



Designation: D 4006 – 81 (Reapproved 2000)^{€1}

An American National Standard



Designation: Manual of Petroleum Measurement Standards, Chapter 10.2 (MPMS)



Designation: IP 358/97

Standard Test Method for Water in Crude Oil by Distillation¹

This standard is issued under the fixed designation D 4006; 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 (€) indicates an editorial change since the last revision or reapproval.

This test method has been approved by the sponsoring committees and accepted by the Cooperating Societies in accordance with established procedures. This method was issued as a joint ASTM-API-IP standard in 1981.

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

€¹ NOTE—Editorial corrections made throughout in April 2000.

1. Scope

1.1 This test method covers the determination of water in crude oil by distillation.

1.2 *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.* For specific precautionary statements, see 6.1 and A1.1.

2. Referenced Documents

2.1 ASTM Standards:

- D 95 Test Method for Water in Petroleum Products and Bituminous Materials by Distillation²
- D 96 Test Methods for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure)²
- D 473 Test Method for Sediment in Crude Oils and Fuel Oils by the Extraction Method²
- D 665 Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water²
- D 1796 Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)²
- D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³
- D 4177 Practice for Automatic Sampling of Petroleum and Petroleum Products³
- E 123 Specification for Apparatus for Determination of

Water by Distillation⁴

2.2 API Standards:

MPMS 8 “Sampling Petroleum and Petroleum Products”⁵

3. Summary of Test Method

3.1 The sample is heated under reflux conditions with a water immiscible solvent which co-distills with the water in the sample. Condensed solvent and water are continuously separated in a trap—the water settles in the graduated section of the trap, and the solvent returns to the distillation flask.

4. Significance and Use

4.1 A knowledge of the water content of crude oil is important in the refining, purchase, sale, or transfer of crude oils.

5. Apparatus

5.1 The preferred apparatus, shown in Fig. 1, consists of a glass distillation flask, a condenser, a graduated glass trap,⁶ and a heater. Other types of distillation apparatus are specified in Specification E 123. Any of these apparatus will be acceptable for this method provided it can be demonstrated that they operate within the precision established with the preferred apparatus.

5.1.1 *Distillation Flask*—A 1000-mL round-bottom, glass, distillation flask fitted with a 24/40 female taper joint shall be used. This flask receives a 5-mL Specification E 123 Type E calibrated, graduated water trap with 0.05-mL graduations. The

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D 02.02 on Static Petroleum Measurement.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 05.02.

⁴ *Annual Book of ASTM Standards*, Vol 14.04.

⁵ Available from the American Petroleum Institute, 1220 L St., N.W., Washington, DC 20005.

⁶ Available on special order from Scientific Glass Apparatus Co., Bloomfield, N.J. 07003.