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# Standard Test Method for Estimation of Net Heat of Combustion (Specific Energy) of Aviation Fuels<sup>1</sup>

This standard is issued under the fixed designation D6446; 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 ( $\epsilon$ ) 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 correlation 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 D1655 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 [D1405](#), [D3338](#), and [D4529](#).

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

<sup>1</sup> 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 on Properties of Fuels, Petroleum Coke and Carbon Material.

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## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- [D129](#) Test Method for Sulfur in Petroleum Products (General Bomb Method)
- [D240](#) Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter
- [D1217](#) Test Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer
- [D1250](#) Guide for Use of the Petroleum Measurement Tables
- [D1266](#) Test Method for Sulfur in Petroleum Products (Lamp Method)
- [D1298](#) Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- [D1405](#) Test Method for Estimation of Net Heat of Combustion of Aviation Fuels
- [D1552](#) Test Method for Sulfur in Petroleum Products (High-Temperature Method)
- [D1655](#) Specification for Aviation Turbine Fuels
- [D2622](#) Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry
- [D3120](#) Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry
- [D3338](#) Test Method for Estimation of Net Heat of Combustion of Aviation Fuels
- [D3701](#) Test Method for Hydrogen Content of Aviation Turbine Fuels by Low Resolution Nuclear Magnetic Resonance Spectrometry
- [D4052](#) Test Method for Density and Relative Density of Liquids by Digital Density Meter
- [D4294](#) Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry
- [D4529](#) Test Method for Estimation of Net Heat of Combustion of Aviation Fuels

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.