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 1816

Reference Fuel Isooctane

(2,2,4-Trimethylpentane)

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.

Property	Value[1]		Range[2]
Density at 20°C[a], g/ml	0.69192	±	0.00001
Refractive Index[b], n_D^{20}	1.39148	±	0.00004
Freezing Point[c], °C	-107.383	±	0.007
Distillation[d]:			
50% Recovered, °C (760 mm of Hg)	99.238	±	0.002
Differential, 80% Recovered			
Minus 20% Recovered, °C	0.007	±	0.006
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. The freezing point is based upon five determinations, three by one operator and two by a second operator.

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 16, 1974

J. Paul Cali, Chief
Office of Standard Reference Materials

(over)

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 isooctane 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. Only three impurities were indicated. One impurity was positively identified as n-heptane, <0.01 percent. The other impurities were not identified; however, one of them appears to be either 2,2-dimethylhexane; 1,1,3-trimethylcyclopentane; or methylcyclohexane, 0.01 percent. The third impurity was <0.01 percent and could be 2,3-dimethylpentane or 1,1-dimethylcyclopentane. The purity determined by chromatography and by freezing point was 99.98 and 99.99 volume percent, respectively.