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An American National Standard

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Standard Test Method for Estimation of Net Heat of Combustion (Specific Energy) of Aviation Fuels[1]

This standard is issued under the fixed designation D 6446; 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 test method covers the estimation of the net heat of combustion (specific energy) at constant pressure in SI units, megajoules per kilogram, from the fuel density, sulfur, and hydrogen content.

1.2 This test method is purely empirical, and it is applicable only to liquid hydrocarbon fuels derived by normal refining processes from conventional crude oil that conform to the requirements of specifications for aviation turbine fuels of limited boiling ranges and compositions, as described in Note 1 and permitted by each specification.

NOTE 1—The estimation of the heat of combustion of a hydrocarbon fuel from its hydrogen content, density, and sulfur is justifiable only when the fuel belongs to a well-defined class for which a relationship between these quantities has been derived from accurate experimental measurements on representative samples of that class. Even in this class, the possibility that the estimates can be in error by large amounts for individual fuels should be recognized. The classes of fuels used to establish the correclation presented in this test method are represented by the following specifications:

Fuel	Specification
JP-5, Avcat/FSII	MIL-DTL-5624 DEF STAN 91-86 NATO Code F-44
JP-8, Avtur/FSII	MIL-DTL-83133 DEF STAN 91–87 NATO Code F-34
Jet A, Jet A-1, Avtur	Specification D 1655 DEF STAN 91-91 NATO Code F-35 CAN/CGSB-3.23

1.3 The heat of combustion can also be estimated by Test Methods D 1405, D 3338, and D 4529.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 129 Test Method for Sulfur in Petroleum Products (General Bomb Method)

D 240 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter

D 1217 Test Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

D 1250 Guide for Use of the Petroleum Measurement Tables

D 1266 Test Method for Sulfur in Petroleum Products (Lamp Method)

D 1298 Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

D 1405 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels

D 1552 Test Method for Sulfur in Petroleum Products (High-Temperature Method)

D 1655 Specification for Aviation Turbine Fuels

D 2622 Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry

D 3120 Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry

D 3338 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels

D 3701 Test Method for Hydrogen Content of Aviation Turbine Fuels by Low Resolution Nuclear Magnetic Resonance Spectrometry

D 4052 Test Method for Density and Relative Density of Liquids by Digital Density Meter

D 4294 Test Method for Sulfur in Petroleum Products by

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.05.0B on Calorimetry of Liquid Hydrocarbon Fuels.

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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.