



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 2712

#### Lead in Reference Fuel

This Standard Reference Material (SRM) is intended for use in the calibration of instruments and the evaluation of techniques used for the analysis of lead in gasoline or similar materials. SRM 2712 consists of 6 amber ampoules, each containing 20 mL of a reference fuel with a nominal lead concentration level of 0.008 g/L (0.03 g/gal).

Certified Value: The certified value for the lead concentration, expressed in units of  $\mu\text{g/g}$ , is given below. The certified value is based on results by thermal ionization isotope dilution mass spectrometry.

Certified lead concentration . . . . .  $11.4 \pm 0.4^* \mu\text{g/g}$

\*The uncertainty of the certified value is based on scientific judgement and approximates the 95 percent confidence interval. It includes allowances for measurement imprecision and for known sources of possible error.

CAUTION: This SRM contains chemical components that are highly flammable and moderately toxic by inhalation and ingestion. Avoid inhalation of vapors and skin contact with liquid. Read carefully the Material Safety Data Sheet that accompanies the SRM.

USE: The SRM should be stored at temperatures between 10-30 °C. It should not be exposed to intense sources of radiation, including ultraviolet light or sunlight. The ampoules in the SRM unit should be opened only at time of use. No attempt should be made to keep the material in opened ampoules for future use.

PREPARATION OF MATERIAL: This SRM is a mixture of 91 percent by volume of 2,2,4,-Trimethylpentane (isooctane) and 9 percent by volume n-heptane. The material was spiked with lead in the form of tetraethyl-lead motor mix.

Analyses leading to certification were performed in the Inorganic Analytical Research Division by I.L. Barnes, J.R. Moody, and T.J. Murphy.

The statistical review of the data was performed by R.C. Paule of the NIST National Measurement Laboratory.

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 T.E. Gills.

Gaithersburg, MD 20899  
October 28, 1988

Stanley D. Rasberry, Chief  
Office of Standard Reference Materials

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### Supplemental Information

Since the volume of this SRM varies with temperature, the concentration of lead is certified on a weight basis, i.e., micrograms of lead per gram of reference fuel. For convenience to the user, the concentration is also given in the customary units, grams per gallon and grams per liter at 23 °C. The density of this SRM is 0.6887 g/mL at 23 °C and the temperature coefficient is 0.0008 mL/°C.

#### Lead Concentration @ 23 °C

<i>g/gal</i>	<i>g/L</i>
0.0297 ± 0.0010	0.0079 ± 0.0003

# NIST Standard Reference Materials



U.S. DEPARTMENT OF COMMERCE  
National Institute of Standards and Technology

## Standard Reference Materials 2712, 2713, 2714, and 2715

### Lead in Reference Fuel

The deleterious effects of lead on human, animal, and plant life is well known. To reduce the levels of lead in the environment, the United States Environmental Protection Agency (U.S. EPA) regulates atmospheric lead under the air quality standards concept.

Emissions of lead to the atmosphere result from the smelting of lead and other heavy-metal ores, combustion of fossil fuels, combustion of leaded gasolines, and manufacturing lead-containing products. Some reports indicate that alkyl lead used as anti-knock additives in gasoline is still considered to be the major single source of lead entering the atmosphere.

To aid industry in complying with lead-emission limits set by the U.S. EPA, the National Institute of Standards and Technology (formerly National Bureau of Standards) announces the availability of four lead in reference fuel Standard Reference Materials (SRM's), intended for use in the accurate calibration and the evaluation of techniques used for the analysis of gasoline or similar materials.

These SRM's consist of mixtures of 2,2,4,-trimethylpentane (isooctane), 91 percent by volume, and n-heptane, 9 percent by volume, with varying concentrations of lead added as tetraethyl-lead motor mix. The SRM's cover the lead concentration range from 0.03 to 2.0 grams per U.S. gallon. The concentrations of lead are certified on a weight basis,  $\mu\text{g/g}$ , because the volume of these SRM's varies with temperature. For convenience to the user, the concentrations are given in customary units, grams per gallon and grams per liter at 23 °C.

The following is a list of the certified concentration levels in  $\mu\text{g/g}$  and in calculated customary units.

SRM	Certified Concentration ( $\mu\text{g/g}$ )	Lead Concentration at 23 °C	
		(g/gal)	(g/L)
2712	11.4	0.0297	0.0079
2713	19.4	0.0506	0.0134
2714	28.1	0.0733	0.0194
2715	784	2.045	0.540

These SRM's are available in units of 6x20 mL vials for \$110. Orders and requests for information should be directed to:

Office of Standard Reference Materials  
National Institute of Standards and Technology  
Room B311, Chemistry Building  
Gaithersburg, MD 20899

Telephone: (301) 975-OSRM (6776)