



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	KEROSENE
Version #	01
Revision date	10-23-2010
MSDS Number	105
Product use	Refinery feedstock.
Synonym(s)	K-1 Kerosene, K-2 Kerosene, Paraffinic Kerosene, Petroleum Distillate-Kerosene, Low- Sulfur Kerosene 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. Exhaust Fumes have been reported to be an occupational hazard due to NIOSH-reported potential carcinogenic properties. 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. High pressure skin injections are SERIOUS MEDICAL EMERGENCIES . Injuries may not appear serious at first. Within a few hours, tissues will become swollen, discolored and extremely painful.
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, teratogenic 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
Kerosene	8008-20-6	0 - 100
Distillates, petroleum residues vacuum	68955-27-1	0 - 100
Naphthalene	91-20-3	0 - 3
Xylene (o, m, p isomers)	1330-20-7	0 - 2
Ethylbenzene	100-41-4	0 - 1
Toluene	108-88-3	0 - 1
Cyclohexane	110-82-7	0 - 1
Benzene	71-43-2	0 - 0.5
Hydrogen sulfide	7783-06-4	< 0.1

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. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
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 dust/fume/gas/mist/vapors/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	Form
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	
Hydrogen sulfide (7783-06-4)	STEL	5 ppm	
	TWA	1 ppm	
Kerosene (8008-20-6)	TWA	200 mg/m3	Non-aerosol.
Naphthalene (91-20-3)	STEL	15 ppm	
	TWA	10 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	300 ppm
		1050 mg/m3
Ethylbenzene (100-41-4)	PEL	100 ppm
		435 mg/m3
Hydrogen sulfide (7783-06-4)	Ceiling	20 ppm
Naphthalene (91-20-3)	PEL	10 ppm
		50 mg/m3
Toluene (108-88-3)	Ceiling	300 ppm
	TWA	200 ppm
Xylene (o, m, p isomers) (1330-20-7)	PEL	435 mg/m3
		100 ppm

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

Components	Type	Value	Form
Benzene (71-43-2)	STEL	2.5 ppm	
		8 mg/m3	
	TWA	0.5 ppm	
Cyclohexane (110-82-7)		1.6 mg/m3	
	TWA	344 mg/m3	
		100 ppm	
Ethylbenzene (100-41-4)	STEL	125 ppm	
		543 mg/m3	
	TWA	100 ppm	
Hydrogen sulfide (7783-06-4)		434 mg/m3	
	Ceiling	15 ppm	
Kerosene (8008-20-6)		21 mg/m3	
	TWA	14 mg/m3	
		10 ppm	
Naphthalene (91-20-3)	TWA	200 mg/m3	Vapor.
	STEL	15 ppm	
Toluene (108-88-3)		79 mg/m3	
	TWA	10 ppm	
		52 mg/m3	
	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	Form
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	
Hydrogen sulfide (7783-06-4)	Ceiling	10 ppm	
Kerosene (8008-20-6)	TWA	200 mg/m3	Non-aerosol.
Naphthalene (91-20-3)	STEL	15 ppm	
	TWA	10 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
	TWA	125 ppm
Hydrogen sulfide (7783-06-4)	TWA	435 mg/m3
	STEL	100 ppm
Kerosene (8008-20-6)	TWA	15 ppm
	STEL	21 mg/m3
Naphthalene (91-20-3)	TWA	14 mg/m3
	STEL	10 ppm
Toluene (108-88-3)	TWA	200 mg/m3
	STEL	15 ppm
Xylene (o, m, p isomers) (1330-20-7)	TWA	78 mg/m3
	STEL	10 ppm
Xylene (o, m, p isomers) (1330-20-7)	TWA	52 mg/m3
	STEL	20 ppm
Xylene (o, m, p isomers) (1330-20-7)	TWA	150 ppm
	STEL	150 ppm
Xylene (o, m, p isomers) (1330-20-7)	TWA	650 mg/m3
	STEL	100 ppm
Xylene (o, m, p isomers) (1330-20-7)	TWA	435 mg/m3
	STEL	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
	TWA	5 ppm
Cyclohexane (110-82-7)	TWA	3 mg/m3
	TWA	1 ppm
Ethylbenzene (100-41-4)	TWA	1030 mg/m3
	STEL	300 ppm
Ethylbenzene (100-41-4)	STEL	125 ppm
	TWA	543 mg/m3
Hydrogen sulfide (7783-06-4)	TWA	100 ppm
	STEL	434 mg/m3
Hydrogen sulfide (7783-06-4)	STEL	15 ppm
	TWA	21 mg/m3
Naphthalene (91-20-3)	TWA	10 ppm
	STEL	14 mg/m3
Naphthalene (91-20-3)	STEL	79 mg/m3
	TWA	15 ppm
Naphthalene (91-20-3)	TWA	52 mg/m3
	STEL	10 ppm

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

Components	Type	Value
Toluene (108-88-3)	TWA	50 ppm 188 mg/m3
	STEL	150 ppm
Xylene (o, m, p isomers) (1330-20-7)	TWA	651 mg/m3 434 mg/m3 100 ppm

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	300 ppm 1050 mg/m3
	STEL	125 ppm 545 mg/m3
Ethylbenzene (100-41-4)	TWA	435 mg/m3 100 ppm
	STEL	15 ppm
Hydrogen sulfide (7783-06-4)	TWA	21 mg/m3 10 ppm 14 mg/m3
	STEL	75 mg/m3 15 ppm
	TWA	50 mg/m3 10 ppm
Toluene (108-88-3)	TWA	50 ppm 188 mg/m3
Xylene (o, m, p isomers) (1330-20-7)	STEL	150 ppm
	TWA	655 mg/m3 435 mg/m3 100 ppm

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. Yellow or brown.

Odor Kerosene (strong).

Odor threshold	Not available.
Physical state	Liquid.
Form	Liquid.
pH	Not available.
Melting point	Not available.
Freezing point	-60.1 °F (-51.15 °C) Estimated
Boiling point	219.9 - 579.9 °F (104.4 - 304.4 °C)
Flash point	> 100 °F (> 37.8 °C) Closed Cup
Evaporation rate	Not available.
Flammability limits in air, upper, % by volume	6 %
Flammability limits in air, lower, % by volume	0.7 %
Vapor pressure	< 0.7 kPa at 20 deg C
Vapor density	3 (Air = 1)
Specific gravity	0.79 - 0.9 at 60 deg F
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	399.9 °F (204.4 °C)
Decomposition temperature	Not available.
VOC	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	Strong 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
Toluene (108-88-3)	Acute Oral LD50 Rat: 5.46 g/kg Acute Inhalation LC50 Rat: 8000 mg/l 4 Hours
Cyclohexane (110-82-7)	Acute Oral LC50 Rat: 636 mg/kg Acute Oral LD50 Rat: 12705 mg/kg
Xylene (o, m, p isomers) (1330-20-7)	Acute Oral LD50 Mouse: 1590 mg/kg
Benzene (71-43-2)	Acute Oral LD50 Rat: 6670 mg/kg Acute Oral LD50 Mouse: 4700 mg/kg
Hydrogen sulfide (7783-06-4)	Acute Oral LD50 Rat: 3306 mg/kg Acute Inhalation LC50 Mouse: > 0.024 mg/l 960 Minutes
Naphthalene (91-20-3)	Acute Inhalation LC50 Rat: > 0.38 mg/l 960 Minutes 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.
Kerosene (CAS 8008-20-6)	Can be absorbed through the skin.
Naphthalene (CAS 91-20-3)	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.
Kerosene (CAS 8008-20-6)	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.
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US NTP Report on Carcinogens: Known carcinogen

Benzene (CAS 71-43-2)	Known carcinogen.
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US OSHA Specifically Regulated Substances: Cancer hazard

Benzene (CAS 71-43-2)	Cancer hazard.
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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
Cyclohexane (110-82-7)	LC50 Fathead minnow (Pimephales promelas): 3.961 - 5.181 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. (Distillates, petroleum residues vacuum)
Hazard class	Combustible Liquid
Packing group	III
Labels required	3

Additional information:

Special provisions	144, B1, IB3, T4, TP1, TP29
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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. (Distillates, petroleum residues vacuum)
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. (Distillates, petroleum residues vacuum)
Hazard class	3
Packing group	III
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 (Distillates, petroleum residues vacuum)
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.
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.

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 %

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.

Toluene (CAS 108-88-3) Listed.

Xylene (o, m, p isomers) (CAS 1330-20-7) Listed.

CERCLA (Superfund) reportable quantity (lbs)

Naphthalene 100

Xylene (o, m, p isomers) 1000

Ethylbenzene 1000

Toluene 1000

Cyclohexane 1000

Benzene 10

Hydrogen sulfide 100

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

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

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

Country(s) or region	Inventory name	On inventory (yes/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 WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

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.
Hydrogen sulfide (CAS 7783-06-4)	Listed.
Naphthalene (CAS 91-20-3)	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.
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US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Male reproductive toxin.
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US - Massachusetts RTK - Substance: 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.
Kerosene (CAS 8008-20-6)	Listed.
Naphthalene (CAS 91-20-3)	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
Kerosene (CAS 8008-20-6)	10000 LBS
Naphthalene (CAS 91-20-3)	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.
Kerosene (CAS 8008-20-6)	Listed.
Naphthalene (CAS 91-20-3)	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.
Hydrogen sulfide (CAS 7783-06-4)	Listed.
Kerosene (CAS 8008-20-6)	Listed.
Naphthalene (CAS 91-20-3)	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.
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16. Other Information**Further information**

HMIS® is a registered trade and service mark of the NPCA.

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: 1
Flammability: 3
Instability: 0

Disclaimer

This Material Safety Data Sheet (MSDS) was prepared in accordance with 29 CFR 1910.1200 by Valero Marketing & Supply Co., ("VALERO"). VALERO does not assume any liability arising out of product use by others. The information, recommendations, and suggestions presented in this MSDS are based upon test results and data believed to be reliable. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use, the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all the scientific and study information in the format of this document, plus additional information may be necessary under exceptional conditions of use, or because of applicable laws or government regulations.

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