



Designation: D 1405 – 95a

An American National Standard



Designation: 193/80

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

This standard is issued under the fixed designation D 1405; 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. This is also a standard of the Institute of Petroleum issued under the fixed designation IP 193. The final number indicates the year of last revision.

This test method has been approved by the sponsoring committee and accepted by the Cooperating Societies in accordance with established procedures.

This standard has been approved for use by agencies of the Department of Defense.

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 or inch-pound units Btu per pound.

1.2 This test method is purely empirical and 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.

1.3 This test method is not applicable to pure hydrocarbons. It is not intended as a substitute for experimental measurements of heat of combustion.

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

1.5 The heat of combustion may also be determined in SI units by Test Method D 4529. Test Method D 4529 requires calculation of a single equation for all aviation fuels with a precision equivalent to that of this test method.

1.6 *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 Colorimeter²

D 287 Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)²

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 Pycnometer³

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 1655 Specification for Aviation Turbine Fuels²

D 2382 Test Method for Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method)³

D 2622 Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry⁴

D 3120 Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry⁴

D 4052 Test Method for Density and Relative Density of Liquids by Digital Density Meter⁴

D 4529 Test Method for Estimation of Net Heat of Combustion of Aviation Fuels⁴

D 4809 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Intermediate Precision Method)⁵

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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In the IP, this test method is under the jurisdiction of the Standardization Committee.

In 1964, this test method was adopted as standard with editorial revisions.

² *Annual Book of ASTM Standards*, Vol 05.01.

³ Discontinued; See 1993 *Annual Book of ASTM Standards*, Vol 05.01.

⁴ *Annual Book of ASTM Standards*, Vol 05.02.

⁵ *Annual Book of ASTM Standards*, Vol 05.03.