NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

Date of Issue:
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SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 1619b
SRM Name: Sulfur in Residual Fuel Oil
(Nominal Mass Fraction 0.7 %)
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 calibration of instruments and the evaluation of methods used in the determination of total sulfur and mercury in fuel oils or materials of similar matrix. A unit of SRM 1619b consists of approximately 100 mL of commercial "No. 6" residual fuel oil as defined by ASTM D396-95 Standard Specification for Fuel Oils.

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
E-mail: SRMMSDS@nist.gov
Website: https://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.

Label Elements

Symbol



Signal Word
WARNING

Hazard Statement(s)

H227	Combustible liquid.
H351	Suspected of causing cancer (inhalation).

Precautionary Statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P235	Keep away from flames and hot surfaces. – No Smoking.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313	If exposed or concerned: get medical advice/attention.
P370+P378	In case of fire use dry chemical, carbon dioxide, or regular foam for extinction.
P403	Store in a well-ventilated place.
P405	Store locked up.

P501 Dispose of content/container in accordance with local/regional/national/international regulations.

Hazards Not Otherwise Classified: None.

Ingredients(s) with Unknown Acute Toxicity: None.

3. Composition and Information on Hazardous Ingredients

Substance: Fuel Oil, No 6.

Other Designations: Residual fuel oil; Bunker C oil; Grade 6.

Components are listed in compliance with OSHA's 29 CFR 1910.1200.

Hazardous Component	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Fuel Oil No. 6	68553-00-4	271-384-7	100

4. First Aid Measures

Description of First Aid Measures

Inhalation: If adverse effects occur, remove to well-ventilated (uncontaminated) area. If breathing is difficult, qualified personnel may administer oxygen. If not breathing, qualified personnel should give artificial respiration. Seek immediate medical attention.

Skin Contact: Rinse affected skin with water for at least 15 minutes, then wash thoroughly with soap or mild detergent and water. If skin irritation persists, seek medical aid and bring the container or label.

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

Ingestion: If a large amount is swallowed, seek medical attention.

Most Important Symptoms/Effects, Acute and Delayed

Inhalation: Irritation, cough, difficulty breathing, cancer (suspect).

Skin Contact: Irritation, repeated or prolonged contact may result in dermatitis.

Eye Contact: Irritation.

Ingestion: Irritation.

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

5. Fire Fighting Measures

Fire and Explosion Hazards: Moderate fire hazard. Vapor/air mixtures are explosive above the flash point. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media

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

Unsuitable: Avoid using straight water streams in order to avoid frothing.

Specific Hazards Arising from the Chemical: Not applicable.

Special Protective Equipment and Precautions for Fire-Fighters: Move container from fire area if it can be done without personal risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection". Keep out of waters supplies and sewers.

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

7. Handling and Storage

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

Storage and Incompatible Materials: Store in a well-ventilated area. Keep separated from incompatible substances (oxidizing materials).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: No occupational exposure limits established.

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

Personal Protection Measures: 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 Protection: Splash resistant safety goggles and emergency eyewash are recommended.

Skin and Body Protection: Chemical resistant clothing and gloves are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Properties	Fuel Oil No. 6
Molar Mass (g/mol)	not applicable
Molecular Formula	not applicable
Appearance (physical state, color, etc.)	black, liquid paste
Odor	varies
Odor threshold	not available
pH	not available
Evaporation rate	not available
Melting point/freezing point	not available
Relative Density as Specific Gravity (water = 1)	0.9 to 1.1
Density[(a)]	1010.1 kg/m^3 at 15 °C 8.5 API at 60 °F
Vapor Pressure	0.2 mmHg at 20 °C
Vapor Density (air = 1)	not available
Viscosity	900 to 9000 SUS at 38 °C
Kinematic Viscosity[(a)]	322.9 cSt at 40 °C 151.1 cSt at 50 °C 16.17 cSt at 100 °C
Solubilities	water: insoluble
Partition coefficient (n-octanol/water)	not available
Thermal Stability Properties	
Autoignition Temperature	407 °C (765 °F)
Thermal Decomposition	not available
Initial boiling point and boiling range	>177 °C (>351 °F)
Explosive Limits, LEL	1 %
Explosive Limits, UEL	5 %
Flash Point[(a)]	93 °C (199 °F)
Flammability (solid, gas)	not applicable

[(a)] Property was determined for SRM 1619b (see Certificate of Analysis) using ASTM method.

10. STABILITY AND REACTIVITY

Reactivity: This material is not reactive at normal temperatures and pressure.

Stability: _X_ Stable _____ Unstable

Possible Hazardous Reactions: Not applicable.

Conditions to Avoid: Avoid heat, flames, sparks, and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers. Dangerous gases may accumulate in confined spaces.

Incompatible Materials: Oxidizing materials.

Hazardous Decomposition: Oxides of carbon, hydrogen sulfide.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Eye or skin irritation and possible skin disorders.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Irritation hazard is low unless heated or misted. High concentrations of vapor or mist may cause irritation and possibly systems of central nervous system depression. Prolonged contact may cause irritation.

Skin Contact: May cause irritation and redness. Smarting skin may occur. Large concentrations may produce weight loss, anorexia, ataxia, and lethargy, and death.

Eye Contact: Irritation.

Ingestion: Large quantities may cause gastrointestinal distress; no other adverse effects identified.

Numerical Measures of Toxicity

Acute toxicity: Not classified.
Rat, Oral, LD50: 4320 mg/kg
Rat, Oral, LD50: >25 mL/kg
Rabbit, Dermal, LD50: >2000 mg/kg

Skin corrosion/irritation: Not classified.
Rabbit, skin: 500 mg mild; 0.5 mL

Serious eye damage/eye irritation: Not classified.
Rabbit, eyes: 100 µL (24 h) mild.

Respiratory sensitization: No data available.

Skin sensitization: No data available.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Category 2.

Listed as a Carcinogen/Potential Carcinogen X **Yes** _____ **No**

IARC lists residual fuel oils as Group 2b, *possibly carcinogenic to humans*.
Residual fuel oil No. 6 is not listed in NTP or OSHA as a carcinogen.
Skin application to mice of cracked bunker fuel (alone) and blended, induced benign and malignant skin tumors.

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: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Fish, Zebrafish, *Brachydanio rerio*, LC50: 48 mg/L, semi-static, (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 in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: This material is in non-bulk packaging and is not regulated by DOT per 173.150(f)(2) or IATA.

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:	No
CHRONIC HEALTH:	Yes
FIRE:	Yes
REACTIVE:	No
PRESSURE:	No

State Regulations: Not listed.

U.S. TSCA Inventory: Fuel oil No. 6 is listed.

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

Canadian Regulations: WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

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Sources: ChemADVISOR, Inc., MSDS *Fuel Oil No. 6*, 09 December 2015.

ChemADVISOR, Inc., MSDS *Residual Fuel Oil*, 09 December 2015.

World Health Organization, International Agency for Research on Cancer, *Occupational Exposures in Petroleum Refining; Crude Oil and Major Petroleum Fuels*, Vol. 45, (1998) available at https://publications.iarc.who.int/63 (accessed Jun 2026).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	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 Level
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
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	STEL	Short Term Exposure Level
LD50	Median Lethal Dose or 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
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

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