

SAFETY DATA SHEET

1. IDENTIFICATION

1.1 Product identifier

Material name: Kerosene, Jet Fuel
Synonym(s): K-1 Kerosene, K-2 Kerosene, Paraffinic Kerosene, Petroleum Distillate-Kerosene, Low- Sulfur Kerosene, Ultra Low Sulfur Kerosene, ULSK, Jet Fuel, Jet Fuel Stock, Jet A, Aviation Jet Fuel A, JP-5, JP-8, DERD

1.2 Relevant identified uses of the substance or mixture

Identified use(s): Fuel.

1.3 Details of the supplier of the safety data sheet

Company Identification: Vitol Aviation Company
1100 Louisiana St., Suite 550
Houston, Texas 77002
Telephone: (713) 230-1000
Fax: (713) 230-1234
Email: SDSHOU@Vitol.com

1.4 Emergency telephone number

Emergency phone no. (24h): Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification (GHS-US)

Flammable liquids Category **3**

Skin corrosion/irritation Category **2**

Carcinogenicity Category **2**

Specific target organ toxicity (single exposure) Category **3** - Narcotic effects

Specific target organ toxicity (single exposure) Category **3** - Respiratory irritation

Aspiration hazard Category **1**

Hazardous to the aquatic environment – Chronic Hazard Category **2**

GHS-US labeling



Hazard Pictograms (GHS-US)

Signal word (GHS-US)

Danger

Hazard statements (GHS-US)

Flammable liquid and vapor
May be fatal if swallowed and enters airways **Causes skin irritation**
Causes serious eye irritation **May cause respiratory irritation**
May cause drowsiness or dizziness
Suspected of causing cancer

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Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US)

Prevention:

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Wear protective gloves/protective clothing/eye protection/face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area.

Response:

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

If skin irritation occurs: Get medical advice/attention. If exposed or concerned: Get medical advice/attention.

If swallowed: Immediately call a poison center/doctor. Do not induce vomiting.

If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. Take off contaminated clothing and wash before reuse.

Storage:

Store in a well-ventilated place. Keep container tightly closed. Keep cool.

Disposal:

Dispose of contents and container in accordance with all local, regional, national and international regulations.

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 - 1
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

4.1 Description of first aid measures

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

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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. FIREFIGHTING MEASURES

5.1	Flammable properties	Combustible by OSHA criteria. Containers may explode when heated.
5.2	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.
5.4	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.
5.5	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

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		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.
5.6	Specific methods	In the event of fire and/or explosion do not breathe fumes. Use water spray to cool unopened containers.
5.7	Hazardous combustion products	Carbon monoxide. Carbon dioxide. Sulfur oxides. Nitrogen oxides (NOx). Hydrocarbons.

6. ACCIDENTAL RELEASE MEASURES

- 6.1 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.
- 6.2 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 Firefighting 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.



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- 6.3 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.
- 6.4 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.
- 6.5 Other information** Clean up in accordance with all applicable regulations.

7. HANDLING AND STORAGE

- 7.1 Handling** Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. 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.
- 7.2 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

8.1 Occupational exposure limits



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US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Benzene (CAS 71-43-2)	STEL	2.5 ppm	
	TWA	0.5 ppm	
Cyclohexane (CAS 110-82-7)	TWA	100 ppm	
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm	
Hydrogen sulfide (CAS 7783-06-4)	STEL	5 ppm	
	TWA	1 ppm	
Kerosene (CAS 8008-20-6)	TWA	200 mg/m3	Non-aerosol
Naphthalene (CAS 91-20-3)	STEL	15 ppm	
	TWA	10 ppm	
Toluene (CAS 108-88-3)	TWA	20 ppm	
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	150 ppm	
	TWA	100 ppm	

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Benzene (CAS 71-43-2)	STEL	5 ppm
	TWA	1 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Cyclohexane (CAS 110-82-7)	PEL	1050 mg/m3
		300 ppm
Ethylbenzene (CAS 100-41-4)	PEL	435 mg/m3
		100 ppm
Naphthalene (CAS 91-20-3)	TWA	50 mg/m3
		10 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	PEL	435 mg/m3
		100 ppm

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

Components	Type	Value
Benzene (CAS 71-43-2)	Ceiling	25 ppm
	TWA	10 ppm
Hydrogen sulfide (CAS 7783-06-4)	Ceiling	20 ppm
Toluene (CAS 108-88-3)	Ceiling	300 ppm
	TWA	200 ppm

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Components	Type	Value	Form
Benzene (CAS 71-43-2)	STEL	8 mg/m ³ 2.5 ppm	
	TWA	1.6 mg/m ³ 0.5 ppm	
Cyclohexane (CAS 110-82-7)	TWA	344 mg/m ³ 100 ppm	
	STEL	543 mg/m ³ 125 ppm	
Ethylbenzene (CAS 100-41-4)	TWA	434 mg/m ³ 100 ppm	
	Ceiling	21 mg/m ³ 15 ppm	
Hydrogen sulfide (CAS 7783-06-4)	TWA	14 mg/m ³ 10 ppm	
	TWA	200 mg/m ³	Vapor.
Kerosene (CAS 8008-20-6)	STEL	79 mg/m ³ 15 ppm	
	TWA	52 mg/m ³ 10 ppm	
Naphthalene (CAS 91-20-3)	TWA	188 mg/m ³ 50 ppm	
	STEL	651 mg/m ³ 150 ppm	
Toluene (CAS 108-88-3)	TWA	434 mg/m ³ 100 ppm	
	STEL	150 ppm	
Xylene (o, m, p isomers) (CAS 1330-20-7)	TWA	434 mg/m ³ 100 ppm	
	STEL	651 mg/m ³ 150 ppm	



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Regulation 296/97, as amended Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety)

Components	Type	Value	Form
Benzene (CAS 71-43-2)	STEL	2.5 ppm	
	TWA	0.5 ppm	
Cyclohexane (CAS 110-82-7)	TWA	100 ppm	
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm	
Hydrogen sulfide (CAS 7783-06-4)	Ceiling	10 ppm	
Kerosene (CAS 8008-20-6)	TWA	200 mg/m ³	Non-aerosol
Naphthalene (CAS 91-20-3)	STE	15 ppm	
	L	10 ppm	
Toluene (CAS 108-88-3)	TWA	20 ppm	
Xylene (o, m, p isomers) (CAS 1330-20-7)	STE	150 ppm	
	L	100 ppm	

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Benzene (CAS 71-43-2)	STEL	2.5 ppm	
	TWA	0.5 ppm	
Cyclohexane (CAS 110-82-7)	TWA	100 ppm	
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm	
Hydrogen sulfide (CAS 7783-06-4)	STEL	5 ppm	
	TWA	1 ppm	
Kerosene (CAS 8008-20-6)	TWA	200 mg/m ³	Non-aerosol
Naphthalene (CAS 91-20-3)	STEL	15 ppm	
	TWA	10 ppm	
Toluene (CAS 108-88-3)	TWA	20 ppm	
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	150 ppm	
	TWA	100 ppm	

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

Components	Type	Value	Form
Benzene (CAS 71-43-2)	STEL	2.5 ppm	
	TWA	0.5 ppm	
Cyclohexane (CAS 110-82-7)	TWA	100 ppm	
Ethylbenzene (CAS 100-41-4)	STE	125 ppm	
	L	100 ppm	
Hydrogen sulfide (CAS 7783-06-4)	STEL	15 ppm	
Kerosene (CAS 8008-20-6)	TWA	200 mg/m ³	Non-aerosol

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Naphthalene (CAS 91-20-3)	STE	15 ppm
	L	10 ppm
Toluene (CAS 108-88-3)	TWA	20 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STE	150 ppm
	L	100 ppm

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

Components	Type	Value
Benzene (CAS 71-43-2)	STEL	15.5 mg/m ³
		5 ppm
	TWA	3 mg/m ³
Cyclohexane (CAS 110-82-7)		1 ppm
	TWA	1030 mg/m ³
		300 ppm
Ethylbenzene (CAS 100-41-4)	STE	543 mg/m ³
		125 ppm
	L	434 mg/m ³
Hydrogen sulfide (CAS 7783-06-4)		100 ppm
	STE	21 mg/m ³
	L	15 ppm
Naphthalene (CAS 91-20-3)		14 mg/m ³
	STE	10 ppm
	L	79 mg/m ³
Toluene (CAS 108-88-3)		15 ppm
	TWA	52 mg/m ³
		10 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	TWA	188 mg/m ³
		50 ppm
	STE	651 mg/m ³
	L	150 ppm
		434 mg/m ³
		100 ppm

Mexico. Occupational Exposure Limit Values

Components	Type	Value
Benzene (CAS 71-43-2)	STEL	16 mg/m ³
		5 ppm
	TWA	3.2 mg/m ³
Cyclohexane (CAS 110-82-7)		1 ppm
	STEL	1300 mg/m ³
		375 ppm
	TWA	1050 mg/m ³

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		300 ppm
Ethylbenzene (CAS 100-41-4)	STEL	545 mg/m ³ 125 ppm
	TWA	435 mg/m ³ 100 ppm
Hydrogen sulfide (CAS 7783-06-4)	STEL	21 mg/m ³ 15 ppm
	TWA	14 mg/m ³ 10 ppm
Naphthalene (CAS 91-20-3)	STEL	75 mg/m ³ 15 ppm
	TWA	50 mg/m ³ 10 ppm
Toluene (CAS 108-88-3)	TWA	188 mg/m ³ 50 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	655 mg/m ³ 150 ppm
	TWA	435 mg/m ³ 100 ppm

8.2 Exposure guidelines

Canada - Alberta OELs: 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.
Toluene (CAS 108-88-3)	Can be absorbed through the skin.

Canada - British Columbia OELs: 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.
Xylene (o, m, p isomers) (CAS 1330-20-7)	Can be absorbed through the skin.

Canada - Manitoba OELs: 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.

Canada - Ontario OELs: 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.

Canada - Quebec OELs: Skin designation

Toluene (CAS 108-88-3)	Can be absorbed through the skin.
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Canada - Saskatchewan OELs: Skin designation

Kerosene (CAS 8008-20-6)	Can be absorbed through the skin.
Naphthalene (CAS 91-20-3)	Can be absorbed through the skin.
Toluene (CAS 108-88-3)	Can be absorbed through the skin.

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Mexico OELs: Skin designation

Toluene (CAS 108-88-3)

Can be absorbed through the skin.

US - California OELs: Skin designation

Benzene (CAS 71-43-2)

Can be absorbed through the skin.

Toluene (CAS 108-88-3)

Can be absorbed through the skin.

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.

8.2.1 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.

8.2.2 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

9.1 Information on basic physical and chemical properties

Appearance: Liquid (may be dyed red).
 Physical state: Liquid.
 Form: Liquid.
 Color: Clear. Straw. Yellow or brown.
 Odor: Kerosene (strong).

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Odor threshold:	Not available.
pH:	Not available.
Vapor pressure:	< 0.7 kPa at 20 deg C
Vapor density:	3 (Air = 1)
Boiling point:	219.92 - 579.92 °F (104.4 - 304.4 °C)
Melting point/Freezing point:	-60.07 °F (-51.15 °C) Estimated
Solubility (water):	Not available.
Specific gravity:	0.79 - 0.9 at 60 deg F
Flash point:	> 100.0 °F (> 37.8 °C) Closed Cup
Flammability limits in air, upper, % by volume:	<= 7 %
Flammability limits in air, lower, % by volume:	>= 0.7 %
Auto-ignition temperature:	399.92 °F (204.4 °C)
Percent Volatile:	Negligible
Flash point class:	Flammable IB

10. STABILITY & REACTIVITY

10.1	Chemical stability	Stable under normal temperature conditions and recommended use.
10.2	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.
10.3	Incompatible materials	Strong oxidizing agents.
10.4	Hazardous decomposition products	Carbon monoxide. Carbon dioxide. Sulfur Oxides. Hydrogen sulfide. Hydrocarbons.
10.5	Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Components	Species	Test Results
Benzene (CAS 71-43-2) Acute <i>Oral</i> LD50	Rat	930 mg/kg
Cyclohexane (CAS 110-82-7) Acute		
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<p><i>Oral</i> LD50</p> <p>Ethylbenzene (CAS 100-41-4)</p> <p>Acute <i>Dermal</i> LD50</p> <p><i>Oral</i> LD50</p> <p>Hydrogen sulfide (CAS 7783-06-4)</p> <p>Acute <i>Inhalation</i> LC50</p> <p>Naphthalene (CAS 91-20-3)</p> <p>Acute <i>Dermal</i> LD50</p> <p><i>Oral</i> LD50</p> <p>Toluene (CAS 108-88-3)</p> <p>Acute <i>Inhalation</i> LC50</p> <p><i>Oral</i> LD50</p> <p>Xylene (o, m, p isomers) (CAS 1330-20-7)</p> <p>Acute <i>Oral</i> LD50</p>	<p>Rat</p> <p>Rabbit</p> <p>Rat</p> <p>Rat</p> <p>Rat</p> <p>Rabbit</p> <p>Rat</p> <p>Rat</p> <p>Rat</p> <p>Rat</p> <p>Rat</p>	<p>12705 mg/kg</p> <p>> 5000 mg/kg</p> <p>5.46 g/kg</p> <p>> 0.38 mg/l, 960 Minutes</p> <p>> 2 g/kg</p> <p>490 mg/kg</p> <p>12200 mg/l, 2 Hours 8000 mg/l, 4 Hours</p> <p>636 mg/kg</p> <p>4300 mg/kg</p>
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Sensitization This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals.

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.

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

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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)	Reasonably Anticipated to be a Human Carcinogen.
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US NTP Report on Carcinogens: Known carcinogen

Benzene (CAS 71-43-2)	Known To Be Human Carcinogen.
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US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Benzene (CAS 71-43-2)	Cancer
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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

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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

12.1 Ecotoxicological data

Components	Species		Test Results
Benzene (CAS 71-43-2)			
Aquatic			
Crustacea	EC50	Water flea (<i>Daphnia magna</i>)	8.76 - 15.6 mg/l, 48 Hours
Fish	LC50	Rainbow trout, Donaldson trout (<i>Oncorhynchus mykiss</i>)	5.9 mg/l, 96 hours
Cyclohexane (CAS 110-82-7)			
Aquatic			
Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>)	3.961 - 5.181 mg/l, 96 hours
		Striped bass (<i>Morone saxatilis</i>)	8.3 mg/l, 96 hours
Ethylbenzene (CAS 100-41-4)			
Aquatic			
Crustacea	EC50	Water flea (<i>Daphnia magna</i>)	1 - 4 mg/l, 48 hours

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Fish Hydrogen sulfide (CAS 7783-06-4) Aquatic	LC50	Rainbow trout, Donaldson trout (Oncorhynchus mykiss)	4 mg/l, 96 hours
Fish Naphthalene (CAS 91-20-3) Aquatic	LC50	Lake whitefish (Coregonus clupeaformis)	0.002 mg/l, 96 hours
Crustacea	EC50	Water flea (Daphnia magna)	1.09 - 3.4 mg/l, 48 hours
Fish	LC50	Rainbow trout, Donaldson trout (Oncorhynchus mykiss)	1.11 - 1.68 mg/l, 96 hours
Toluene (CAS 108-88-3) Aquatic	EC50	Water flea (Daphnia magna)	5.46 - 9.83 mg/l, 48 hours
Fish	LC50	Pink salmon (Oncorhynchus gorbuscha)	7.45 - 8.78 mg/l, 96 hours
Xylene (o, m, p isomers) (CAS 1330-20-7) Aquatic	LC50	Rainbow trout, Donaldson trout (Oncorhynchus mykiss)	8 mg/l, 96 Hours

12.2 Ecotoxicity	Contains a substance which causes risk of hazardous effects to the environment.
12.3 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.
12.4 Aquatic toxicity	Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
12.5 Persistence and degradability	Not available.
12.6 Bioaccumulation / Accumulation	Not available.
12.7 Partition coefficient	
Benzene (CAS 71-43-2)	2.13
Cyclohexane (CAS 110-82-7)	3.44
Ethylbenzene (CAS 100-41-4)	3.15
Toluene (CAS 108-88-3)	2.73
Xylene (o, m, p isomers) (CAS 1330-20-7)	3.2

13. DISPOSAL CONSIDERATIONS

13.1 Waste codes	D001: Waste Flammable material with a flash point <140 °F D018: Waste Benzene
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US RCRA Hazardous Waste U List: Reference

Benzene (CAS 71-43-2)	U019
Cyclohexane (CAS 110-82-7)	U056
Hydrogen sulfide (CAS 7783-06-4)	U135
Naphthalene (CAS 91-20-3)	U165
Toluene (CAS 108-88-3)	U220
Xylene (o, m, p isomers) (CAS 1330-20-7)	U239

- 13.2 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

- 14.1 DOT**
- | | |
|------------------------------|---------------------------------|
| UN number: | UN1268 |
| Proper shipping name: | Petroleum distillates, n.o.s. |
| Hazard class: | Combustible Liquid |
| Packing group: | III |
| Special provisions: | 144, B1, IB3, T2, T4, TP1, TP29 |
| Packaging exceptions: | 150 |
| Packaging non bulk: | 203 |
| Packaging bulk: | 242 |
- 14.2 IATA**
- | | |
|------------------------------------|----------------------------|
| UN number: | UN1268 |
| UN proper shipping name: | Petroleum products, n.o.s. |
| Transport hazard class(es): | 3 |
| Packing group: | III |
| ERG code: | 3L |
- 14.3 IMDG**
- | | |
|------------------------------------|----------------------------|
| UN number: | UN1268 |
| UN proper shipping name: | Petroleum products, n.o.s. |
| Transport hazard class(es): | 3 |
| Packing group: | III |
| EmS: | F-E, S-E |
- 14.4 TDG**
- | | |
|------------------------------|----------------------------|
| UN number: | UN1268 |
| Proper shipping name: | Petroleum products, n.o.s. |
| Hazard class: | 3 |
| Packing group: | III |

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.

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TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Benzene (CAS 71-43-2)
Ethylbenzene (CAS 100-41-4)
Naphthalene (CAS 91-20-3)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

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) (40 CFR 302.4)

Naphthalene: isomers: 100
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 (40
CFR 355, Appendix A)** No

SARA 311/312 Hazardous Chemical
No

**Drug Enforcement Administration
(DEA) (21 CFR
1308.11-15)**

Not controlled

Canadian regulations

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS

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contains all the information required by the CPR.

WHMIS status

Controlled

WHMIS classification

B2 - Flammable Liquids
D2A - Other Toxic Effects-VERY TOXIC
D2B - Other Toxic Effects-TOXIC

WHMIS labeling



Inventory status

Country(s) or region	Inventory Name	On inventory
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	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
Unites States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory 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.



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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 - 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: Special hazard	
Benzene (CAS 71-43-2)	Special hazard.
US. Massachusetts RTK - Substance List	
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. New Jersey Worker and Community Right-to-Know Act	
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. Pennsylvania RTK - Hazardous Substances	
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.

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16. OTHER INFORMATION

Information given herein is offered in good faith as accurate, but without guarantee. Conditions of use and suitability of the product for particular uses are beyond our control; all risks of use of the product are therefore assumed by the user and WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. Nothing is intended as a recommendation for uses which infringe valid patents or as extending license under valid patents. Appropriate warnings and safe handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Vitol Aviation Company assumes no responsibility for accuracy of information.