



Designation: D3921 – 96(Reapproved 2011)

Standard Test Method for Oil and Grease and Petroleum Hydrocarbons in Water¹

This standard is issued under the fixed designation D3921; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of fluorocarbon-extractable substances as an estimation of the combined oil and grease and the petroleum hydrocarbon contents of a sample of water or waste water in the range from 0.5 to 100 mg/L. It is the user's responsibility to assume the validity of the standard for untested types of water.

1.2 This test method defines oil and grease in water and waste water as that matter which is extractable in the test method and measured by infrared absorption. Similarly, this test method defines petroleum hydrocarbons in water and waste water as that oil and grease which is not adsorbed by silica gel in the test method and that is measured by infrared absorption.

1.3 Low-boiling organic materials are lost by evaporation during the manipulative transfers. However, these evaporative losses are generally much lower than those experienced with gravimetric procedures that require solvent evaporation before the residue is weighed.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

¹ This test method 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.

D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water
D3325 Practice for Preservation of Waterborne Oil Samples
D3370 Practices for Sampling Water from Closed Conduits
D3856 Guide for Management Systems in Laboratories Engaged in Analysis of Water
D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
E168 Practices for General Techniques of Infrared Quantitative Analysis

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D1129 and Practices E168.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *oil and grease*—the organic matter extracted from water or waste water and measured by this test method.

3.2.2 *petroleum hydrocarbons*—the oil and grease remaining in solution after contact with silica gel and measured by this test method.

4. Summary of Test Method

4.1 The acidified sample of water or waste water is extracted serially with three 30-mL volumes of 1, 1, 2-trichloro-1, 2, 2-trifluoroethane (referred to in this test method as solvent).³ The extract is diluted to 100 mL and a portion is examined by infrared spectroscopy⁴ to measure the amount of oil and grease removed from the original sample. A major portion of the remaining extract is contacted with silica gel to remove polar substances, thereby providing a solution of petroleum hydrocarbons. This treated extract is then similarly examined by infrared spectroscopy.

5. Significance and Use

5.1 The presence of oil and grease in domestic and industrial waste water is of concern to the public because of its

³ Gruenfeld, M., "Extraction of Dispersed Oils from Water for Quantitative Analysis by Infrared Spectrophotometry," *Environmental Science and Technology*, Vol 7, 1973, pp. 636–639.

⁴ Consult the manufacturer's operation manual for the specific instructions related to the infrared spectrometer or analyzer to be used.