

Safety Data Sheet

Middle Distillate Oil

Minerva Bunkering (USA) LLC

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Middle Distillate Oil

Synonyms Diesel Fuel (All Grades), Low or High Sulfur Diesel, No. 2 Diesel, Low or High Sulfur No. 2 Fuel Oil, Low or High Sulfur No. 2 Heating Oil, Low or High Sulfur Heating Oil, Light Cycle Oil, Marine Diesel, Gas Oil, Atmospheric or Vacuum Gas Oil, Cat Cracker Feed, Distillate Blend Stock, Non-Road Diesel, Locomotive Diesel Fuel, Dyed or Undyed Diesel Fuel (may contain dye to meet the requirements for tax-exempt diesel fuel).

Chemical Family Petroleum Hydrocarbon

Intended Use Fuel

MARPOL Annex I Category Gas Oils, Including Ship's Bunkers

Supplier Minerva Bunkering (USA) LLC
20 E Greenway Plaza Suite 650
Houston, TX 77046

24 Hour Emergency Numbers **Emergency phone:** (24-hr) 800-424-9300 (Chemtrec)
Other calls: 720-214-6215 Health, Safety & Environmental
American Association of Poison Control Centers: 800-222-1222

2. HAZARDS IDENTIFICATION

GHS Classification

H226 Flammable liquid – Category 3
H304 Aspiration hazard – Category 1
H315 Skin corrosion/irritation – Category 2
H332 Acute toxicity, inhalation – Category 4
H351 Carcinogenicity – Category 2
H373 Specific target organ toxicity (repeated exposure) – Category 2
H401 Hazardous to the aquatic environment, acute hazard – Category 2
H410 Hazardous to the aquatic environment, long term hazard – Category 2

Label Elements



Signal Words Danger

GHS Hazard Statements

H226 Flammable liquid and vapor
H304 May be fatal if swallowed and enters airways
H315 Causes skin irritation
H332 Harmful if inhaled
H351 Suspected of causing cancer
H373 May cause damage to organs through prolonged or repeated exposure
H411 Toxic to aquatic life with long lasting effects

GHS Precautionary Statements

P201 Obtain special instructions before use

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2. HAZARDS IDENTIFICATION

P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat/sparks/open flames/hot surfaces – no smoking
P233	Keep container tightly closed
P240	Ground/bond container and receiving equipment
P241	Use explosion-proof electrical, ventilating and lighting equipment
P242	Use only non-sparking tools
P243	Take precautionary measures against static discharge
P260	Do not breathe dust/fumes/gas/mist/vapours/spray
P264	Wash thoroughly after handling
P271	Use only outdoors or in a well-ventilated area
P273	Avoid release to the environment
P280	Wear protective gloves / protective clothing / eye protection / face protection
P281	Use personal protective equipment as required
P361, P352, P362	IF ON SKIN OR HAIR: Remove/take off immediately all contaminated clothing. Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.
P332, P313	If skin irritation occurs: Get medical advice/attention
P305,P351,P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P313	If eye irritation persists, get medical advice/attention
P301,P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331	Do NOT induce vomiting
P304,P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF exposed or concerned: get medical attention
P315	IF exposed or concerned: Get medical attention
P312	Call a POISON CENTER or doctor/physician if you feel unwell
P370,P378	In case of fire: Use dry chemical, carbon dioxide, or foam for extinction
P391	Collect spillage
P403,P233, P235 P501	Store in a well-ventilated place. Keep container tightly closed, Keep cool Dispose of contents/container to approved facility

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS Registration No.	Concentration (%)
Fuel Oil, No. 2	68476-34-6	0 - 100
Full Straight Run Middle Distillate	68814-87-9	0 - 100
Hydrotreated Middle Distillate	64742-46-7	0 - 100
Light Catalytic Cracked Distillate	64741-59-9	0 - 100
Straight Run Middle Distillate	64741-44-2	0 - 100
Petroleum Residues Vacuum Distillate	68955-27-1	0 - 100
Cumene	98-82-8	< 1
Ethyl Benzene	100-41-4	< 1
Naphthalene	91-20-3	< 2

4. FIRST AID MEASURES

Eye Contact	Flush eyes with water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye. Remove contact lenses, if worn, after initial flushing. Do not use eye ointment. Seek medical attention.
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4. FIRST AID MEASURES

Skin Contact	Remove contaminated shoes and clothing, and flush affected areas with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, clean affected area thoroughly with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Discard or launder contaminated clothing prior to reuse. Thermal burns require immediate medical attention depending on the severity and area of the body burned. If product is injected into or under the skin, or into any part of the body, the individual should be evaluated immediately by a physician, regardless of the appearance of the wound or its size. {See Notes to Physician}.
Inhalation (Breathing)	If respiratory symptoms or other symptoms of exposure develop, move victim away from the source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airways and give artificial respiration. If breathing is difficult, humidified oxygen should be administered by qualified personnel. Seek immediate medical attention.
Ingestion (Swallowing)	Aspiration hazard. Do not induce vomiting or give anything by mouth because the material can enter the lungs and cause severe lung damage. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention
Most Important Symptoms and Effects	Acute: Respiratory irritation, headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Ingestion can cause irritation of the digestive tract, nausea, diarrhea and vomiting Delayed: Dry skin and possible irritation with repeated or prolonged exposure
Potential Acute Health Effects	Inhalation: Breathing high concentrations may be harmful. Mist or vapor can irritate the throat and lungs. Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness or unconsciousness. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (light sensitivity) and pulmonary edema (fluid accumulation in lungs). Severe exposures can result in nausea, vomiting, muscle weakness or convulsions, respiratory failure and death. Eye Contact: This product can cause eye irritation from short-term contact with liquid, mists or vapors. Symptoms include stinging, watering, redness and swelling. Effects may be more serious with repeated or prolonged contact. Skin Contact: This product is a skin irritant. Contact may cause redness, itching, burning and skin damage. Ingestion: Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema or hemorrhage and even death.
Potential Chronic Health Effects	Chronic effects of overexposure are similar to acute effects including central nervous system (CNS) effects and CNS depression. Effects may also include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting and skin dermatitis.
Notes to Physician	Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

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4. FIRST AID MEASURES

Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis. Inhalation overexposure can produce toxic effects, monitor for respiratory distress. If cough or breathing difficulties develop, evaluate for upper respiratory tract inflammation, bronchitis and pneumonitis.

Skin contact may aggravate an existing dermatitis.

When using high-pressure equipment, injection of product under the skin can occur. In this case, the victim should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure injection injuries may cause substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement. All injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

5. FIRE FIGHTING MEASURES

Flammability Classification	OSHA Classification (29 CFR 1910.1200): Combustible Liquid NFPA Class-II Combustible Liquid NFPA Ratings: Health: 1, Flammability: 2, Reactivity: 0
Flash Point	52 - 96°C, 125 - 205°F Closed Cup (Pensky-Martens)
Flammable Limits	Lower Limit: 0.3% Upper Limit: 10%
Auto ignition Temperature	260°C, 500°F
Combustion Products	Highly dependent on combustion conditions. Combustion may yield fumes, smoke, carbon monoxide, carbon dioxide, sulfur and nitrogen oxides, aldehydes and unburned hydrocarbons.
Fire and Explosion Hazards	This material is extremely flammable and can be ignited by heat, sparks, flames or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment and electronic devices such as cell phones, computers and calculators that have not been certified as intrinsically safe). Vapors are heavier than air and can accumulate in low areas. May create vapor/air explosion hazard indoors, in confined spaces, outdoors or in sewers. Vapors may travel considerable distances to a remote source of ignition where they can ignite, flash back or explode. Product can accumulate a static charge that may cause a fire or explosion. A product container, if not properly cooled, can rupture in the heat of a fire.
Extinguishing Media	Dry chemical, carbon dioxide or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
Fire Fighting	Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate

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5. FIRE FIGHTING MEASURES

hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling.

For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by regulations, a self-contained breathing apparatus should be worn. Wear other appropriate protective equipment as conditions warrant.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Flammable. Spillage of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Avoid direct contact with material. Isolate immediate hazard area and keep unauthorized personnel out. For large spillage, notify persons downwind of the spill/release. Wear appropriate protective equipment, including respiratory protection, as conditions warrant per Exposure Controls/Personal Protection guidelines.

Environmental Precautions

Stop and contain spill/release if it can be done safely. Prevent spilled material from entering waterways, sewers, storm drains, basements or confined areas. Contain release to prevent further contamination of soils, surface water or groundwater. Clean up spill as soon as possible using appropriate techniques such as applying non-combustible absorbent materials or pumping. A vapor suppressing foam may be used to reduce vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. All equipment used when handling the product must be grounded. If spill occurs on water, notify appropriate authorities and advise shipping of any hazard. Where feasible and appropriate, remove contaminated soil.

Methods for Containment and Clean Up

Immediate cleanup of any spill is recommended. Build dike far ahead of spill for containment and later recovery or disposal of spilled material. Absorb spill with inert material such as sand or vermiculite and place in suitable container for disposal. If spilled on water, remove with appropriate equipment like skimmers, booms or absorbents. Use clean non-sparking tools to collect absorbed material. In case of soil contamination, remove contaminated soil for remediation or disposal in accordance with applicable regulations.

Reporting

Report spills/releases, as required, to appropriate local, state and federal authorities. Within the US, Coast Guard and Environmental Protection Agency regulations require immediate reporting of spills/release that could reach any waterway including intermittent dry creeks. Spills into or upon navigable waters, the contiguous zone or adjoining shorelines that cause a sheen or discoloration on the surface of the water may require notification of the National Response Center (800) 424-8802. In case of accident or road spill, call the 24 hour emergency number (800) 222-1222.

7. HANDLING AND STORAGE

Precautions for Safe Handling

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

7. HANDLING AND STORAGE

flames and other ignition sources. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Do not use as a solvent due to its flammable and potentially toxic properties. Siphoning by mouth can result in lung aspiration which can be harmful or fatal.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Use non-sparking tools and explosion-proof equipment. Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. Explosion-proof electrical equipment is recommended and may be required by fire codes. Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements.

Warning! Use of this material in spaces without adequate ventilation may result in the generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). Do not use electronic devices (such as cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified as intrinsically safe. Electrical equipment and fittings should comply with local fire codes For more information, refer to OSHA Standard 29 CFR 1910.106 (Flammable and Combustible Liquids), National Fire Protection Association NFPA 70 (Recommended Practice on Static Electricity) and/or the American Petroleum Institute APS RP 2003 (Protection Against Ignitions Arising Out of Static, Lightning and Stray Currents).

Precautions for Safe Storage

Keep containers tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Store only in approved containers. Post area warnings: 'No

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Smoking or Open Flame'. Keep away from incompatible material. Outdoor or detached storage of portable containers is preferred. Indoor storage should meet OSHA standards and appropriate fire codes. Before working on or in tanks which have contained this material, refer to OSHA regulations, ANSI Z49.1 and other references pertaining to cleaning, repairing, welding or other contemplated operations.

Portable containers should never be filled while they are in or on a motor vehicle or marine craft. Static electricity may ignite vapors when filling non-grounded containers or vehicles on trailers. To avoid static buildup, do not use a nozzle lock open device. Use only approved containers. Keep containers tightly closed. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling.

Empty containers retain liquid and vapor residues and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat, flame, sparks, static electricity or other sources of ignition. They may explode and cause injury or death. Do not attempt to refill or clean containers since residue is difficult to remove. "Empty" drums should be completely drained, properly closed and returned to the supplier or a qualified drum reconditioner. All containers should be disposed of in an environmentally safe manner in accordance with government regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Fuels, Diesel, No. 2	100 mg/m ³ TWA-Skin	100 mg/m ³ TWA-Skin	
Cumene	50 ppm TWA	50 ppm, 245 mg/m ³ PEL Skin	50 ppm, 245 mg/m ³ TWA Skin
Ethyl Benzene	20 ppm TWA 125 ppm STEL	100 ppm, 435 mg/m ³ PEL 125 ppm STEL	100 ppm, 435 mg/m ³ TWA 125 ppm, 545 mg/m ³ STEL 800 ppm IDLH
Naphthalene	10 ppm TWA Skin 15 ppm STEL	10 ppm, 50 mg/m ³ PEL Carcinogen	10 ppm, 50 mg/m ³ TWA 15 ppm, 75 mg/m ³ STEL 250 ppm IDLH
Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional for further information.			
ACGIH - American Conference of Government Industrial Hygienists, OSHA - Occupational Safety and Health Administration, NIOSH - National Institute for Industrial Safety and Health, TWA - Time Weighted Average (8 hour average for ACGIH and OSHA, 10 hour average for NIOSH), STEL - 15 Minute Short Term Exposure Level, Skin - indicates potential for cutaneous absorption of liquid or vapor through the eyes or mucous membranes, Ceiling - Ceiling Level, Peak - Acceptable peak over the ceiling concentration for a specified number of minutes, IDLH - Immediately Dangerous to Life and Health			

Biological Exposure Indices (BEI)			
Material	Determinant	Sampling Time	BEI Level
Ethyl Benzene	Sum of mandelic acid and phenylglyoxylic acid in creatinine in urine	End of shift at end of work week	0.7 g/g
	Ethyl Benzene in end exhaled air	Not critical	

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Biological Exposure Indices (BEI)			
Material	Determinant	Sampling Time	BEI Level
Naphthalene	1-naphthol with hydrolysis + 2-naphthol with hydrolysis	End of shift	
ACGIH - American Conference of Government Industrial Hygienists			

Personal Protective Equipment

General Considerations Consider the potential hazards of this material, applicable exposure limits, job activities and other substances in the work place when designing engineering controls and selecting personal protective equipment.

Engineering Controls Use process enclosures, local exhaust ventilation or other engineering controls to maintain airborne levels below the recommended exposure limits. An emergency eye wash station and quick-drench safety shower should be located near the work station.

Personal Protective Equipment If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, personal protective equipment (PPE) is recommended. A hazard assessment of the work should be conducted by a qualified professional to determine what PPE is required.

Respiratory Protection A respiratory protection program that meets or exceeds OSHA 29 CFR 1910.134 and ANSI Z.88.2 should be followed whenever workplace conditions warrant the use of a respirator. When there is the potential for airborne concentrations exceeding the established exposure limits given in Section 8, use a NIOSH approved air purifying respirator equipped with organic vapor cartridges/canisters. Use a full-face positive-pressure supplied air respirator in circumstances where air-purifying respirators may not provide adequate protection or where there may be the potential for airborne exposure above the exposure limits. If exposure concentration is unknown, in oxygen deficient atmospheres (<19,5% oxygen), or under conditions of limited ventilation where potential fumes or combustion products that may exceed immediately dangerous to life and health (IDLH) exposure limits, use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode.

Eye Protection Eye protection that meets or exceeds ANSI Z.87.1 is recommended if there is a potential for liquid contact with or irritation or injury to the eyes. Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing or spraying of this material. A face shield may be necessary depending on conditions of use.

Skin and Body Protection Avoid skin contact. Wear long-sleeved fire-retardant garments while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing, spraying or other conditions could potentially cause skin contact, including chemical resistant boots, aprons, arm covers, hoods, coveralls, impervious gloves, additional facial protection and encapsulated suite. Suggested protective materials: nitrile rubber. Thoroughly clean shoes and wash contaminated clothing before reuse.

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Personal Protective Equipment

Hand Protection Avoid skin contact. The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. PVC and neoprene may be suitable for incidental contact. Nitrile rubber should be used for longer term protection when prolonged or frequent contact may occur. Gloves should be worn on clean hands and hands should be washed after removing gloves. Also wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities or leaving work.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear to Light Yellow or Red if Dyed	Physical Form	Liquid
Odor	Kerosene-like	Odor Threshold	Not Established
pH	Neutral	Vapor Pressure	<0.2 psi @100°F, 38°C
Vapor Density	> 2 (air = 1)	Boiling Point/Range	300-700°F/150-370°C
Percent Volatile	840 g/l VOC	Partition Coefficient	Not established
Specific Gravity	0.81 – 0.88 @ 60°F	Density	7.1 lb/gal @ 60°F
Molecular Weight	170 – 200	Evaporation Rate	Not established
Flash Point	125 - 205°F, 52-96°C	Test Method	Closed Cup (Pensky-Martens)
Explosive Limits	0.3% LEL, 10% UEL	Auto ignition Temperature	500°F/260°C
Solubility in Water	Slightly Soluble		

10. STABILITY AND REACTIVITY

Reactivity Not chemically reactive

Chemical Stability Stable under normal anticipated storage and handling temperatures and pressures. Extremely flammable liquid and vapor. Vapor can cause flash fire.

Hazardous Reaction Hazardous reactions are not anticipated known to occur

Conditions to Avoid Avoid high temperatures and all possible sources of ignition. Prevent vapor accumulation.

Incompatibility (Materials to Avoid) Avoid contact with strong oxidizing agents such as strong acids, alkalis, chlorine and other halogens, dichromates or permanganates, which can cause fire or explosion.

Hazardous Decomposition Products Hazardous decomposition products are not expected to form during normal storage. The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.

11. TOXICOLOGICAL INFORMATION

Overview This product is a clear to light yellow (or red if dyed) combustible liquid that can release vapors that readily form flammable mixtures at or above the flash point.

11. TOXICOLOGICAL INFORMATION

Keep away from heat, sparks, flames and other sources of ignition. It contains material that has caused cancer based on animal data. Never siphon this product by mouth. If swallowed, this product may be aspirated into the lungs and cause lung damage or death.

This material may contain ethyl benzene, cumene and naphthalene at concentrations above 0.1%. IARC has classified ethyl benzene, cumene and naphthalene as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.

Toxicological Information of the Material.

Acute Toxicity **Dermal:** Low Toxicity: LD50 > 2000 mg/kg (rabbit)
Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking that can lead to dermatitis.

Inhalation: Product expected to have moderate degree of toxicity by inhalation: LC 50 4.1 mg/l, 4 hr (rat) (vapor)
Effect of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

Ingestion: Product expected to have low degree of toxicity by ingestion: Oral LD50 >2000 mg/kg (rat)
Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis that can be fatal.

Eye Damage / Irritation Causes mild eye irritation.

Sensitization **Skin:** Not expected to be a skin sensitizer
Respiratory: Not expected to be a respiratory sensitizer

Specific Target Organ Toxicity Dermal application of a fuel oil blendstock to rats, 5 days a week, for 13 weeks resulted in limited evidence of liver damage (i.e., increased liver weight and changes in hepatic serum enzyme activity).

Single Exposure: High concentrations may cause irritation of the skin, eyes, digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

Repeated Exposure: Repeated dermal application of middle distillates, heating oils and diesel oils to rabbits for 2-4 weeks at up to 1 gm/kg resulted in strong to severe skin irritation with some weight loss at the higher dose. Toxic effects ranging from weight loss to mortality was observed in rabbits treated repeatedly with very high doses (6gm/kg) of these oils. Repeated inhalation exposure of middle distillate and diesel vapor and aerosol to rats for 2-4 weeks at up to 6 mg/l resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and some reduction in lung function.

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Conditions Aggravated by Overexposure Disorders of the organs or organ systems that may be aggravated by significant exposure to this material or its components include the skin, respiratory system, liver, kidneys, CNS, cardiovascular system and blood-forming system.

Carcinogenicity Suspected of causing cancer. Petroleum middle distillates, a class of hydrocarbons distilled from crude oil at approximately 350-750°F, have been shown to cause skin tumors in mice following repeated and prolonged skin contact. The response is typically weak with a low tumor yield and long latency period. Additional studies have shown that these tumors are produced through a non-genotoxic mechanism associated with frequent cell damage and repair, and that they are not likely to cause tumors in the absence of prolonged skin irritation. Animal studies have also shown that washing the skin with soap and water can reduce the tumor response.

Overexposure to diesel exhaust fumes may result in eye irritation, headaches, nausea, and respiratory irritation. Animal studies involving lifetime exposure to high levels of diesel exhaust have produced variable results, with some studies indicating a potential for lung cancer. Limited evidence from epidemiological studies suggests an association between long-term occupational exposure to diesel engine emissions and lung cancer. Diesel engine exhaust typically consists of gases and particulates, including carbon dioxide, carbon monoxide, nitrogen compounds, oxides of sulfur, and hydrocarbons. Diesel exhaust composition will vary with fuel, engine type, load cycle, engine maintenance, tuning and exhaust gas treatment. Use of adequate ventilation and/or respiratory protection in the presence of diesel exhaust is recommended to minimize exposures. The International Agency for Research on Cancer (IARC) has evaluated diesel exhaust fumes and classified them as probably carcinogenic to humans (Group 2A) based on sufficient evidence for carcinogenicity in exposed humans.

Fuels, Diesel	ACGIH	Group A3 Confirmed animal carcinogen with unknown relevance to humans
	GHS/CLP	Carcinogenicity category 2
Cumene	IARC	IARC 2B Possibly carcinogenic to humans
	GHS/CLP	No carcinogenicity classification
Ethyl Benzene	ACGIH	Group A3 Confirmed animal carcinogen with unknown relevance to humans
	IARC	IARC 2B Possibly carcinogenic to humans
	GHS/CLP	No carcinogenicity classification
Naphthalene	ACGIH	Group A4 Not classifiable as a human carcinogen
	NTP	Reasonably anticipated to be a human carcinogen
	IARC	IARC 2B Possibly carcinogenic to humans
	GHS/CLP	Carcinogenicity category 2

ACGIH - American Conference of Government Industrial Hygienists, IARC- International Agency for Research on Cancer, NTP – National toxicology Program, GHS/CLP GHS, Globally Harmonized System on Classification, Labeling and Packaging

Germ Cell Mutagenicity Not expected to cause heritable genetic effects.

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Reproductive and Developmental Toxicity Diesel fuel vapors were tested in an inhalation teratology (developmental toxicity) study in rats and when only minimal maternal toxicity was observed, no fetotoxic or developmental effects were observed. A developmental toxicity study of dermally applied middle distillates did indicate fetotoxicity (reduced litter size, litter weight, increased resorptions) at doses that also caused significant maternal toxicity.

Additional Information Diesel engine exhaust has been classified by the International Agency for Research on Cancer (IARC) and National Toxicology Program (NTP) as a carcinogen.

Toxicological Information of Components

Ethyl Benzene 100-41-4

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), thyroid (hyperplasia) and pituitary (hyperplasia).

Naphthalene 91-20-3

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has been identified as a carcinogen by IARC and NTP.

12. ECOLOGICAL INFORMATION

Toxicity This material is expected to be toxic to aquatic organisms with the potential to cause long term adverse effects in the aquatic environment. Acute aquatic toxicity studies with gas oils show acute toxicity values (LL/EL/IL50) greater than 1 mg/l and mostly in the range of 1 to 20 mg/l. These tests were carried out on water-accommodated fractions in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition.

GHS Classification H411, Hazardous to Aquatic Environment, Chronic Toxicity Category 2 – Toxic to aquatic life with long lasting effects

Coating action of oil can kill birds, plankton, aquatic life, algae and fish.

Persistence and Degradability This material is a complex combination of individual hydrocarbon species. Based on the known or expected properties of individual constituents, this material is not predicted to be readily biodegradable. Some constituents are inherently biodegradable under aerobic conditions while the higher molecular weight components are persistent in water. The individual hydrocarbon components of this material are differentially soluble in water with aromatic hydrocarbons tending to be more water soluble than aliphatic hydrocarbons. If spilled, the lighter components will generally evaporate but depending on local environmental conditions (temperature, wind, soil type, mixing or wave action in water, etc.), photo-oxidation and biodegradation, the remainder may become dispersed in the water column or adsorbed to soil or sediment. Because of their differential solubility, the occurrence of hydrocarbons in groundwater will be at different proportions than the parent

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12. ECOLOGICAL INFORMATION

material. Under anaerobic conditions, such as in anoxic sediments, rates of biodegradation are negligible.

Persistence per IOPC Fund Definition Non-Persistent

Bioaccumulative Potential Contains components with the potential to bioaccumulate. The octanol water coefficient values measured for the hydrocarbon components of this material range from 3.9 to greater than 6, which indicates a high potential to bioaccumulate. Lower molecular weight compounds are readily metabolized and the actual bioaccumulation potential of higher molecular weight compounds is limited by the low water solubility and large molecular size.

Mobility **Air:** Lighter components will volatilize in the air.
Water: Releases to water will result in a hydrocarbon film floating and spreading on the surface of water. For the lighter components, volatilization is an important loss process and reduces the hazard to aquatic organisms. Photo oxidation on the water surface is also a significant loss process particularly for polycyclic aromatic compounds. Significant proportion of spill will remain after one day. Lower molecular weight aromatic hydrocarbons and some polar compounds have low but significant water solubility. Some higher molecular weight compounds are removed by emulsification and these also slowly biodegrade while others adsorb to sediment and sink. Heavier fractions agglomerate to form tars, some of which sink.
Soil: Adsorption is the most predominant physical process on release to soil. Adsorbed hydrocarbons will slowly degrade in both water and soil. Some constituents may be mobile and contaminate groundwater.

Other Adverse Effects Films form on water and may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Recover or recycle if possible. It is the responsibility of the generator to determine the toxicity and physical properties of the material generated so as to properly classify the waste and ensure disposal methods comply with applicable federal, state and local regulations.

This material, if discarded as produced, is not a RCRA "listed" hazardous waste. However, it should be fully characterized prior to disposal (40 CFR 261) to see whether it is a federally regulation RCRA hazardous waste due to the ignitability characteristic D001. It is possible that the material as produced contains constituents that are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

Do not dispose of tank water bottoms by draining onto the ground. This will result in soil and groundwater contamination. Waste arising from spillage or tank cleaning should be disposed of in accordance with applicable regulations.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as

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drums, should be returned to the distributor or to a qualified drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

14. TRANSPORTATION INFORMATION

**United States
Department of
Transportation
(US DOT)**

**Transportation of
Dangerous Goods (TDG)
Canada**

Shipping Description: UN1202 Diesel Fuel, Combustible Liquid, PG III or UN1202 Fuel Oil No. 2, Combustible Liquid, PG III
Shipping Name: Diesel Fuel or Fuel Oil No. 2
Hazard Class and Division: 3 or Combustible Liquid
ID Number: UN1202 (or NA1993 for domestic land transportation)
Packing Group: PGIII
Label: Combustible Liquid
Placard: Combustible
Emergency Response Guide: 128
Marine Pollutant: Yes

**International Maritime
Organization
International Maritime
Dangerous Goods Code
(IMO/IMDG)**

Shipping Description: UN1202, Diesel Fuel, 3, III or UN1202, Heating Oil, Light, 3, III (52°C)
Shipping Name: Diesel Fuel or Heating Oil, Light
Hazard Class and Division: 3
UN Number: 1202
Label: Flammable Liquid
EMS Guide: F-E, S-E
Marine Pollutant: Yes

**European Agreements
Concerning the
International Carriage by
Rail (RID) and by Road
(ADR)**

Shipping Name: Diesel Fuel or Heating Oil, Light
Hazard Class: 3
Packing Group: III
Label: 3
Danger Number: 30
UN Number: 1202

**International Civil Aviation
Organization /
International Air
Transport Association
(ICAO/IATA)**

Shipping Name: Diesel Fuel or Heating Oil, Light
UN/ID Number: 1202
Hazard Class/Division: 3
Packing Group: III
Labels: Flammable Liquid

15. REGULATORY INFORMATION

United States Federal Regulatory Information

EPA TSCA Inventory This product and/or its components are listed on the Toxic Substances Control Act (TSCA) Inventory

**EPA SARA 302/304
Emergency Planning
and Notification** This material contains the following chemicals subject to reporting under the Superfund Amendments and Reauthorization Act of 1986 (SARA):

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15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories)
 Acute Health: Yes
 Chronic Health: Yes
 Fire Hazard: Yes
 Pressure Hazard: No
 Reactive Hazard: No

EPA SARA Toxic Chemical Notification and Release Reporting (40 CFR 372) and CERCLA Reportable Quantities (40 CFR 302.4)

Component	CAS Number	Concentration	RQ
Cumene	98-82-8	< 1 %	5000 lb
Ethyl Benzene	100-41-4	< 1 %	1000 lb
Naphthalene	91-20-3	< 2	100 lb

CERCLA Section 101(14) excludes crude oil and crude oil fractions, including hazardous constituents of petroleum, from the definition of hazardous substances. The petroleum exclusion applies to this product.

EPA CWA and OPA
 This product is classified as an oil under Section 311 of the Clean Water Act (CWA) and Oil Pollution Act of 1990 (OPA), subject to spill reporting requirements.

Canadian Regulatory Information

DSL/NDSL Inventory
 This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations.

Workplace Hazardous Materials Information System (WHMIS) Hazard Class
 B3 - Combustible Liquid
 D2A: Material Causing Other Toxic Effects Very Toxic
 D2B - Material Causing Other Toxic Effects - Toxic Material

European Union Regulatory Information

Labeling
 Product is dangerous as defined by the European Union Dangerous Substances / Preparations Directives
 Contains: Fuels, Diesel

Symbol
Risk Phrases
Xn Harmful
 R40-65-66
 Limited evidence of a carcinogenic effect. Harmful: May cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking.

Safety Phrases
 S24-2-36/37-62
 Avoid contact with skin. Keep out of the reach of children. Wear suitable protective clothing and gloves. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

California Proposition 65

This product may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects, or other reproductive harm and which may be subject to the warning requirements of California Proposition 65. Chemicals known to the State of California to cause cancer, birth defects or other reproductive harm are created by the combustion of this product.

Carcinogens: Benzene, Ethyl Benzene, Naphthalene, Diesel Engine Exhaust

Developmental Toxicity: Benzene, Toluene

Male Reproductive Toxicity: Benzene

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Carcinogen Identification by International Agency for Research on Cancer

Group 1	Carcinogenic to Humans	Benzene
Group 2A	Probably Carcinogenic to Humans	
Group 2B	Possibly Carcinogenic to Humans	Cumene, Ethyl Benzene, Naphthalene
Group 3	Not Classifiable	

16. OTHER INFORMATION

Prepared By METI HSE

The information in this Material Safety Data Sheet (MSDS) is based on data considered to be accurate and obtained from sources which we believe are reliable. **However, the information is provided without any warranty, express or implied, regarding its correctness; and it should not be relied upon as a commercial specification of manufacturer or seller.** This information should be used to make an independent determination of the methods to safeguard workers and the environment.

The conditions or methods of handling, storage, use and disposal of the material are beyond our control and may be beyond our knowledge. **For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the material.**

The SDS was prepared and is to be used only for this material. If the material is used as a component in another product, this SDS information may not be applicable.