



U. S. Oil & Refining Co.

3001 Marshall Avenue, Tacoma, Washington, 98421 (253) 383-1651

Product Specification ISO Marine Residual Fuels

<u>Characteristic</u>	<u>Limit</u>	<u>Test Method</u>		<u>Specifications^a</u>				
		ISO	ASTM	RME-180	RMG-380	RMG-500	RMK-500	RMK-700
Viscosity @50°C mm ² /s	max	3104	D 445	180.0	380.0	500.0	500.0	700.0
Density @15°C, kg/m ³	max	12185	D 4052	991.0	991.0	991.0	1010.0	1010.0
Gravity, °API, reference only	min		D 4052	11.2	11.2	11.2	8.6	8.6
CCAI	max	8217aF		860	870	870	870	870
Sulfur, mass %	max	8754	D 4294	0.50	0.50	0.50	0.50	0.50
Flash Point, PMCC, °C	min	2719	D 93B	60.0	60.0	60.0	60.0	60.0
Acid number, mg KOH/g	max	D 664	D 664	2.5	2.5	2.5	2.5	2.5
Hydrogen Sulfide, mg/kg	max	IP570	D 7621	2.00	2.00	2.00	2.00	2.00
Total sediment, potential, mass %	max	10307-2	D 4870A	0.10	0.10	0.10	0.10	0.10
Carbon residue, mass %	max	10370	D 4530	15.00	18.00	18.00	20.00	20.00
Pour Point, °C Winter/Summer	max	3016	D 5950	30/30	30/30	30/30	30/30	30/30
Water, volume %	max	3733	D 4006	0.50	0.50	0.50	0.50	0.50
Ash, mass %	max	6245	D 482	0.070	0.100	0.100	0.150	0.150
Vanadium, mg/kg	max	14597	IP501	150	350	350	450	450
Sodium, mg/kg	max	IP501	IP501	50	100	100	100	100
Aluminum + Silicon, mg/kg	max	10478	IP501	50	60	60	60	60
Used lubricating oil (ULO) mg/kg	---	IP501	IP501	The fuel shall be free of ULO ^b				
calcium & zinc				calcium > 30 and zinc > 15				
calcium & phosphorus				calcium > 30 and phosphorus > 15				

a. Product conforms to ISO 8217:2017(E) listed grade.

b. A fuel shall be considered to contain ULO if either of the conditions is met.

c. Reserved

d. Reserved



Par Pacific

Residual Fuel Oil

SAFETY DATA SHEET

Date of Preparation: December 17, 2024

Section 1: IDENTIFICATION

Product Identifier: Residual Fuel Oil

Other Means of Identification: Residual Fuel Oil; Fuel Oil #6; Bunker C Fuel Oil; ISO Marine Fuels; IFO Marine Fuels.

SDS Number: 940

Product Code: Fuel Oil, All grades.

Product Use: Marine Fuel Oil.

Restrictions on Use: Not available.

Manufacturer/Supplier: U.S. OIL & REFINING CO.
3001 Marshall Ave.
Tacoma, WA 98421

Emergency Phone: U.S. OIL & REFINING CO.: (253) 383-1651
CHEMTREC: 800-424-9300
NATIONAL POISON CENTER: 1-800-222-1222

Date of Preparation of SDS: December 17, 2024

Section 2: HAZARD(S) IDENTIFICATION

CLASSIFICATION: Flammable Liquids, Category 4
Skin Irritation, Category 2
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (Single Exposure), Category 3 - Narcotic Effects
Specific Target Organ Toxicity (Repeated Exposure), Category 2
Aspiration Hazard, Category 1

LABEL ELEMENTS

**Hazard
Symbol(s):**



Signal Word: Danger

**Hazard
Statements:** H227: Combustible liquid.
H315: Causes skin irritation.
H350: May cause cancer.
H336: May cause drowsiness or dizziness.
H373: May cause damage to organs through prolonged or repeated exposure.
H304: May be fatal if swallowed and enters airways.



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PRECAUTIONARY STATEMENTS

Prevention: P201: Obtain special instructions before use.
 P202: Do not handle until all safety precautions have been read and understood.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P260: Do not breathe mist, vapours, or spray.
 P264: Wash hands thoroughly after handling.
 P271: Use only outdoors or in a well-ventilated area.
 P280: Wear protective gloves, protective clothing and eye protection.

Response: P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor.
 P302 + P352: IF ON SKIN: Wash with plenty of water.
 P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P308 + P313: IF exposed or concerned: Get medical attention.
 P312: Call a POISON CENTER or doctor if you feel unwell.
 P331: Do NOT induce vomiting.
 P332 + P313: If skin irritation occurs: Get medical attention.
 P362 + P364: Take off contaminated clothing and wash it before reuse.
 P370 + P378: In case of fire: Use dry chemical, CO₂, water spray or regular foam to extinguish.

Storage: P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
 P235: Keep cool.
 P405: Store locked up.

Disposal: P501: Dispose of contents and container in accordance with applicable regional, national and local laws and regulations.

Hazards Not Otherwise Classified: No applicable information was found.

Ingredients with Unknown Acute Toxicity: 100% of this product mixture consists of ingredient(s) of unknown acute toxicity.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

This material is considered hazardous by the Hazardous Products Regulations.

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS			
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Hazardous Ingredient(s)	Common name / Synonyms	CAS No.	% wt./wt.
Fuel Oil, Residual	Bunker Fuel	68476-33-5	100
Polycyclic Aromatic Hydrocarbons	Not available.	130498-29-2	variable
Hydrogen Sulfide (H ₂ S)	Hydrogen Sulphide	7783-06-4	Trace



Section 4: FIRST-AID MEASURES

Inhalation: If inhaled: Remove person to fresh air and keep comfortable for breathing. If symptoms persist, get medical attention/advice. If breathing or the heart stops, trained personnel should immediately begin artificial respiration (AR) or cardiopulmonary resuscitation (CPR) respectively. Get medical attention immediately.

Acute and delayed symptoms and effects: May cause drowsiness or dizziness. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Excessive inhalation may cause headache, dizziness, confusion, loss of appetite and/or loss of consciousness. This product may contain small amounts of Hydrogen Sulfide which may accumulate in confined spaces. Inhalation of Hydrogen Sulfide may cause loss of sense of smell, major irritation of the respiratory tract, headache, nausea, vomiting, dizziness, and fluid buildup in the lungs (pulmonary edema), which can be fatal. At 300 ppm unconsciousness may occur after 20 minutes.

Skin Contact: If on skin (or hair): Rinse skin with water or shower. Get immediate medical attention. Remove non-adhering contaminated clothing. Cool adherent materials and burned areas with ice and/or cold water. Do not remove adherent material or clothing. Wash contaminated clothing before reuse.

Acute and delayed symptoms and effects: Causes skin irritation. Signs/symptoms may include localized redness, swelling, and itching. Hot liquid product may cause serious thermal burns on direct contact.

Eye Contact: If in eyes: Rinse cautiously with water for at least 30 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor.

Acute and delayed symptoms and effects: May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hot liquid product may cause serious thermal burns on direct contact.

Ingestion: If swallowed: Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration. Never give anything by mouth to an unconscious person. If breathing or the heart stops, trained personnel should immediately begin artificial respiration (AR) or cardiopulmonary resuscitation (CPR) respectively. Get medical attention immediately.

Acute and delayed symptoms and effects: May be fatal if swallowed and enters airways. Hot product may cause thermal burns. Signs/symptoms may include severe mouth, throat and abdominal pain, nausea, vomiting, and diarrhea, blood in the feces and/or vomitus may also be seen.



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Note to Physicians: Symptoms may not appear immediately. For inhalation of Hydrogen Sulfide, consider Oxygen.

Section 5: FIRE-FIGHTING MEASURES

NFPA 704



SUITABLE/UNSUITABLE EXTINGUISHING MEDIA

Suitable Extinguishing Media: Small Fire: Dry chemical, CO₂, water spray or regular foam.

Large Fire: Water spray, fog or regular foam. Move containers from fire area if it can be done safely.

Unsuitable Extinguishing Media: Do not spray water onto burning product as this may cause spattering and spreading of the flame.

SPECIFIC HAZARDS

Combustible liquid. Will be ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Substance may be transported hot. Spraying water onto burning product may cause spattering and spreading of the flame. When heated, this material may evolve toxic and flammable Hydrogen Sulfide.

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Fire involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Products of Combustion: Oxides of Carbon. Oxides of Sulfur. Oxides of Nitrogen.

Sensitivity to Mechanical Impact: This material is not sensitive to mechanical impact.

Sensitivity to Static Discharge: This material is not sensitive to static discharge.

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS

Inhalation or contact with material may irritate or burn skin and eyes. Fire may produce irritating, corrosive and/or toxic gases. Vapors may cause dizziness or suffocation. Runoff from fire control or dilution water may cause pollution. Hydrogen Sulfide is heavier than air and may



collect in low lying areas and confined spaces. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

- Personal Precautions:** Do not touch or walk through spilled material. Use personal protection recommended in Section 8. Don full-face, positive pressure, self-contained breathing apparatus.
- Protective Equipment:** Emergency eyewash capability should be available. Wear respiratory protection as conditions warrant.
- Emergency Procedures:** As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

- Methods for Containment:** Stop leak if it can be done without risk. A vapor suppressing foam may be used to reduce vapors.
- Methods for Clean-Up:** Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Section 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING:

Do not swallow. Do not breathe mist, vapors, or spray. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use non-sparking tools. Take action to prevent static discharges. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. See Section 8 for information on Personal Protective Equipment.

CONDITIONS FOR SAFE STORAGE:

Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up. Store away from incompatible materials. See Section 10 for information on Incompatible Materials. Head spaces in storage containers may contain toxic Hydrogen Sulfide gas. Structural materials and lighting and ventilation systems should be corrosion resistant.



Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Component	ACGIH	OSHA
Fuel Oil, Residual [CAS No. 68476-33-5]	A2; Exposure by all routes should be carefully controlled to levels as low as possible (2010); For Mineral oil, excluding metal working fluids; Poorly and mildly refined	5 mg/m ³ (TWA); For Oil Mist, Mineral.
Polycyclic Aromatic Hydrocarbons [CAS No. 130498-29-2]	A2; BEI; Exposure by all routes should be carefully controlled to levels as low as possible (1993); For Benz[a]anthracene	0.2 mg/m ³ (TWA); For Benzene-soluble fraction.
Hydrogen Sulfide [CAS No. 7783-06-4]	1 ppm (TWA); 5 ppm (STEL); (2010)	20 ppm (C); 50 ppm (Peak) (Maximum duration: 10 mins. once only if no other meas. exp. occurs.) 10 ppm (TWA); 15 ppm (STEL) [Vacated]

TWA: Time-Weighted Average
STEL: Short-Term Exposure Limit
C: Ceiling

ENGINEERING CONTROLS

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, gas, etc.) below recommended exposure limits. Use explosion-proof electrical, ventilating, and lighting equipment.

PERSONAL PROTECTIVE EQUIPMENT (PPE)



Eye/Face Protection:

Wear chemical safety goggles. If product is hot, wear full face-shield. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3:20 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.

Hand Protection:

Wear protective gloves. If product is hot, thermally protective gloves are recommended. Consult manufacturer specifications for further information.

Skin and Body Protection:

Wear protective clothing. Flame resistant clothing that meets the NFPA 2112 and CAN/CGSB 155.20 standards is recommended in areas where material is stored or handled. Clothing with full length sleeves and pants should be worn.



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Respiratory Protection:

If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH approved air-purifying respirator, with organic vapor cartridge, or self-contained breathing apparatus must be used. Supplied air breathing apparatus must be used when Oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

General Hygiene Considerations:

Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection. Emergency eyewash should be available near operations presenting a potential splash exposure. Avoid skin exposure. Promptly remove contaminated clothing, gloves, and shoes.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Thick, oily liquid.
Color:	Brown to black.
Odor:	Strong petroleum odor, asphalt-like.
Odor Threshold:	Not available.
Physical State:	Liquid.
pH:	Not available.
Melting Point / Freezing Point:	Not available.
Initial Boiling Point:	175 °C (347 °F)
Boiling Range:	175 to 650 °C (347 to 1200 °F)
Flash Point:	> 60 °C (140 °F) (Closed Cup)
Evaporation Rate:	Negligible.
Flammability (solid, gas):	Not applicable.
Lower Flammability Limit:	Not available.
Upper Flammability Limit:	Not available.
Vapor Pressure:	Not available.
Relative Vapor Density:	> 1 (Air = 1)
Relative Density:	0.93 to 1.01 (Water = 1) at 15 °C (59 °F)
Solubilities:	Insoluble in water.
Partition Coefficient: n-Octanol/Water:	Not available.



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Auto-ignition Temperature: 260 °C (500 °F)
Decomposition Temperature: Not available.
Kinematic Viscosity: 30 to 1200 mm²/s at 50 °C (122 °F)
Percent Volatile, wt. %: Not available.
VOC Content, wt. %: Not available.
Particle Characteristics: Not available.

Section 10: STABILITY AND REACTIVITY

Reactivity: Contact with incompatible materials. Sources of ignition. Exposure to heat.
Chemical Stability: Stable under normal storage conditions.
Possibility of Hazardous Reactions: None known.
Conditions to Avoid: Contact with incompatible materials. Sources of ignition. Exposure to heat.
Incompatible Materials: Acids. Bases. Strong oxidizers.
Hazardous Decomposition Products: Oxides of Carbon. Oxides of Sulfur. Oxides of Nitrogen.

Section 11: TOXICOLOGICAL INFORMATION

LIKELY ROUTES OF EXPOSURE: Eye contact. Skin contact. Inhalation. Ingestion.

ACUTE EXPOSURE

PRODUCT TOXICITY

Oral: Not available.
Dermal: Not available.
Inhalation: Not available.

COMPONENT TOXICITY

Component	CAS No.	LD ₅₀ oral	LD ₅₀ dermal	LC ₅₀
Fuel Oil, Residual	68476-33-5	Not available.	Not available.	Not available.
Polycyclic Aromatic Hydrocarbons	130498-29-2	Not available.	Not available.	Not available.
Hydrogen Sulfide	7783-06-4	Not available.	Not available.	444 ppm (rat); 4H

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Lungs. Blood. Cardiovascular system. Bone marrow. Liver. Kidneys. Central nervous system.



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SYMPTOMS (including delayed and immediate effects)

Inhalation: May cause drowsiness or dizziness. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Excessive inhalation may cause headache, dizziness, confusion, loss of appetite and/or loss of consciousness. This product may contain small amounts of Hydrogen Sulfide which may accumulate in confined spaces. Inhalation of Hydrogen Sulfide may cause loss of sense of smell, major irritation of the respiratory tract, headache, nausea, vomiting, dizziness, and fluid buildup in the lungs (pulmonary edema), which can be fatal. At 300 ppm unconsciousness may occur after 20 minutes.

Eye: May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hot liquid product may cause serious thermal burns on direct contact.

Skin: Causes skin irritation. Signs/symptoms may include localized redness, swelling, and itching. Hot liquid product may cause serious thermal burns on direct contact.

Ingestion: May be fatal if swallowed and enters airways. Hot product may cause thermal burns. Signs/symptoms may include severe mouth, throat and abdominal pain, nausea, vomiting, and diarrhea, blood in the feces and/or vomitus may also be seen.

Skin Sensitization: Not available.

Respiratory Sensitization: Not available.

Medical Conditions Aggravated By Exposure: Not available.

CHRONIC EFFECTS (from short and long-term exposure)

Target Organs: Eyes. Skin. Gastrointestinal tract. Respiratory system. Cardiovascular system. Central nervous system. Bone marrow. Liver.

Chronic Effects: Hazardous by OSHA/WHMIS criteria. May cause chronic effects. Prolonged or repeated contact may dry skin and cause irritation. High vapor concentrations, generally greater than 10% by volume, may sensitize the heart and lead to lethal cardiac arrhythmias. This product contains Polycyclic Aromatic Hydrocarbons. Prolonged contact with these compounds has been associated with the induction of skin and lung tumors, anemia, disorders of the liver, bone marrow and lymphoid tissues. Hydrogen Sulfide may reduce lung function; cause neurological effects such as headaches, nausea, depression and personality changes; eye and mucous membrane irritation; and damage to cardiovascular system.

Carcinogenicity: May cause cancer.



Component Carcinogenicity

Component	ACGIH	IARC	NTP	OSHA	Prop 65
Fuel Oil, Residual	A2	Group 1	List 1	OSHA Carcinogen.	Listed.
Polycyclic Aromatic Hydrocarbons	A2	Not listed.	List 2	OSHA Carcinogen.	Listed.

Mutagenicity: Not available.

Reproductive Effects: Not available.

Developmental Effects

Teratogenicity: Not available.

Embryotoxicity: Not available.

Toxicologically Synergistic Materials: Not available.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: Not available.

Persistence / Degradability: Not available.

Bioaccumulation / Accumulation: Not available.

Mobility in Environment: Not available.

Other Adverse Effects: Not available.

Section 13: DISPOSAL CONSIDERATIONS

Disposal Instructions: Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

Section 14: TRANSPORT INFORMATION

REGULATORY INFORMATION	ID NUMBER	EMERGENCY RESPONSE GUIDEBOOK	PROPER SHIPPING NAME	CLASS	PACKING GROUP	PLACARD
DOT Classification	NA1993	Guide 128	COMBUSTIBLE LIQUID, N.O.S. (Fuel Oil)	Combustible liquid	III	
TDG Classification	Not applicable	Not applicable	Not regulated	Not applicable	Not applicable	Not applicable
IATA/ICAO	Not applicable	Not applicable	Not regulated	Not applicable	Not applicable	Not applicable



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Section 15: REGULATORY INFORMATION

CHEMICAL INVENTORIES

US (TSCA)

The components of this product are in compliance with the chemical notification requirements of TSCA.

Canada (DSL)

The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

FEDERAL REGULATIONS

United States

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III

Component	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)
Polycyclic Aromatic Hydrocarbons	Not listed.	Not listed.	Not listed.	313	Not listed.	Not listed.
Hydrogen Sulfide	500	100	100	313	U135	10000

SARA SECTION 311/312 - EPA HAZARD CATEGORIES

<u>ACUTE HEALTH</u>	<u>CHRONIC HEALTH</u>	<u>FIRE</u>	<u>SUDDEN RELEASE OF PRESSURE</u>	<u>REACTIVE</u>
X	X	X	-	-

State Regulations

California

California Prop 65:



WARNING This product can expose you to chemicals including Fuel Oil, Residual and Polycyclic Aromatic Hydrocarbons, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.



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Section 16: OTHER INFORMATION

Disclaimer:

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for his own particular use.

Date of Preparation of SDS: December 17, 2024

Version: 3.0

GHS SDS Prepared by: **Aegis Regulatory Inc.**

Phone: (519) 488-0351

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