

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 1624d
SRM Name: Sulfur in Diesel Fuel Oil (Nominal Mass Fraction 0.4 %)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use in the evaluation of methods and the calibration of instruments used in the determination of total sulfur in fuel oils or materials of a similar matrix. A unit of SRM 1624d consists of 10 amber ampoules, each containing approximately 10 mL of a commercial "No. 2-D" distillate fuel oil sealed under an argon atmosphere.

Company Information

National Institute of Standards and Technology
 Standard Reference Materials Program
 100 Bureau Drive, Stop 2300
 Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
 FAX: 301-948-3730
 E-mail: SRMMSDS@nist.gov
 Website: <http://www.nist.gov/srm>

Emergency Telephone ChemTrec:
 1-800-424-9300 (North America)
 +1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Combustible liquid Category 4
Health Hazard: Carcinogenicity Category 2
 Aspiration Hazard Category 1

Label Elements

Symbol



Signal Word
DANGER

Hazard Statement(s)

H227 Combustible liquid.
 H304 Maybe fatal if swallowed and enters airways.
 H351 Suspected of causing cancer.

Precautionary Statement(s)

P201 Obtain special instructions before use.
 P210 Keep away from heat, sparks, open flames, hot surfaces. – No smoking.
 P280 Wear protective gloves, protective clothing, and eye protection.
 P301+P310 If swallowed: Immediately call a doctor.
 P331 Do NOT induce vomiting.
 P308+P313 If exposed or concerned: Get medical attention.
 P403+P235 Store in a well-ventilated place. Keep cool.
 P405 Store locked up.
 P501 Dispose of contents and container in accordance with local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Diesel fuel oil No. 2-D

Other Designations: Diesel oil; diesel fuel; diesel oil, medium; diesel oil no. 2-D; diesel fuel no. 2-D; fuel oil #2

Components are listed in compliance with OSHA's 29 CFR 1910.1200. The material contains trace amounts of other oxide components; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Diesel Fuel Oil No. 2 – D	68476-34-6	270-676-1	>99

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash affected area with soap and water for at least 15 minutes while removing contaminated clothing. Seek medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of with water for at least 15 minutes. Seek medical attention.

Ingestion: Aspiration hazard. Do not induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Seek immediate medical attention. Give artificial respiration if not breathing.

Most Important Symptoms/Effects, Acute and Delayed: May cause eye, skin and respiratory irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Moderate fire hazard. Vapor is heavier than air. Vapor/air mixtures are explosive above flash point. Vapors or gases may ignite at distant ignition sources and flash back. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, water, regular foam.

Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Combustible liquid.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2

Fire = 2

Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Avoid heat, flames, sparks, and other sources of ignition. Remove sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Absorb small, spilled material with sand or other non-combustible material. Collect spilled material in an appropriate container for disposal.

7. HANDLING AND STORAGE

Safe Handling Precautions: Avoid contact with incompatible materials (see Section 10, "Stability and Reactivity").

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: ACGIH (TWA): 100 mg/m³ (as total hydrocarbons, inhalable fraction and vapor)
Skin – potential significant contribution to overall exposure by the cutaneous route.

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties

Diesel Fuel Oil No. 2 – D

Appearance (physical state, color, etc.)	colorless to brown liquid
Molecular Formula	not applicable
Molar Mass (g/mol)	not applicable
Odor	petroleum odor
Odor threshold	0.11 ppm
pH	not available
Evaporation rate	not available
Melting point/freezing point	-18 °C (-0.4 °F)
Relative Density^(a)	849.9 kg/m ³ at 15 °C
Vapor Pressure	2.6 mmHg at 20 °C
Vapor Density (air = 1)	>1
Viscosity^(a)	3.239 × 10 ⁻⁶ m ² /s (3.239 cSt) at 40 °C
Solubility(ies)	water: insoluble
Partition coefficient (n-octanol/water)	not available
Thermal Stability Properties	
Autoignition Temperature	>246 °C (>474.8 °F)
Thermal Decomposition	not available
Initial boiling point and boiling range	171 °C to 360 °C (340 °F to 680 °F)
Explosive Limits, LEL (Volume %)	>0.6
Explosive Limits, UEL (Volume %)	>6.0
Flash Point (closed cup)^(a)	73.3 °C (163.9 °F)
Flammability (solid, gas)	not applicable

^(a)Physical property listed in the NIST Certificate of Analysis.

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid heat, flames, sparks or other sources of ignition. Container may rupture or explode if exposed to heat.

Incompatible Materials: Oxidizing materials.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of carbon; oxides of sulfur.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Dizziness, nausea, coughing, respiratory tract irritation, skin irritation, central nervous system depression, aspiration hazard.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Acute exposure to high levels of vapor may cause central nervous system depression, headache, dizziness, nausea, vomiting, anorexia, incoordination and unconsciousness. Prolonged or repeated exposure may cause irritation.

Skin Contact: Acute exposure may cause redness. In animal tests, fuel oils caused moderate irritation, erythema, and edema. Chronic skin exposure may cause defatting and drying of the skin resulting in irritation and dermatitis.

Eye Contact: Acute exposure of liquid or vapor may cause irritation. In animal tests, exposure to fuel oils caused mild irritation.

Ingestion: Diesel fuel may cause lung damage if aspirated into the lungs and may be fatal. Symptoms may include coughing, difficulty breathing, cyanosis and pulmonary edema. Acute exposure by ingestion may cause nausea, vomiting, cramping, and symptoms of the central nervous system depression.

Numerical Measures of Toxicity

Acute toxicity: Not classified.

Rat, oral LD50: 12 g/kg

Skin Corrosion/Irritation: No data available; not classified.

Serious Eye Damage/Irritation: No data available; not classified.

Respiratory Sensitization: No data available; not classified.

Skin Sensitization: No data available; not classified.

Germ Cell Mutagenicity: No data available; not classified.

Carcinogenicity: Category 2

Listed as a Carcinogen/Potential Carcinogen X Yes _____ No

NTP does not list Diesel Fuel Oil No. 2 as a carcinogen. ARC lists diesel fuels as Group 3, *not classifiable*, as to their carcinogenicity to humans. ACGIH lists Diesel Fuel Oil No. 2 as an A3 – confirmed animal carcinogen with unknown relevance to humans.

Reproductive Toxicity: No data available.

Specific Target Organ Toxicity, Single Exposure: No data available.

Specific Target Organ Toxicity, Repeated Exposure: No data available.

Aspiration Hazard: Category 1.

Kinematic Viscosity: 3.239×10^{-6} m²/s (3.239 cSt) at 40 °C

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Fish Toxicity: Fathead minnow (*Pimephales promelas*) LC50: 35 mg/L (flow through) 96 h.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: This material is not hazardous for shipping purposes (exempt under DOT 173.150, and not regulated by IATA; flash point is above regulated limits) (see Section 9, "Physical and Chemical Properties").

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: Yes

CHRONIC HEALTH: Yes

FIRE: Yes

REACTIVE: No

PRESSURE: No

State Regulations:

California Proposition 65: Not listed.

U.S. TSCA Inventory: Diesel Fuel Oil, No. 2-D is listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 04 April 2016

Sources: ChemADVISOR, Inc., SDS, *Fuel Oil No. 2*, 09 December 2015.

National Library of Medicine, Hazardous Substances Databank, *Fuel Oil No. 2*, <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB> (accessed Apr 2016).

49 CFR 173.150, *U.S. Department of Transportation*, 01 October 2011.

IATA, *Dangerous Goods Regulations*, 54th ed., 01 January 2013.

EC; European Chemical Substance Information System (ESIS), *Fuels, Diesel, No. 2*, CAS No. 68476-34-6; available at <http://echa.europa.eu/> (accessed Apr 2016).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <http://www.nist.gov/srm>.