



Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method¹

This standard is issued under the fixed designation D2007; 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 classifying oil samples of initial boiling point of at least 260 °C (500 °F) into the hydrocarbon types of polar compounds, aromatics and saturates, and recovery of representative fractions of these types. This classification is used for specification purposes in rubber extender and processing oils.

NOTE 1—See Test Method [D2226](#).

1.2 This test method is not directly applicable to oils of greater than 0.1 % by mass pentane insolubles. Such oils can be analyzed after removal of these materials, but precision is degraded (see [Appendix X1](#)).

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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 and health practices and determine the applicability of regulatory limitations prior to use.* Specific warning statements are given in [6.1](#), [Section 7](#), [A1.4.1](#), and [A1.5.5](#).

2. Referenced Documents

2.1 ASTM Standards:²

[D2226](#) Classification for Various Types of Petroleum Oils for Rubber Compounding Use

[D5309](#) Specification for Cyclohexane 999

[E691](#) Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

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 [D02.04.0C](#) on Liquid Chromatography.

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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. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 The following terms refer to the hydrocarbon types and structural groups as measured by this test method:

3.1.2 *aromatics*—material that, on percolation, passes through a column of adsorbent clay in a *n*-pentane eluent but adsorbs on silica gel under the conditions specified.

3.1.3 *asphaltenes*, or *n*-pentane insolubles—insoluble matter that precipitates from a solution of oil in *n*-pentane under the specified conditions.

3.1.4 *polar aromatics*—synonym for polar compounds.

3.1.5 *polar compounds*—material retained on adsorbent clay after percolation of the sample in *n*-pentane eluent under the conditions specified.

3.1.6 *saturates*—material that, on percolation in a *n*-pentane eluent, is not adsorbed on either the clay or silica gel under the conditions specified.

4. Summary of Test Method

4.1 The sample is diluted with solvent and charged to a glass percolation column containing clay in the upper section and silica gel plus clay in the lower section. *n*-pentane is then charged to the double column until a definite quantity of effluent has been collected. The upper (clay) section is removed from the lower section and washed further with *n*-pentane. A toluene-acetone mixture 50 to 50 by volume is then charged to the clay section for desorption and a specified volume of effluent collected. The lower (gel) column may be desorbed by recirculation of toluene.

4.2 The solvents are completely removed from the recovered *n*-pentane and the toluene-acetone fractions and the residues are weighed and calculated as saturate and polar compounds contents. Aromatics may be calculated by difference, or measured following evaporation of the toluene used for desorption of the gel column.

4.3 When the sample contains more than 0.1 % by mass of *n*-pentane insolubles, this test method cannot be used directly. The insoluble matter must be removed from the sample prior to charging to the column. A method for this removal is given as an appendix.

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