



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 2724a

#### Sulfur in Diesel Fuel Oil

This Standard Reference Material (SRM) is intended for use in the determination of total sulfur in fuel oils or material of similar matrix. SRM 2724a is a commercial "No. 2-D" distillate fuel oil as defined by the American Society for Testing and Materials (ASTM). A unit of SRM 2724a consists of approximately 100 mL of diesel fuel oil in an amber bottle. The certified value, reported as a mass fraction [1], for the sulfur content in SRM 2724a is as follows:

Sulfur, Mass Fraction ..... 0.04304 %  $\pm$  0.00037 %

The sulfur content in SRM 2724a was certified using isotope dilution thermal ionization mass spectrometry [2]. Homogeneity testing was performed using x-ray fluorescence spectrometry.

The expanded uncertainty, whose level of confidence is approximately 95 %, was computed according to the CIPM method [3] and includes within method sources of uncertainty which were statistically evaluated (Type A) or evaluated by other means (Type B). It defines a range of values for the certified value within which the true value is believed to lie, at a level of confidence of approximately 95 %.

**Expiration of Certification:** The certification of this SRM is valid for three years from the date of shipment from NIST. Should the certified value change before the expiration of certification, purchasers will be notified by NIST.

Analyses for certification were performed by W.R. Kelly, R.D. Vocke, A.F. Marlow, and P.A. Pella of the NIST Analytical Chemistry Division.

The statistical analysis was performed by S.B. Schiller of the NIST Statistical Engineering Division.

The supplemental information reported on page two was obtained from physical tests and measurements using ASTM methods and was performed by a commercial firm under contract to the National Institute of Standards and Technology.

The overall direction and coordination of the technical measurements leading to the certification of this SRM was coordinated through the Standard Reference Materials Program by J.S. Kane and B.S. MacDonald.

Gaithersburg, MD 20899  
August 24, 1995

Thomas E. Gills, Chief  
Standard Reference Materials Program

## SUPPLEMENTAL INFORMATION

Physical properties of SRM 2724a are listed in Table 1. The values given are not certified but are provided as additional information on the matrix.

Table 1. SRM 2724a Physical Properties

Test	ASTM Method	Value
Specific Gravity @ 15 °C	D 1298	0.8459 g/cm <sup>3</sup>
Flash Point	D 93	73 °C
Pour Point	D 97	-18 °C
Refractive Index	D 1218	1.4720
Viscosity Kinematic @ 38 °C	D 445	3.00 x 10 <sup>-6</sup> m <sup>2</sup> /s (3.00 cSt)
Viscosity Kinematic @ 50 °C	D 445	2.36 x 10 <sup>-6</sup> m <sup>2</sup> /s (2.36 cSt)

### ASTM Methods Used for Physical Tests:

- D 1298-85 (1990)<sup>e1</sup> Practice for Density, Relative Density (Specific Gravity) or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
- D 97-93 Test Method for Pour Point of Petroleum Products.
- D 445-88 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity).
- D 93-90<sup>e1</sup> Test Methods for Flash Point by Pensky-Martens Closed Tester.
- D 1218-92 Test Method for Refractive Index and Refractive Dispersion of Hydrocarbon Liquids.

### REFERENCES

- [1] Taylor, B.N., Guide for the Use of the International System of Units (SI), NIST Special Publication 811, 1995 Ed., (April 1995).
- [2] Kelly, W.R., Paulsen, P.J., Murphy, K.E., Vocke, R.D., Jr., and Chen, L.-T., Determination of Sulfur in Fossil Fuels by Isotope Dilution-Thermal Ionization Mass Spectrometry, Anal. Chem. 66, 2505-2513, (1994).
- [3] "Guide to the Expression of Uncertainty in Measurement", ISBN 92-67-10188-9, 1st Ed. ISO, Geneva, Switzerland, (1993).