



Standard Practice for Receipt, Storage, and Handling of Fuels for Gas Turbines¹

This standard is issued under the fixed designation D 4418; 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 practice covers the receipt, storage, and handling of fuels for gas turbines, except for gas turbines used in aircraft. It is intended to provide guidance for the control of substances in a fuel that could cause deterioration of either the fuel system, or the gas turbine, or both.

1.2 This practice provides no guidance for either the selection of a grade of fuel, a topic covered by Specification D 2880, or for the safety aspects of the fuel and fuel systems. For example, this practice does not address the spacings of storage tanks, loading and unloading facilities, etc., and procedures for dealing with the flammability and toxic properties of the fuels.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)²
- D 1796 Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)²
- D 2274 Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)²
- D 2276 Test Methods for Particulate Contaminant in Aviation Fuel by Line Sampling²
- D 2880 Specification for Gas Turbine Fuel Oils²
- D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³

¹ This practice is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.01 on Burner, Diesel, and Gas Turbine Fuel Oils.

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² Annual Book of ASTM Standards, Vol. 05.01.

³ Annual Book of ASTM Standards, Vol. 05.02.

D 6469 Guide for Microbial Contamination in Fuels and Fuel Systems⁴

3. Terminology

3.1 *fuel entering the combustor(s)*—this term is used to designate the fuel that is actually burned in the gas turbine. Fuel may actually be sampled at a point upstream from the point of entry into the combustor(s), provided the sample is representative of the fuel actually entering the combustor(s).

3.2 *fuel contaminants*—in principle, are any fuel component other than hydrocarbon oils. In the present context the contaminants are foreign materials that make the fuel less suitable or even unsuitable for the intended use. The contaminants of primary interest are foreign materials introduced subsequent to the manufacture of specification quality fuel. Hence they are materials introduced in the distribution system (that is storage tanks, pipelines, tank, trucks, barges, etc.), or in the user's storage and handling systems, or generated within these systems (rust generated in steel pipes and tanks by moist fuel, etc.). Contaminants may be soluble or insoluble in the fuel.

3.3 *dissolved and free water*—water may be present in the fuel as dissolved water or as “free” (undissolved) water, or both. The free water may be fresh or saline. Fresh water may enter the fuel from steam coils in storage tanks, from condensation out of moisture-laden air, or from leaking cooling coils. Saline water can enter the fuel during transportation in barges or tankers.

3.4 *particulate solids*—may enter a fuel from the air (suspended dirt and aerosols) or from the distribution and storage systems (rust, corrosion products, gasket debris, and so forth).

3.5 *metallic compounds*—metals may be present as metallic compounds in the fuel as a natural result of the composition of the crude oil and of the refining process. However, unless special precautions are taken, additional metallic compounds can be acquired during distribution and storage. A commercial product pipeline may contain residues of lead-containing gasoline that would then be dissolved by the gas turbine fuel. Tank trucks, railroad tankcars, barges, and tankers may be inadequately cleaned and contain residues of past cargos.

⁴ Annual Book of ASTM Standards, Vol. 05.04.

