



Designation: D8275 – 22

Standard Specification for Gasoline-like Test Fuel for Compression-Ignition Engines¹

This standard is issued under the fixed designation D8275; 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 This specification covers the requirements of test fuels suitable for use in certain gasoline compression-ignition engines and vehicles, which have been specifically designed to operate on the fuel described in this specification. These gasoline-like fuels, which may contain certain gasoline blending components, are henceforth referred to in this specification as “gasoline compression-ignition (GCI) test fuels.”

1.1.1 The GCI test fuels described by this specification are only intended for use by engine and vehicle manufacturers in the continuing development of appropriately designed compression-ignition engines that can take advantage of certain chemical and physical properties of GCI test fuels to achieve higher efficiency and lower emissions (henceforth referred to as “GCI engines”). These GCI test fuels are not intended for use by the general public.

1.1.2 GCI engines include only those engines that directly inject fuel into the combustion chamber, and rely on autoignition of the fuel to initiate combustion part or all the time. Although various combustion strategies may be used depending on the fuel and engine operating condition, the level of fuel stratification is typically decreased in GCI engines under certain operating conditions relative to traditional diesel compression-ignition engines. Engines that use an auxiliary ignition source (such as a spark plug) some but not all of the time could qualify as GCI engines.

1.1.3 The GCI test fuels covered in this specification may contain oxygenates, such as alcohols and ethers. Recommended limits on the type and concentration of specific oxygenates are provided in [Appendix X3](#).

1.2 This specification provides a description of GCI test fuels for automotive engines that are not currently widely available to the general public, but are being developed and require defined standard test fuels. Commercial fuels meeting the same or similar requirements as the GCI test fuels described in this specification could become available to the general public if/when such engines are introduced into com-

merce; however use of this specification by the general public would require significant modifications. The specification is under continuous review, which can result in revisions based on changes in fuel, automotive requirements, test methods, or a combination thereof. All users of this specification, therefore, should refer to the latest edition.

1.3 Traditional diesel compression-ignition engines and fuel systems are designed for use with fuel, which has a lower volatility, higher flash-point, and higher viscosity than GCI test fuels. Such engines are therefore usually unsuitable for use with GCI test fuels. Certain hardware modifications may be required for the safe use of low flash-point, GCI test fuels.

NOTE 1—If there is any doubt as to the latest edition of Specification D8275, contact ASTM International Headquarters.

1.4 The values stated in SI units are to be regarded as the standard. Any other values given are provided for information only.

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

1.6 *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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- [D86 Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure](#)
- [D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test](#)
- [D240 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter](#)
- [D381 Test Method for Gum Content in Fuels by Jet Evaporation](#)

¹ This specification is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.A0.01 on Gasoline and Gasoline-Oxygenate Blends.

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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.

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

- D525** Test Method for Oxidation Stability of Gasoline (Induction Period Method)
- D1266** Test Method for Sulfur in Petroleum Products (Lamp Method)
- D1319** Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption
- D2622** Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry
- D2699** Test Method for Research Octane Number of Spark-Ignition Engine Fuel
- D2700** Test Method for Motor Octane Number of Spark-Ignition Engine Fuel
- D3120** Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry
- D3237** Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy
- D3341** Test Method for Lead in Gasoline—Iodine Monochloride Method
- D3606** Test Method for Determination of Benzene and Toluene in Spark Ignition Fuels by Gas Chromatography
- D3831** Test Method for Manganese in Gasoline By Atomic Absorption Spectroscopy
- D4052** Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter
- D4057** Practice for Manual Sampling of Petroleum and Petroleum Products
- D4175** Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants
- D4176** Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)
- D4177** Practice for Automatic Sampling of Petroleum and Petroleum Products
- D4306** Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination
- D4814** Specification for Automotive Spark-Ignition Engine Fuel
- D4815** Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C₁ to C₄ Alcohols in Gasoline by Gas Chromatography
- D4953** Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)
- D5059** Test Methods for Lead and Manganese in Gasoline by X-Ray Fluorescence Spectroscopy
- D5191** Test Method for Vapor Pressure of Petroleum Products and Liquid Fuels (Mini Method)
- D5291** Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants
- D5443** Test Method for Paraffin, Naphthene, and Aromatic Hydrocarbon Type Analysis in Petroleum Distillates Through 200 °C by Multi-Dimensional Gas Chromatography
- D5453** Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
- D5482** Test Method for Vapor Pressure of Petroleum Products and Liquid Fuels (Mini Method—Atmospheric)
- D5580** Test Method for Determination of Benzene, Toluene, Ethylbenzene, *p/m*-Xylene, *o*-Xylene, C₉ and Heavier Aromatics, and Total Aromatics in Finished Gasoline by Gas Chromatography
- D5769** Test Method for Determination of Benzene, Toluene, and Total Aromatics in Finished Gasolines by Gas Chromatography/Mass Spectrometry
- D5842** Practice for Sampling and Handling of Fuels for Volatility Measurement
- D5854** Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products
- D6079** Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)
- D6378** Test Method for Determination of Vapor Pressure (VP_x) of Petroleum Products, Hydrocarbons, and Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method)
- D7039** Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry
- D7220** Test Method for Sulfur in Automotive, Heating, and Jet Fuels by Monochromatic Energy Dispersive X-ray Fluorescence Spectrometry
- D7667** Test Method for Determination of Corrosiveness to Silver by Automotive Spark-Ignition Engine Fuel—Thin Silver Strip Method
- D7671** Test Method for Corrosiveness to Silver by Automotive Spark-Ignition Engine Fuel—Silver Strip Method
- D7757** Test Method for Silicon in Gasoline and Related Products by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry
- E29** Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. Terminology

3.1 Definitions:

3.1.1 For general terminology, refer to Terminology **D4175**.

3.1.2 *dry vapor pressure equivalent, DVPE, n*—value calculated by a defined correlation equation that is expected to be comparable to the vapor pressure value obtained by Test Method **D4953**, Procedure A.

3.1.3 *gasoline, n*—volatile mixture of liquid hydrocarbons, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition, internal combustion engines.

3.1.4 *gasoline-oxygenate blend, n*—fuel consisting primarily of gasoline along with a substantial amount (more than 0.35 % by mass oxygen) of one or more oxygenates.

3.1.5 *octane sensitivity, n*—the mathematical difference between research octane number (RON) and motor octane number (MON) (octane sensitivity = RON – MON).

3.1.5.1 *Discussion*—The terms octane sensitivity and octane number sensitivity are used synonymously.

3.1.6 *oxygenate, n*—a molecule composed solely of carbon, hydrogen, and oxygen.

3.1.6.1 *Discussion*—The fuel described in this standard may contain oxygenates, such as alcohol and ethers.