MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**No.2 Fuel Oil**
Version #	01
Revision date	10-23-2010
CAS #	Mixture
MSDS Number	109
Product use	Refinery feedstock.
Synonym(s)	Fuel Oil No. 2, Home Heating Oil, X Grade Middle Distillate, Heating X-Grade Oil, Petroleum Distillate-Gas Oil & Light Gas Oil, Light Fuel Oil, Petroleum Distillate-Gas Oil #2 & #3 See section 16 for complete information.
Manufacturer information	Valero Marketing & Supply Company and Affiliates P.O. Box 696000 San Antonio, TX 78269-6000 General Assistance 210-345-4593 24 Hour Emergency 866-565-5220 1-800-424-9300 (CHEMTREC USA)

2. Hazards Identification

Physical state	Liquid.
Appearance	Liquid (may be dyed red).
Emergency overview	DANGER! Combustible liquid and vapor. Will be easily ignited by heat, spark or flames. Heat may cause the containers to explode. Harmful if inhaled, absorbed through skin, or swallowed. Aspiration may cause lung damage. Irritating to eyes, respiratory system and skin. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. Diesel exhaust has been reported to be an occupational hazard due to NIOSH-reported potential carcinogenic properties. Hydrogen sulfide, a highly toxic gas, may be present or released. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Contains benzene. Cancer hazard. Mutagen. May cause heritable genetic damage. May cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. Prolonged exposure may cause chronic effects. Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Contact may irritate or burn eyes. Eye contact may result in corneal injury.
Skin	Harmful if absorbed through skin. Irritating to skin. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Inhalation	Harmful if inhaled. Irritating to respiratory system. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea. May cause breathing disorders and lung damage. May cause cancer by inhalation. Prolonged inhalation may be harmful.
Ingestion	Harmful if swallowed. Ingestion may result in vomiting; aspiration (breathing) of vomitus into lungs must be avoided as even small quantities may result in aspiration pneumonitis. Irritating to mouth, throat, and stomach.
Target organs	Blood. Eyes. Liver. Respiratory system. Skin. Kidneys. Central nervous system.
Chronic effects	Cancer hazard. Contains material which may have reproductive toxicity, teratogenetic or mutagenic effects. Liver injury may occur. Kidney injury may occur. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.

Signs and symptoms Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Cyanosis (blue tissue condition, nails, lips, and/or skin). Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash.

Potential environmental effects Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Distillates petroleum residues vacuum	68955-27-1	0 - 100
n-Nonane	111-84-2	0 - 3
Cyclohexane	110-82-7	0 - 1
Ethylbenzene	100-41-4	0 - 1
Hexane (Other Isomers)	96-14-0	0 - 1
Hydrogen sulfide	7783-06-4	0 - 1
Naphthalene	91-20-3	0 - 1
Octane (all isomers)	111-65-9	0 - 1
Toluene	108-88-3	0 - 1
Xylene (o,m,p isomers)	1330-20-7	0 - 1
n-Heptane	142-82-5	0 - 1
n-Hexane	110-54-3	0 - 1
Benzene	71-43-2	0 - 0.5

Composition comments Small amount of hydrogen sulfide, a highly toxic gas, may be present, especially in the headspace of containers.

4. First Aid Measures

First aid procedures

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.

Skin contact Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if discomfort develops or persists.

Ingestion Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Get medical attention immediately.

Notes to physician In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General advice If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire Fighting Measures

Flammable properties Combustible by OSHA criteria. Containers may explode when heated.

Extinguishing media

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use a solid water stream as it may scatter and spread fire.

Protection of firefighters

Specific hazards arising from the chemical	Vapor may cause flash fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.
Protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
Fire fighting equipment/instructions	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Vapors may form explosive air mixtures even at room temperature. Prevent buildup of vapors or gases to explosive concentrations. Some of these materials, if spilled, may evaporate leaving a flammable residue. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.
Specific methods	In the event of fire and/or explosion do not breathe fumes. Use water spray to cool unopened containers.
Hazardous combustion products	Carbon monoxide. Carbon Dioxide. Sulfur oxides. Nitrogen oxides (NOx). Hydrocarbons.

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Local authorities should be advised if significant spills cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the MSDS for Personal Protective Equipment.
Environmental precautions	If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Flammable. Review Fire Fighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802. For highway or railways spills, contact Chemtrec at 1-800-424-9300.
Methods for containment	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.
Methods for cleaning up	Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.
Other information	Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling	Wear personal protective equipment. Do not breathe gas/fumes/vapor/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is flammable, and heating may generate vapors which may form explosive vapor/air mixtures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.

Storage

Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Benzene (71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Cyclohexane (110-82-7)	TWA	100 ppm
Ethylbenzene (100-41-4)	STEL	125 ppm
	TWA	100 ppm
Hexane (Other Isomers) (96-14-0)	STEL	1000 ppm
	TWA	500 ppm
Hydrogen sulfide (7783-06-4)	STEL	5 ppm
	TWA	1 ppm
Naphthalene (91-20-3)	STEL	15 ppm
	TWA	10 ppm
n-Heptane (142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (110-54-3)	TWA	50 ppm
n-Nonane (111-84-2)	TWA	200 ppm
Octane (all isomers) (111-65-9)	TWA	300 ppm
Toluene (108-88-3)	TWA	20 ppm
Xylene (o,m,p isomers) (1330-20-7)	STEL	150 ppm
	TWA	100 ppm

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Benzene (71-43-2)	Ceiling	25 ppm
	STEL	5 ppm
	TWA	1 ppm
Cyclohexane (110-82-7)	PEL	1050 mg/m3
		300 ppm
Ethylbenzene (100-41-4)	PEL	435 mg/m3
		100 ppm
Hydrogen sulfide (7783-06-4)	Ceiling	20 ppm
Naphthalene (91-20-3)	PEL	50 mg/m3
		10 ppm
n-Heptane (142-82-5)	PEL	500 ppm
		2000 mg/m3
n-Hexane (110-54-3)	PEL	1800 mg/m3
		500 ppm
Octane (all isomers) (111-65-9)	PEL	500 ppm
		2350 mg/m3
Toluene (108-88-3)	Ceiling	300 ppm
	TWA	200 ppm
Xylene (o,m,p isomers) (1330-20-7)	PEL	100 ppm
		435 mg/m3

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
Benzene (71-43-2)	STEL	8 mg/m3
		2.5 ppm

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
	TWA	1.6 mg/m3
		0.5 ppm
Cyclohexane (110-82-7)	TWA	344 mg/m3
		100 ppm
Ethylbenzene (100-41-4)	STEL	125 ppm
		543 mg/m3
	TWA	434 mg/m3
		100 ppm
Hexane (Other Isomers) (96-14-0)	STEL	1000 ppm
		3500 mg/m3
	TWA	500 ppm
		1760 mg/m3
Hydrogen sulfide (7783-06-4)	Ceiling	21 mg/m3
		15 ppm
	TWA	14 mg/m3
		10 ppm
Naphthalene (91-20-3)	STEL	15 ppm
		79 mg/m3
	TWA	10 ppm
		52 mg/m3
n-Heptane (142-82-5)	STEL	500 ppm
		2050 mg/m3
	TWA	400 ppm
		1640 mg/m3
n-Hexane (110-54-3)	TWA	50 ppm
		176 mg/m3
n-Nonane (111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (all isomers) (111-65-9)	TWA	300 ppm
		1400 mg/m3
Toluene (108-88-3)	TWA	50 ppm
		188 mg/m3

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
Benzene (71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Cyclohexane (110-82-7)	TWA	100 ppm
Ethylbenzene (100-41-4)	STEL	125 ppm
	TWA	100 ppm
Hexane (Other Isomers) (96-14-0)	TWA	200 ppm
Hydrogen sulfide (7783-06-4)	Ceiling	10 ppm
Naphthalene (91-20-3)	STEL	15 ppm
	TWA	10 ppm
n-Heptane (142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-Hexane (110-54-3)	TWA	20 ppm
n-Nonane (111-84-2)	TWA	200 ppm
Octane (all isomers) (111-65-9)	TWA	300 ppm
Toluene (108-88-3)	TWA	20 ppm
Xylene (o,m,p isomers) (1330-20-7)	STEL	150 ppm
	TWA	100 ppm

Canada. Ontario OELs. (Ministry of Labor - Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
Benzene (71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Cyclohexane (110-82-7)	TWA	100 ppm
Ethylbenzene (100-41-4)	STEL	540 mg/m3
		125 ppm
	TWA	100 ppm
		435 mg/m3
Hexane (Other Isomers) (96-14-0)	STEL	3520 mg/m3
		1000 ppm
	TWA	500 ppm
		1760 mg/m3
Hydrogen sulfide (7783-06-4)	STEL	15 ppm
		21 mg/m3
	TWA	10 ppm
		14 mg/m3
Naphthalene (91-20-3)	STEL	78 mg/m3
		15 ppm
	TWA	10 ppm
		52 mg/m3
n-Heptane (142-82-5)	STEL	500 ppm
		2045 mg/m3
	TWA	1635 mg/m3
		400 ppm
n-Hexane (110-54-3)	TWA	50 ppm
		176 mg/m3
n-Nonane (111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (all isomers) (111-65-9)	STEL	375 ppm
		1750 mg/m3
	TWA	300 ppm
		1400 mg/m3
Toluene (108-88-3)	TWA	20 ppm
Xylene (o,m,p isomers) (1330-20-7)	STEL	150 ppm
		650 mg/m3
	TWA	100 ppm
		435 mg/m3

Canada. Quebec OELS. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Benzene (71-43-2)	STEL	15.5 mg/m3
		5 ppm
	TWA	3 mg/m3
		1 ppm
Cyclohexane (110-82-7)	TWA	1030 mg/m3
		300 ppm
Ethylbenzene (100-41-4)	STEL	125 ppm
		543 mg/m3
	TWA	100 ppm
		434 mg/m3
Hexane (Other Isomers) (96-14-0)	STEL	3500 mg/m3
		1000 ppm
	TWA	500 ppm
		1760 mg/m3
Hydrogen sulfide (7783-06-4)	STEL	15 ppm
		21 mg/m3
	TWA	14 mg/m3
		10 ppm

Canada. Quebec OELS. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Naphthalene (91-20-3)	STEL	79 mg/m3
		15 ppm
	TWA	10 ppm
		52 mg/m3
n-Heptane (142-82-5)	STEL	2050 mg/m3
		500 ppm
	TWA	400 ppm
		1640 mg/m3
n-Hexane (110-54-3)	TWA	50 ppm
		176 mg/m3
n-Nonane (111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (all isomers) (111-65-9)	STEL	375 ppm
		1750 mg/m3
	TWA	300 ppm
		1400 mg/m3
Toluene (108-88-3)	TWA	50 ppm
		188 mg/m3
Xylene (o,m,p isomers) (1330-20-7)	STEL	150 ppm
		651 mg/m3
	TWA	100 ppm
		434 mg/m3

Mexico. Occupational Exposure Limit Values

Components	Type	Value
Benzene (71-43-2)	STEL	16 mg/m3
		5 ppm
	TWA	3.2 mg/m3
		1 ppm
Cyclohexane (110-82-7)	STEL	375 ppm
		1300 mg/m3
	TWA	1050 mg/m3
		300 ppm
Ethylbenzene (100-41-4)	STEL	125 ppm
		545 mg/m3
	TWA	100 ppm
		435 mg/m3
Hexane (Other Isomers) (96-14-0)	STEL	1000 ppm
		3500 mg/m3
	TWA	1760 mg/m3
		500 ppm
Hydrogen sulfide (7783-06-4)	STEL	15 ppm
		21 mg/m3
	TWA	14 mg/m3
		10 ppm
Naphthalene (91-20-3)	STEL	15 ppm
		75 mg/m3
	TWA	10 ppm
		50 mg/m3
n-Heptane (142-82-5)	STEL	500 ppm
		2000 mg/m3
	TWA	400 ppm
		1600 mg/m3
n-Hexane (110-54-3)	TWA	50 ppm
		176 mg/m3
n-Nonane (111-84-2)	STEL	1300 mg/m3
		250 ppm
	TWA	1050 mg/m3
		200 ppm

Mexico. Occupational Exposure Limit Values

Components	Type	Value
Octane (all isomers) (111-65-9)	STEL	375 ppm
		1800 mg/m3
	TWA	300 ppm
		1450 mg/m3
Toluene (108-88-3)	TWA	50 ppm
		188 mg/m3
Xylene (o,m,p isomers) (1330-20-7)	STEL	655 mg/m3
		150 ppm
	TWA	100 ppm
		435 mg/m3

Engineering controls Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Personal protective equipment

Eye / face protection Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection Wear chemical-resistant, impervious gloves. Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

Respiratory protection Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.

General hygiene considerations Avoid contact with skin. Keep away from food and drink. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance Liquid (may be dyed red).

Color Clear. Straw. Black. Brown. Green.

Odor Kerosene (strong).

Odor threshold Not available.

Physical state Liquid.

Form Liquid.

pH Not available.

Melting point -60.1 °F (-51.2 °C) May start to solidify at this temperature. This is based on data for the following ingredient: n-Nonane. Weighted average: -147.2 degrees F (-99.54 degrees C)

Freezing point Not available.

Boiling point 199.9 - 900.1 °F (93.3 - 482.3 °C)

Flash point > 100 °F (> 37.8 °C) Closed Cup

Evaporation rate Not available.

Flammability limits in air, upper, % by volume 8

Flammability limits in air, lower, % by volume 0.4

Vapor pressure < 1 mm Hg (20°C)

Vapor density 3 - 7 (Air=1)

Specific gravity 0.84 - 0.93 (Water=1) (60°F)

Solubility (water) Not available.

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature	495 °F (257.2 °C)
Decomposition temperature	Not available.
Percent volatile	Negligible.

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal temperature conditions and recommended use.
Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Oxidizing agents.
Hazardous decomposition products	Trace amounts of: Hydrogen sulfide.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	Test Results
Ethylbenzene (100-41-4)	Acute Dermal LD50 Rabbit: > 5000 mg/kg Acute Oral LD50 Rat: 3500 mg/kg Acute Oral LD50 Rat: 5.46 g/kg
Toluene (108-88-3)	Acute Inhalation LC50 Rat: 8000 mg/l 4 Hours Acute Oral LC50 Rat: 636 mg/kg
Cyclohexane (110-82-7)	Acute Oral LD50 Rat: 12705 mg/kg
Octane (all isomers) (111-65-9)	Acute Inhalation LC50 Rat: 118 mg/l 4 Hours
n-Nonane (111-84-2)	Acute Inhalation LC50 Rat: 3200 mg/l 4 Hours
Xylene (o,m,p isomers) (1330-20-7)	Acute Oral LD50 Mouse: 1590 mg/kg Acute Oral LD50 Rat: 6670 mg/kg
n-Heptane (142-82-5)	Acute Inhalation LC50 Rat: 103 mg/l 4 Hours
Benzene (71-43-2)	Acute Oral LD50 Mouse: 4700 mg/kg Acute Oral LD50 Rat: 3306 mg/kg
Hydrogen sulfide (7783-06-4)	Acute Inhalation LC50 Mouse: > 0.024 mg/l 960 Minutes Acute Inhalation LC50 Rat: > 0.38 mg/l 960 Minutes
Naphthalene (91-20-3)	Acute Dermal LD50 Rabbit: > 2 g/kg Acute Oral LD50 Rat: 490 mg/kg

Acute effects	Harmful if inhaled, absorbed through skin, or swallowed. Harmful: may cause lung damage if swallowed. Irritating to eyes, respiratory system and skin. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea.

Local effects

US ACGIH Threshold Limit Values: Skin designation

Benzene (CAS 71-43-2)	Can be absorbed through the skin.
Naphthalene (CAS 91-20-3)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.

Sensitization	This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals.
Chronic effects	Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML). Toluene has been reported to decrease immunological responses and cause recordable hearing loss in laboratory animals. Repeated exposure to naphthalene may cause cataracts, allergic skin rashes, destruction of red blood cells, and anemia, jaundice, kidney and liver damage. Contains organic solvents which in case of overexposure may depress the central nervous system causing dizziness and intoxication. Danger of serious damage to health by prolonged exposure. Prolonged or repeated overexposure may cause central nervous system, kidney, liver, and lung damage.

Subchronic effects Subchronic inhalation of benzene by rats produced decreased white blood cell counts, decreased bone marrow cell activity, increased red blood cell activity and cataracts. Blood disorders may occur after prolonged inhalation, prolonged skin contact and/or ingestion. Liver and kidney damage may occur after prolonged and repeated exposure.

Carcinogenicity

ACGIH Carcinogens

Benzene (CAS 71-43-2)	A1 Confirmed human carcinogen.
Ethylbenzene (CAS 100-41-4)	A3 Confirmed animal carcinogen with unknown relevance to humans.
Naphthalene (CAS 91-20-3)	A4 Not classifiable as a human carcinogen.
Toluene (CAS 108-88-3)	A4 Not classifiable as a human carcinogen.
Xylene (o,m,p isomers) (CAS 1330-20-7)	A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzene (CAS 71-43-2)	1 Carcinogenic to humans.
Ethylbenzene (CAS 100-41-4)	2B Possibly carcinogenic to humans.
Naphthalene (CAS 91-20-3)	2B Possibly carcinogenic to humans.
Toluene (CAS 108-88-3)	3 Not classifiable as to carcinogenicity to humans.
Xylene (o,m,p isomers) (CAS 1330-20-7)	3 Not classifiable as to carcinogenicity to humans.

US NTP Report on Carcinogens: Anticipated carcinogen

Naphthalene (CAS 91-20-3)	Anticipated carcinogen.

US NTP Report on Carcinogens: Known carcinogen

Benzene (CAS 71-43-2)	Known carcinogen.

US OSHA Specifically Regulated Substances: Cancer hazard

Benzene (CAS 71-43-2)	Cancer hazard.

Epidemiology Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established.

Mutagenicity Some middle distillate fuels have caused chromosome damage in the in-vivo rat bone marrow cytogenetics assay and caused mutagenic effects in the L5178Y mouse lymphoma assay. In in-vitro experiments, neither benzene, toluene nor xylene changed the number of sister-chromatid exchanges (SCEs) or the number of chromosomal aberrations in human lymphocytes. However, toluene and xylene caused a significant cell growth inhibition which was not observed with benzene in the same concentrations. In in-vivo experiments, toluene changed the number of sister-chromatid exchanges (SCEs) in human lymphocytes. Toluene may cause heritable genetic damage.

Neurological effects Central and/or peripheral nervous system damage. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue) and/or damage.

Reproductive effects Benzene, xylene and toluene have demonstrated animal effects of reproductive toxicity. Animal studies of benzene have shown testicular effects, alterations in reproductive cycles, chromosomal aberrations and embryo/fetotoxicity. Napthalene interferes with embryo development in experimental animals at dose levels that cause maternal toxicity. In humans, excessive exposure to this agent may cause hemolytic anemia in the mother and fetus. May damage fertility or the unborn child. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. Avoid exposure to women during early pregnancy. Avoid contact during pregnancy/while nursing.

Teratogenicity Abusive inhalation of toluene ("glue sniffing") has been reported to be associated with birth defects in the offspring of abusers. Rats exposed to benzene and xylene vapor during pregnancy showed embryo/fetotoxic effects.

Further information Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data

Components	Test Results
Ethylbenzene (100-41-4)	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 4.2 mg/l 96 hours
Toluene (108-88-3)	LC50 Coho salmon,silver salmon (Oncorhynchus kisutch): 5.5 mg/l 96 hours
n-Hexane (110-54-3)	LC50 Fathead minnow (Pimephales promelas): 2.101 - 2.981 mg/l 96 hours

Components	Test Results
Cyclohexane (110-82-7)	LC50 Fathead minnow (Pimephales promelas): 3.961 - 5.181 mg/l 96 hours
n-Heptane (142-82-5)	LC50 Mozambique tilapia (Tilapia mossambica): 375 mg/l 96 hours
Benzene (71-43-2)	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 5 mg/l 96 Hours
Hydrogen sulfide (7783-06-4)	LC50 Lake whitefish (Coregonus clupeaformis): 0.002 mg/l 96 hours
Naphthalene (91-20-3)	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 0.91 - 2.82 mg/l 96 hours

Ecotoxicity Contains a substance which causes risk of hazardous effects to the environment.

Environmental effects The product contains a substance which is toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.

Aquatic toxicity Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Persistence and degradability Not available.

Bioaccumulation / Accumulation No data available.

Partition coefficient (n-octanol/water) Not available.

Mobility in environmental media No data available.

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 °F
D018: Waste Benzene

Disposal instructions Dispose in accordance with all applicable regulations. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

14. Transport Information

DOT

Basic shipping requirements:

UN number UN1268
Proper shipping name Petroleum distillates, n.o.s.
Hazard class Combustible Liquid
Packing group III
Labels required 3
Additional information:
Special provisions 144, B1, IB3, T4, TP1, TP29
Packaging exceptions 150
Packaging non bulk 203
Packaging bulk 242
ERG number 128

IATA

Basic shipping requirements:

UN number 1268
Proper shipping name Petroleum products, n.o.s.
Hazard class 3
Packing group III
Additional information:
ERG code 3L

IMDG

Basic shipping requirements:

UN number	1268
Proper shipping name	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.
Hazard class	3
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS No.	F-E, S-E

TDG

Basic shipping requirements:

Proper shipping name	PETROLEUM DISTILLATES, N.O.S.; or PETROLEUM PRODUCTS, N.O.S. SOR/2002-306
Hazard class	3
UN number	UN1268
Packing group	III
Marine pollutant	.

DOT

IATA

IMDG

TDG

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA) and 8 CCR § 5194 (Cal/OSHA).
All components are on the U.S. EPA TSCA Inventory List.

US TSCA Section 12(b) Export Notification: Export Notification requirement/De minimis concentration

Naphthalene (CAS 91-20-3)	0.1 % One-Time Export Notification only.
n-Heptane (CAS 142-82-5)	1.0 % One-Time Export Notification only.
n-Nonane (CAS 111-84-2)	1.0 % One-Time Export Notification only.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

Hydrogen sulfide (CAS 7783-06-4)	100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

Hydrogen sulfide (CAS 7783-06-4)	500 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Benzene (CAS 71-43-2)	0.1 %
Cyclohexane (CAS 110-82-7)	1.0 %
Ethylbenzene (CAS 100-41-4)	0.1 %
Naphthalene (CAS 91-20-3)	0.1 %
n-Hexane (CAS 110-54-3)	1.0 %
Toluene (CAS 108-88-3)	1.0 %
Xylene (o,m,p isomers) (CAS 1330-20-7)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Benzene (CAS 71-43-2)	Listed.
Cyclohexane (CAS 110-82-7)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
Toluene (CAS 108-88-3)	Listed.
Xylene (o,m,p isomers) (CAS 1330-20-7)	Listed.

CERCLA (Superfund) reportable quantity (lbs)

n-Nonane 100
Cyclohexane 1000
Ethylbenzene 1000
Hexane (Other Isomers) 100
Hydrogen sulfide 100
Naphthalene 100
Octane (all isomers) 100
Toluene 1000
Xylene (o,m,p isomers) 1000
n-Heptane 100
n-Hexane 5000
Benzene 10

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No
Drug Enforcement Agency (DEA)	Not controlled
WHMIS status	Controlled
WHMIS classification	B2 - Flammable/Combustible D2A - Other Toxic Effects-VERY TOXIC D2B - Other Toxic Effects-TOXIC

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations

US - California Hazardous Substances (Director's): Listed substance

Benzene (CAS 71-43-2)	Listed.
Cyclohexane (CAS 110-82-7)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Hexane (Other Isomers) (CAS 96-14-0)	Listed.
Hydrogen sulfide (CAS 7783-06-4)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (all isomers) (CAS 111-65-9)	Listed.
Toluene (CAS 108-88-3)	Listed.
Xylene (o,m,p isomers) (CAS 1330-20-7)	Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
Toluene (CAS 108-88-3)	Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzene (CAS 71-43-2)	Listed: February 27, 1987 Carcinogenic.
Ethylbenzene (CAS 100-41-4)	Listed: June 11, 2004 Carcinogenic.
Naphthalene (CAS 91-20-3)	Listed: April 19, 2002 Carcinogenic.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Developmental toxin.
Toluene (CAS 108-88-3)	Listed: January 1, 1991 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

Toluene (CAS 108-88-3)	Listed: August 7, 2009 Female reproductive toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Male reproductive toxin.

US - Massachusetts RTK - Substance: Listed substance

Benzene (CAS 71-43-2)	Listed.
Cyclohexane (CAS 110-82-7)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Hexane (Other Isomers) (CAS 96-14-0)	Listed.
Hydrogen sulfide (CAS 7783-06-4)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (all isomers) (CAS 111-65-9)	Listed.
Toluene (CAS 108-88-3)	Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

Benzene (CAS 71-43-2)	500 LBS
Cyclohexane (CAS 110-82-7)	500 LBS
Ethylbenzene (CAS 100-41-4)	500 LBS
Hydrogen sulfide (CAS 7783-06-4)	500 LBS
Naphthalene (CAS 91-20-3)	500 LBS
n-Hexane (CAS 110-54-3)	500 LBS
Toluene (CAS 108-88-3)	500 LBS
Xylene (o,m,p isomers) (CAS 1330-20-7)	500 LBS

US - New Jersey RTK - Substances: Listed substance

Benzene (CAS 71-43-2)	Listed.
Cyclohexane (CAS 110-82-7)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Hydrogen sulfide (CAS 7783-06-4)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (all isomers) (CAS 111-65-9)	Listed.
Toluene (CAS 108-88-3)	Listed.
Xylene (o,m,p isomers) (CAS 1330-20-7)	Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

Benzene (CAS 71-43-2)	Listed.
Cyclohexane (CAS 110-82-7)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Hexane (Other Isomers) (CAS 96-14-0)	Listed.
Hydrogen sulfide (CAS 7783-06-4)	Listed.
Naphthalene (CAS 91-20-3)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
n-Nonane (CAS 111-84-2)	Listed.
Octane (all isomers) (CAS 111-65-9)	Listed.
Toluene (CAS 108-88-3)	Listed.
Xylene (o,m,p isomers) (CAS 1330-20-7)	Listed.

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Benzene (CAS 71-43-2)	Special hazard.

16. Other Information

Other information

Note: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical Specifications vary greatly depending on the products and are not reflected in this document. Consult specification sheets for technical information.

HMIS® ratings

Health: 2*
Flammability: 3
Physical hazard: 0

NFPA ratings

Health: 2
Flammability: 3
Instability: 0

Disclaimer

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