



Designation: D5739 – 06 (Reapproved 2020)

Standard Practice for Oil Spill Source Identification by Gas Chromatography and Positive Ion Electron Impact Low Resolution Mass Spectrometry¹

This standard is issued under the fixed designation D5739; 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 practice covers the use of gas chromatography and mass spectrometry to analyze and compare petroleum oil spills and suspected sources.

1.2 The probable source for a spill can be ascertained by the examination of certain unique compound classes that also demonstrate the most weathering stability. To a greater or lesser degree, certain chemical classes can be anticipated to chemically alter in proportion to the weathering exposure time and severity, and subsequent analytical changes can be predicted. This practice recommends various classes to be analyzed and also provides a guide to expected weathering-induced analytical changes.

1.3 This practice is applicable for moderately to severely degraded petroleum oils in the distillate range from diesel through Bunker C; it is also applicable for all crude oils with comparable distillation ranges. This practice may have limited applicability for some kerosenes, but it is not useful for gasolines.

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

1.5 *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.*

1.6 *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

- D1129 Terminology Relating to Water
- D3325 Practice for Preservation of Waterborne Oil Samples
- D3326 Practice for Preparation of Samples for Identification of Waterborne Oils
- D3328 Test Methods for Comparison of Waterborne Petroleum Oils by Gas Chromatography
- D3414 Test Method for Comparison of Waterborne Petroleum Oils by Infrared Spectroscopy (Withdrawn 2018)³
- D3415 Practice for Identification of Waterborne Oils
- D3650 Test Method for Comparison of Waterborne Petroleum Oils By Fluorescence Analysis (Withdrawn 2018)³
- D5037 Test Method for Comparison of Waterborne Petroleum Oils by High Performance Liquid Chromatography (Withdrawn 2002)³
- E355 Practice for Gas Chromatography Terms and Relationships

3. Summary of Practice

3.1 The recommended chromatography column is a capillary directly interfaced to the mass spectrometer (either quadrupole or magnetic).

3.2 The low-resolution mass spectrometer is operated in the positive ion electron impact mode, 70 eV nominal.

3.3 Mass spectral data are acquired, stored, and processed with the aid of commercially available computer-based data systems.

4. Significance and Use

4.1 This practice is useful for assessing the source for an oil spill. Other less complex analytical procedures (Test Methods D3328, D3414, D3650, and D5037) may provide all of the necessary information for ascertaining an oil spill source;

¹ This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.06 on Methods for Analysis for Organic Substances in Water.

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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 The last approved version of this historical standard is referenced on www.astm.org.