

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

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

SRM Number: 1623c
MSDS Number: 1623c
SRM Name: Sulfur in Residual
Fuel Oil (0.3 %)

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Description: 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 in fuel oils or materials of similar matrix. A unit consists of 100 mL of commercial "No. 4 (light)" residual fuel oil as defined by ASTM D 396-95 Standard Specification for Fuel Oils, in an amber bottle.

Substance: Residual Fuel Oil

Other Designations: Residual Fuel Oil (fuel oil; fuel oil No. 4; No. 4 fuel oil)

2. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 1 Fire = 2 Reactivity = 0

NOTE: Residual fuel oil is a complex mixture that has been studied as a whole and the health hazard and physical properties of the mixture is reported in this MSDS.

Major Health Hazards: Possible cancer hazard (in humans)^(a)

Physical Hazards: Combustible liquid and vapor.

Potential Health Effects (Acute and Chronic):

Inhalation: Acute: irritation, headache, drowsiness, dizziness, loss of coordination; Chronic: irritation.

Skin Contact: Acute: irritation; Chronic: irritation, skin disorders, rash.

Eye Contact: Irritation.

Ingestion: No information available.

Listed as a Carcinogen/Potential Carcinogen

	Yes	No
National Toxicology Program (NTP) Report on Carcinogens	_____	X
International Agency for Research on Cancer (IARC) Monographs	X ^(a)	_____
Occupational Safety and Health Administration (OSHA)	_____	X

^(a)Residual (heavy) fuel oils are listed by IARC as a Group 2B Carcinogen – *possibly carcinogenic to humans*.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EC Number (EINECS)	Nominal Concentration (%)
Residual Fuel Oil (No. 4)	68476-31-3	270-673-5	100 %

Note: There may be trace amounts of hydrogen sulfide generated due to the sulfur content in the fuel oil. There is not a direct correlation between hydrogen sulfide generation and the total sulfur content listed on the Certificate of Analysis.

EC Classification: Xn.

EC Risk (R No.): R40.

EC Safety (S No.): S36/37.

EC Risk/Safety Phrases: See Section 15, "Regulatory Information".

4. FIRST AID MEASURES

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

Skin Contact: Rinse affected area with soap and water for at least 15 minutes. Seek medical assistance if necessary.

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.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Moderate fire hazard. Vapor/air mixtures are explosive above flash point.

Extinguishing Media: Regular dry chemical, carbon dioxide, fine water spray, regular foam.

Fire Fighting: Avoid inhalation of combustion by-products.

Flash Point (°C): 52 (125 °F)

Method Used: Pensky-Martens Closed-Cup Tester (ASTM D93—94)

Autoignition Temp. (°C): 263 (505 °F)

Flammability Limits in Air

UPPER (Volume %): 5

LOWER (Volume %): 1

Products of Combustion: Thermal decomposition may release hazardous or toxic gases (see Section 10, “Stability and Reactivity”).

Note: When available, value is from Certificate of Analysis of SRM 1623c.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Absorb with sand or other non-combustible material and collect in appropriate container for proper disposal.

Disposal: Refer to Section 13, “Disposal Considerations”.

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards.

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

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits for Fuel Oil No. 4: No OSHA permissible exposure limits established.

ACGIH (TWA): 100 mg/m³ TWA (as total hydrocarbons, inhalable fraction and vapor)

Ventilation: Local exhaust ventilation system.

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

Eye Protection: Wear safety goggles. An eyewash station and drench shower should be readily available near the handling and use areas.

Personal Protection: Chemically resistant gloves and clothing are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: light to dark color liquid, petroleum odor

Molecular Formula: not applicable.

Specific Gravity (water = 1): <1

Density (15 °C): 899.6 kg/m³

Boiling Point (°C): >101 (>214 °F)

Pour Point (°C): 21 (70 °F)

Water Solubility: insoluble

Note: When available, value is from Certificate of Analysis of SRM 1623c.

10. STABILITY AND REACTIVITY

Stability: Stable Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Avoid heat, flames, sparks, and other ignition sources. Avoid contact with incompatible materials. Containers 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 sulfur and carbon.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: Inhalation Skin Ingestion

Toxicity Data: No information available.

Health Effects: See Section 2, "Hazards Identification" for potential health effects.

Target Organs: Respiratory tract.

Mutagen/Teratogen: No information available.

Medical Conditions Generally Aggravated by Exposure: Immune systems disorders, allergies, respiratory disorders, and skin disorders.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Aquatic Toxicity - Fish: flathead minnows (*Pimephales promelas*), LC₅₀: 35 mg/L (96 hrs, flow-through).

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Gas oil; Hazard class 3, UN1202, Packing Group III.

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

California Proposition 65: Keep out of water supplies and sewers. Warning this product contains residual (heavy) fuel oils known to the state of California to cause cancer.

CANADIAN REGULATIONS

WHMIS Information: Not provided for this information.

EUROPEAN REGULATIONS

EC Classification: Xn: Harmful (Carc. Cat. 3)

EC Risk Phrases: R40 – Limited evidence of a carcinogenic effect.

EC Safety Phrases: S36/37 – Wear suitable protective clothing and gloves.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Fuel Oil listed.

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

16. OTHER INFORMATION

Sources: ChemAdvisor, MSDS *Fuel Oil No. 4*, 10 June 2011.

International Agency for Research on Cancer (IARC) - Summaries & Evaluations, *FUEL OILS (HEATING OILS)*, VOL. 45, p. 239, (1989) available at <http://www.inchem.org/documents/iarc/vol45/45-06.html> (accessed Oct 2011).

State of California Office of Environmental Health Hazard Assessment, *Proposition 65*, available at <http://www.oehha.ca.gov/prop65.html> (accessed Oct 2011).

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