



Designation: D4124 – 09 (Reapproved 2018)

Standard Test Method for Separation of Asphalt into Four Fractions¹

This standard is issued under the fixed designation D4124; 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 separation of four defined fractions from petroleum asphalts. The four fractions are defined as saturates, naphthene aromatics, polar aromatics, and iso-octane insoluble asphaltenes. This method can also be used to isolate saturates, naphthene aromatics, and polar aromatics from distillate products such as vacuum gas oils, lubricating oils, and cycle stocks. These distillate products usually do not contain asphaltenes.

1.2 The values stated in SI units are to be regarded as standard.

1.3 Since a precision estimate for this standard has not been developed, this test method is to be used for research or informational purposes only. Therefore, this standard should not be used for acceptance or rejection of a material for purchasing purposes.

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.* Specific precautionary statements are given in Section 8.

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

D140 Practice for Sampling Bituminous Materials

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.47 in Miscellaneous Asphalt Tests.

Current edition approved Jan. 1, 2018. Published January 2018. Originally approved in 1982. Last previous edition approved in 2009 as D4124 – 09. DOI: 10.1520/D4124-09R18.

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.

2.2 Other Documents:

Manual on Hydrocarbon Analysis³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *asphaltenes* or *alkane insolubles*—insoluble matter that can be separated from asphalt following digestion of the asphalt in *n*-alkane (and in some cases, branched alkanes) under the specified conditions in this test method.

3.1.2 *naphthene*—any of a group of hydrocarbon ring compounds of the general formula, C_nH_{2n} , derivatives of cyclopentane and cyclohexane, found in certain petroleum stocks.

3.1.3 *naphthene aromatics*—material that is adsorbed on calcined CG-20 alumina in the presence of *n*-heptane, and desorbed by toluene, after removal of saturates under the conditions specified.

3.1.4 *petrolenes* (also referred to as *maltenes*)—(1) any of the constituents of a bitumen, as asphalt, that are soluble in *n*-alkanes (and in some cases, branched alkanes), which generally range in carbon number between *n*-C₅ to *n*-C₁₀ alkanes, *n*-heptane being the most common solvent used; (2) the low molecular weight alkane-soluble matter recovered following separation of asphaltenes from the digested mixture under the specified conditions described in this and similar test methods.

3.1.5 *polar aromatics (resins)*—material desorbed from calcined CG-20 alumina absorbent, after the saturates fraction and naphthenic aromatics fraction have been removed, using toluene:methanol (50:50, vol:vol) and trichloroethylene eluate under the conditions specified.

3.1.6 *saturates*—material that, on percolation in an alkane eluate, is not absorbed on calcined CG-20 alumina absorbent under the conditions specified.

4. Summary of Test Method

4.1 The sample containing the four defined fractions is first separated into alkane-insoluble asphaltenes and alkane-soluble petrolenes. Petrolenes are then adsorbed onto calcined CG-20 alumina and further fractionated into saturate, naphthene

³ Available from ASTM as MNL3-6TH-EB.