrations.

3.1.3 *pyrolysis, n*—chemical decomposition of organic materials by heating in the absence of oxygen.

3.1.4 *pyrolysis liquid biofuel, n*—liquid product from the pyrolysis of biomass.

3.1.4.1 *Discussion*—Pyrolysis liquid biofuel is comprised of a complex mixture of the decomposition products of lignocellulosic biomass including highly oxygenated organic compounds. It is produced from the pyrolysis of biomass, followed by the rapid condensation of its vapors.

3.1.5 *pyrolysis solids, n*—solid particles contained within the pyrolysis liquid biofuel.

3.1.5.1 *Discussion*—Pyrolysis solids consists of ash and char.

4. Summary of Test Method

4.1 A pyrolysis liquid sample is dissolved in a methanol and dichloromethane solution (1:1), which is then filtered through a vacuum filter system. After filtering, the filtrand is washed with the solvent until the filtrate is clear. The filter is removed, dried and weighed. The pyrolysis solids content is calculated based on the original pyrolysis liquid sample.

5. Significance and Use

5.1 Pyrolysis liquid can be produced to various char concentrations. Increasing pyrolysis solids content can affect the pyrolysis liquid biofuel handling, atomization and storage stability in a negative manner.

6. Apparatus (see Fig. 1)

6.1 *Smooth-tip Forceps.*

6.2 *Beaker, 400 mL.*

6.3 *Glass Stirring Rod.*

6.4 *Oven, explosion-proof, capable of maintaining a temperature of $105 \pm 3^\circ\text{C}$.*



FIG. 1 Paper Filtration Apparatus