



Standard Test Method for Acidity in Ethanol and Ethanol Blends by Titration¹

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1. Scope*

1.1 This test method covers the determination of acidity as acetic acid (see Specification [D4806](#)) in commonly available grades of denatured ethanol, and ethanol blends with gasoline ranging from E95 to E30. This test method is used for determining low levels of acidity, below 200 mg/kg (ppm mass), with the exclusion of carbon dioxide.

1.1.1 *Procedure A*—Developed specifically for measurement of acidity by potentiometric titration. This is the referee method.

1.1.2 *Procedure B*—Developed specifically for measurement of acidity by color end point titration.

1.2 The ethanol and ethanol blends may be analyzed directly by this test method without any sample preparation.

1.3 Review the current and appropriate Material Safety Data Sheets (MSDS) for detailed information concerning toxicity, first aid procedures, and safety precautions and proper personal protective equipments.

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. Some specific hazards statements are given in Section 7 on Hazards.*

2. Referenced Documents

2.1 ASTM Standards:²

[D770](#) Specification for Isopropyl Alcohol

[D1193](#) Specification for Reagent Water

¹ This test method is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.06](#) on Analysis of Liquid Fuels and Lubricants.

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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.

[D4175](#) Terminology Relating to Petroleum, Petroleum Products, and Lubricants

[D4806](#) Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel

[D6708](#) Practice for Statistical Assessment and Improvement of Expected Agreement Between Two Test Methods that Purport to Measure the Same Property of a Material

[E200](#) Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis

3. Terminology

3.1 Definitions:

3.1.1 *acidity, n*—the quality, state, or degree of being acid.

D4175

3.1.1.1 *Discussion*—The amount of acid titrated with a base (NaOH or KOH) in a sample of ethanol or ethanol blend with gasoline, calculated as acetic acid in mg/kg (ppm mass).

3.2 Abbreviations:

3.2.1 $KHC_8H_4O_4$ —KHP—Potassium Acid Phthalate

4. Summary of Test Method

4.1 Samples are purged with nitrogen prior to and during titration for the elimination of carbon dioxide and then a known amount of ethanol or ethanol blend sample is analyzed potentiometrically either using a monotonic or dynamic end point titrant addition, as specified in Procedure A, or by color end point titration, as specified in Procedure B, using a base (NaOH) solution. Acid content is calculated as milligrams of acetic acid per kilogram of sample.

5. Significance and Use

5.1 This test method measures acidity in ethanol or ethanol blends quantitatively. Denatured fuel ethanol may contain additives such as corrosion inhibitors and detergents as well as contaminants from manufacturing that can affect the acidity of finished ethanol fuel. Very dilute aqueous solutions of low molecular mass organic acids, such as acetic acid, are highly corrosive to many metals. It is important to keep such acids at a very low level.

5.2 Acceptable levels of acidity in ethanol or ethanol blends can vary with different specifications but in general it is below 200 mg/kg (ppm). Knowledge of the acidity can be required to establish whether the product quality meets specification.

*A Summary of Changes section appears at the end of this standard