



Designation: D500 – 95 (Reapproved 2023)

Standard Test Methods of Chemical Analysis of Sulfonated and Sulfated Oils¹

This standard is issued under the fixed designation D500; 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 These test methods cover the chemical analysis of sulfonated and sulfated oils. The analytical procedures appear in the following order:

	Section
Moisture:	
Test Method A. Water by Distillation with Volatile Solvent	4 – 9
Test Method B. Moisture and Volatile Matter by Hot-Plate Method	10 – 14
Organically Combined Sulfuric Anhydride:	
Test Method A. Titration Test	15 – 19
Test Method B. Extraction-Titration Test	20 – 24
Test Method C. Ash-Gravimetric Test (in the Presence of True Sulfonates)	25 – 28
Total Desulfated Fatty Matter	29 – 32
Total Active Ingredients	33 – 36
Unsaponifiable Nonvolatile Matter	37 – 41
Inorganic Salts	42 – 46
Total Alkalinity	47 – 49
Total Ammonia	50 – 52
Acidity as Free Fatty Acids or Acid Number:	
Test Method A. In the Absence of Ammonium or Triethanolamine	53 – 56
Soaps	
Test Method B. In the Presence of Dark Colored Oils but in the Absence of Ammonium or Triethanolamine Soaps (Brine Test)	57 – 60
Test Method C. In the Presence of Ammonium or Triethanolamine	61 – 63
Soaps	
Water-Immiscible Organic Solvents Volatile with Steam	64 – 70

1.2 The values stated in inch-pound units are to be regarded as the standard. The metric equivalents of inch-pound units may be approximate.

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, health, and environmental 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.

1.4 *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 Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards*:²
D1193 Specification for Reagent Water

3. Purity of Reagents

3.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.³ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

3.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Specification **D1193**.

MOISTURE

Method A. Water by Distillation with Volatile Solvent

4. Scope

4.1 This test method covers the determination of water existing in a sample of sulfonated or sulfated oil, or both, by distilling the sample with a volatile solvent. The method is applicable only to sulfonated and sulfated oils that do not contain the following: mineral acids, free sulfonic acids, or free sulfuric acid esters; or alkali hydroxides, carbonates or acetates; or alcohol, glycerin, diethylene glycol, acetone, or other water-miscible volatile compounds.

¹ These test methods are under the jurisdiction of ASTM Committee **D12** on Soaps and Other Detergents and is the direct responsibility of Subcommittee **D12.12** on Analysis and Specifications of Soaps, Synthetics, Detergents and their Components.

Current edition approved July 1, 2023. Published July 2023. Originally approved in 1937. Last previous edition approved in 2016 as D500 – 95 (2016). DOI: 10.1520/D0500-95R23.

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 *ACS Reagent Chemicals, Specifications and Procedures for Reagents and Standard-Grade Reference Materials*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.