U. S. Department of Commerce
Frederick B. Dent
Secretary
National Bureau of Standards
Richard W. Roberts, Director

National Bureau of Standards Certificate of Analysis

Standard Reference Material 1815

Reference Fuel n-Heptane

This Standard Reference Material is intended for use by the manufacturers of reference fuels in accordance with the American Society for Testing and Materials (ASTM). It is to be used in maintaining the integrity of primary standards for knock testing of motor and aviation fuels as specified in ASTM Manual for Rating Motor, Diesel, and Aviation Fuels, Third Edition; 1973.

	Value[1]		Range[2]
Density at 20°C[a], g/ml	0.68386	±	0.00008
Refractive Index[b], n_D^{20}	1.38776	±	0.00002
Freezing Point[c], °C	−90.636	±	0.005
Distillation[d]:			
50% Recovered, °C (760 mm of Hg)	98.427	±	0.003
Differential, 80% Recovered			
Minus 20% Recovered, °C	0.004	±	0.003
Lead Content[e], g/3.78 liters	0.0000		

[1] The values certified are based upon the methods indicated for the specific property and are the means of three determinations for each property except the freezing point and the density. The freezing point is based upon five determinations, three by one operator and two by a second operator. The density is based upon six determinations.

[2] The total ranges of the values observed.

The analytical work was performed by T. W. Mears and C. L. Stanley of the Office of Standard Reference Materials, and D. P. Enagonio of the Chromatographic Analysis Section, Analytical Chemistry Division.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by C. L. Stanley.

Washington, D.C. 20234
August 14, 1974

J. Paul Cali, Chief
Office of Standard Reference Materials

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METHODS:

a/ Determined in accordance with ASTM Method D 1217, Test for Density and Specific Gravity of Liquids by Bingham Pycnometer.

b/ Determined in accordance with ASTM Method D 1218, Measurement of Refractive Index and Refractive Dispersion of Hydrocarbon Liquids.

c/ Determined in accordance with ASTM Method D 1015, Test for Freezing Points of High-Purity Hydrocarbons.

d/ For equipment and method used, see Journal of Research, National Bureau of Standards, Vol. 44, No. 3, 1950, pp. 309 and 310 (RP2079).

e/ Determined in accordance with ASTM Method D 1368, Test for Tetraethyllead in Trace Concentrations in Primary Reference Fuels.

Supplementary Information

The material for this standard was selected from the lots of n-heptane submitted to the National Bureau of Standards over the past 15 years.

A chromatographic analysis was made on this material in accordance with ASTM Method D 2268, Analysis of High-Purity n-Heptane and Isooctane by Capillary Gas Chromatography. Four impurities were indicated. Only one impurity isooctane, 0.01 percent, was positively identified. Indications are that the other three impurities are l-cis-2-dimethylcyclopentane, 0.11 percent; l-trans-2-dimethylcyclopentane, <0.01 percent; and methylcyclohexane, l,l,3-trimethylcyclopentane and/or, 2,2-dimethylhexane, <0.01 percent. The purity is 99.87 volume percent by the chromatographic method as well as the freezing point method.