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Standard Test Method for Estimation of Net Heat of Combustion of Aviation Fuels¹

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1. Scope

1.1 This test method covers the estimation of the net heat of combustion at constant pressure in metric (SI) units, megajoules per kilogram.

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 which conform to the requirements of specifications for aviation gasolines or aircraft turbine and jet engine fuels of limited boiling ranges and compositions as described in Note 1.

NOTE 1—The estimation of the net heat of combustion of a hydrocarbon fuel from its aniline point temperature and density 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 JP-8 fuel, although not experimentally tested, has properties similar to JP-5 and Jet A fuels and can be considered in the same class. The classes of fuels used to establish the correlation presented in this test method are represented by the following applications:

Fuel	Specification
Aviation gasoline Grades 100/130, 100LL and 115/145	MIL-G-5572 ASTM D910 DERD 2485 NATO Code F-18
JP-4, Jet B, Avgat/FSII	MIL-T-5624 DERD 2454 DERD 2486 NATO Code F-40
JP-5, Avcat/FSII	MIL-T-5624 NATO Code F-44
JP-8, Avtur/FSII	MIL-T-83133 DERD 2453 NATO Code F-34
Jet A, Jet A-1, Avtur	ASTM D1655 DERD 2494 NATO Code F-35

1.3 The net heat of combustion can also be estimated by Test Method D 1405. Test Method D 1405 requires calculation of one of four equations dependent on the fuel type with the

precision equivalent to that of this test method.

1.4 The values stated in acceptable metric units are to be regarded as the 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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 129 Test Method for Sulfur in Petroleum Products (General Bomb Method)²
- D 240 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter²
- D 611 Test Methods for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents²
- D 910 Specification for Aviation Gasolines²
- D 941 Test Method for Density and Relative Density (Specific Gravity) of Liquids by Lipkin Bicapillary Pycnometer²
- D 1217 Test Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer²
- D 1250 Guide for Petroleum Measurement Tables²
- D 1266 Test Method for Sulfur in Petroleum Products (Lamp Method)²
- D 1298 Test Method for Density, Relative Density (Specific Gravity) or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method²
- D 1405 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels²
- D 1655 Specification for Aviation Turbine Fuels²
- D 2382 Test Method for Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method)²
- D 2622 Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry³
- D 3120 Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry³

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.05 on Petroleum, Coke, and Carbon Materials.

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² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 05.02.