



Standard Test Method for Water Using Volumetric Karl Fischer Titration¹

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

1. Scope

1.1 This test method is intended as a general guide for the application of the volumetric Karl Fischer (KF) titration for determining free water and water of hydration in most solid or liquid organic and inorganic compounds. This test method is designed for use with automatic titration systems capable of determining the KF titration end point amperometrically; however, a manual titration method for determining the end point visually is included as Appendix X1. Samples that are gaseous at room temperature are not covered (see Appendix X4). This test method covers the use of both pyridine and pyridine-free KF reagents for determining water by the volumetric titration. Determination of water using KF coulometric titration is not discussed. By proper choice of the sample size, KF reagent concentration and apparatus, this test method is suitable for measurement of water over a wide concentration range, that is, parts per million to pure water.

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.* Specific warnings are given in 3.1 and 7.3.3.

1.3 Review the current Material Safety Data Sheets (MSDS) for detailed information concerning toxicity, first aid procedures, and safety precautions for chemicals used in this test procedure.

2. Referenced Documents

2.1 A list of existing ASTM Karl Fischer methods, their applications to various products, and the sponsoring committees is given in Appendix X3.

2.2 ASTM Standards:

D 789 Test Methods for Determination of Relative Viscosity, and Moisture Content of Polyamide (PA)²

D 803 Test Methods for Testing Tall Oil³
D 890 Test Method for Water in Liquid Naval Stores³
D 1123 Test Methods for Water in Engine Coolant Concentrate by the Karl Fischer Reagent Method⁴
D 1152 Specification for Methanol (Methyl Alcohol)⁵
D 1193 Specification for Reagent Water⁶
D 1348 Test Methods for Moisture in Cellulose³
D 1364 Test Method for Water in Volatile Solvents (Fischer Reagent Titration Method)⁵
D 1533 Test Method for Water in Insulating Liquids by Coulometric Karl Fischer Titration⁷
D 1568 Test Methods for Sampling and Chemical Analysis of Alkylbenzene Sulfonates⁸
D 1631 Test Method for Water in Phenol and Related Materials by the Iodine Reagent Method⁵
D 2072 Test Method for Water in Fatty Nitrogen Compounds³
D 2575 Method for Testing Polymerized Fatty Acids³
D 3277 Test Methods for Moisture Content of Oil-Impregnated Cellulosic Insulation⁷
D 3401 Test Methods for Water in Halogenated Organic Solvents and Their Admixtures⁹
D 4017 Test Method for Water in Paints and Paint Materials by Karl Fischer Method¹⁰
D 4377 Test Method for Water in Crude Oils by Potentiometric Karl Fischer Titration¹¹
D 4672 Test Methods for Polyurethane Raw Materials—Determination of Water Content of Polyols¹²
D 4928 Test Methods for Water in Crude Oils by Coulometric Karl Fischer Titration¹³

³ Annual Book of ASTM Standards, Vol 06.03.

⁴ Annual Book of ASTM Standards, Vol 15.05.

⁵ Annual Book of ASTM Standards, Vol 06.04.

⁶ Annual Book of ASTM Standards, Vol 11.01.

⁷ Annual Book of ASTM Standards, Vol 10.03.

⁸ Annual Book of ASTM Standards, Vol 15.04.

⁹ Annual Book of ASTM Standards, Vol 15.05.

¹⁰ Annual Book of ASTM Standards, Vol 06.01.

¹¹ Annual Book of ASTM Standards, Vol 05.02.

¹² Annual Book of ASTM Standards, Vol 08.03.

¹³ Annual Book of ASTM Standards, Vol 05.03.

¹ This test method is under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and is the direct responsibility of Subcommittee E15.01 on General Standards.

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² Annual Book of ASTM Standards, Vol 08.01.