SAFETY DATA SHEET

1. Identification

Product identifier Kerosene

Other means of identification
- SDS number: 105-GHS
- Synonyms: K-1 Kerosene, K-2 Kerosene, Paraffinic Kerosene, Petroleum Distillate-Kerosene, Low- Sulfur Kerosene, Ultra Low Sulfur Kerosene, ULSK

Recommended use Refinery feedstock.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Valero Marketing & Supply Company and Affiliates
One Valero Way
San Antonio, TX 78269-6000

General Assistance
210-345-4593

E-Mail CorpHSE@valero.com

Contact Person Industrial Hygienist

Emergency Telephone 24 Hour Emergency 866-565-5220
1-800-424-9300 (CHEMTREC USA)

2. Hazard(s) identification

Physical hazards Flammable Liquids Category 3

Health Hazards
- Skin corrosion/irritation Category 2
- Germ cell mutagenicity Category 1B
- Carcinogenicity Category 1B
- Reproductive toxicity Category 2
- Specific Target Organ Toxicity, Single Exposure Category 3 narcotic effects
- Aspiration hazard Category 1

Environmental hazards Hazardous to the aquatic environment, long-term hazard Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Flammable liquid and vapor. Causes skin irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May be fatal if swallowed and enters airways.

Precautionary statement
Prevention
Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Keep away from heat/sparks/open flames and hot surfaces. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Wash thoroughly after handling. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area.
Response
If exposed or concerned: Get medical advice/attention. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. In case of fire: Use for extinction. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash before re-use. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a doctor if you fell unwell. If swallowed: Immediately call a poison center/doctor.

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

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)
None known.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosene</td>
<td>8008-20-6</td>
<td>0 - 100</td>
</tr>
<tr>
<td>Distillates, petroleum residues vacuum</td>
<td>68955-27-1</td>
<td>0 - 100</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Xylene (o, m, p isomers)</td>
<td>1330-20-7</td>
<td>0 - 2</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>100-41-4</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>110-82-7</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>0 - 0.5</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>7783-06-4</td>
<td>&lt; 0.1</td>
</tr>
</tbody>
</table>

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

4. First-aid measures

Inhalation
Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. 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. If high pressure injection under the skin occurs, always seek medical attention.

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.

Ingestion
Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Indication of immediate medical attention and special treatment needed
In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information
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

Suitable extinguishing media

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

Special 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

Use water spray to cool unopened containers.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

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 SDS for Personal Protective Equipment.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Local authorities should be advised if significant spillages cannot be contained. 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.

Use non-sparking tools and explosion-proof equipment.

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.

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, flames, 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.

7. Handling and storage

Precautions for safe 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.
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. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>STEL</td>
<td>5 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1 ppm</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexane (CAS 110-82-7)</td>
<td>PEL</td>
<td>1050 mg/m³</td>
</tr>
<tr>
<td>Ethylbenzene (CAS 100-41-4)</td>
<td>PEL</td>
<td>300 ppm</td>
</tr>
<tr>
<td>Naphthalene (CAS 91-20-3)</td>
<td>PEL</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Xylene (o, m, p isomers) (CAS 1330-20-7)</td>
<td>PEL</td>
<td>435 mg/m³</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Ceiling</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td>Hydrogen sulfide (CAS 7783-06-4)</td>
<td>Ceiling</td>
<td>20 ppm</td>
</tr>
<tr>
<td>Toluene (CAS 108-88-3)</td>
<td>Ceiling</td>
<td>300 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>200 ppm</td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values

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

US. NIOSH: Pocket Guide to Chemical Hazards

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>STEL</td>
<td>1 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Cyclohexane (CAS 110-82-7)</td>
<td>TWA</td>
<td>1050 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>300 ppm</td>
</tr>
</tbody>
</table>
### Components

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylbenzene (CAS 100-41-4)</td>
<td>STEL</td>
<td>545 mg/m³</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>125 ppm</td>
</tr>
<tr>
<td>Hydrogen sulfide (CAS 7783-06-4)</td>
<td>Ceiling</td>
<td>15 mg/m³</td>
</tr>
<tr>
<td>Kerosene (CAS 8008-20-6)</td>
<td>TWA</td>
<td>100 mg/m³</td>
</tr>
<tr>
<td>Naphthalene (CAS 91-20-3)</td>
<td>STEL</td>
<td>75 mg/m³</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>15 ppm</td>
</tr>
<tr>
<td>Toluene (CAS 108-88-3)</td>
<td>STEL</td>
<td>560 mg/m³</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>150 ppm</td>
</tr>
<tr>
<td>Xylene (o, m, p isomers) (CAS 1330-20-7)</td>
<td>STEL</td>
<td>655 mg/m³</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>150 ppm</td>
</tr>
</tbody>
</table>

### Biological limit values

**ACGIH Biological Exposure Indices**

<table>
<thead>
<tr>
<th>Components</th>
<th>Value</th>
<th>Determinant</th>
<th>Specimen</th>
<th>Sampling Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>25 µg/g</td>
<td>S-Phenylmercapturic acid</td>
<td>Creatinine in urine</td>
<td>*</td>
</tr>
<tr>
<td>Ethylbenzene (CAS 100-41-4)</td>
<td>0.15 g/g</td>
<td>Sum of mandelic acid and phenylglyoxylic acid</td>
<td>Creatinine in urine</td>
<td>*</td>
</tr>
<tr>
<td>Toluene (CAS 108-88-3)</td>
<td>0.3 mg/g</td>
<td>o-Cresol, with hydrolysis</td>
<td>Creatinine in urine</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>0.03 mg/l</td>
<td>Toluene</td>
<td>Urine</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>0.02 mg/l</td>
<td>Toluene</td>
<td>Blood</td>
<td>*</td>
</tr>
<tr>
<td>Xylene (o, m, p isomers) (CAS 1330-20-7)</td>
<td>1.5 g/g</td>
<td>Methylhippuric acids</td>
<td>Creatinine in urine</td>
<td>*</td>
</tr>
</tbody>
</table>

* - For sampling details, please see the source document.

### Exposure guidelines

**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 - Minnesota Haz Subs: Skin designation applies**

**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.

**Appropriate 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.

**Individual protection measures, such as personal protective equipment**

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

**Skin protection**

**Hand protection**
- Avoid exposure - obtain special instructions before use. Wear protective gloves. Protective gloves.
Other

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.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Liquid (may be dyed red).

Physical state

Liquid.

Form

Liquid.

Color

Clear. Straw. Yellow or brown.

Odor

Kerosene (strong).

Odor threshold

Not available.

pH

Not available.

Melting point/freezing point

-60.07 °F (-51.15 °C) Estimated

Initial boiling point and boiling range

219.92 - 579.92 °F (104.4 - 304.4 °C)

Flash point

> 100.0 °F (> 37.8 °C) Closed Cup

Evaporation rate

Not available.

Flammability (solid, gas)

Not available.

Upper/lower flammability or explosive limits

| Flammability limit - lower (%) | 0.7 % |
| Flammability limit - upper (%) | 6 % |
| Explosive limit - lower (%) | Not available. |
| Explosive limit - upper (%) | Not available. |

Vapor pressure

< 0.7 kPa at 20 deg C

Vapor density

3 (Air = 1)

Relative density

0.79 - 0.9 (60 °F)

Solubility(ies)

Solubility (water)

Not available.

Partition coefficient (n-octanol/water)

Not available.

Auto-ignition temperature

399.92 °F (204.4 °C)

Decomposition temperature

Not available.

Viscosity

Not available.

Other information

VOC (Weight %)

Negligible

10. Stability and reactivity

Reactivity

The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability

Stable under normal temperature conditions and recommended use.

Possibility of hazardous reactions

Hazardous polymerization does not occur.
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.

11. Toxicological information

Information on likely routes of exposure:
- **Inhalation**: In high concentrations, mists/vapors may irritate throat and respiratory system and cause coughing. May cause drowsiness or dizziness.
- **Skin contact**: Causes skin irritation. Prolonged contact may cause dryness of the skin.
- **Eye contact**: May cause eye irritation.
- **Ingestion**: May be fatal if swallowed and enters airways.

Symptoms related to the physical, chemical and toxicological characteristics:

Information on toxicological effects:
Acute toxicity: Based on available data, the classification criteria are not met.

### Test Results

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Dermal</td>
<td>&gt; 9.4 ml/kg, 24 Hours</td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Inhalation</td>
<td>9980 ppm</td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Mouse</td>
<td>9980 ppm, 7 Hours</td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Rat</td>
<td>43767 mg/m3, 4 Hours</td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>13700 ppm, 4 Hours</td>
<td></td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>10000 ppm, 7 Hours</td>
<td></td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Oral</td>
<td>5970 mg/kg</td>
</tr>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Rat</td>
<td>930 mg/kg</td>
</tr>
<tr>
<td>Cyclohexane (CAS 110-82-7)</td>
<td>Oral</td>
<td>12705 mg/kg</td>
</tr>
<tr>
<td>Distillates, petroleum residues vacuum (CAS 68955-27-1)</td>
<td>Dermal</td>
<td>&gt; 2000 mg/kg, 24 Hours</td>
</tr>
<tr>
<td>Distillates, petroleum residues vacuum (CAS 68955-27-1)</td>
<td>Inhalation</td>
<td>&gt; 320 mg/m3, 4 Hours</td>
</tr>
<tr>
<td>Distillates, petroleum residues vacuum (CAS 68955-27-1)</td>
<td>Oral</td>
<td>4320 mg/kg</td>
</tr>
<tr>
<td>Ethylbenzene (CAS 100-41-4)</td>
<td>Dermal</td>
<td>&gt; 5000 mg/kg</td>
</tr>
<tr>
<td>Ethylbenzene (CAS 100-41-4)</td>
<td>Inhalation</td>
<td>17.8 ml/kg, 24 Hours</td>
</tr>
<tr>
<td>Ethylbenzene (CAS 100-41-4)</td>
<td>Mouse</td>
<td>&gt; 8000 ppm, 20 Minutes</td>
</tr>
<tr>
<td>Components</td>
<td>Species</td>
<td>Test Results</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------</td>
<td>--------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000 ppm</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>5.46 g/kg</td>
</tr>
<tr>
<td>LD50</td>
<td>Rat</td>
<td>17.81 mm/kg</td>
</tr>
<tr>
<td>Other</td>
<td>Mouse</td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen sulfide (CAS 7783-06-4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Inhalation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Rat</td>
<td>&gt; 0.38 mg/l, 960 Minutes</td>
</tr>
<tr>
<td>Kerosene (CAS 8008-20-6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dermal</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td><em>Inhalation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Rat</td>
<td>&gt; 4.3 mg/l, 4 Hours</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg</td>
</tr>
<tr>
<td>Naphthalene (CAS 91-20-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dermal</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 2 g/kg</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>490 mg/kg</td>
</tr>
<tr>
<td>Toluene (CAS 108-88-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dermal</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 5000 mg/kg, 24 Hours</td>
</tr>
<tr>
<td><em>Inhalation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Mouse</td>
<td>6405 - 7436 ppm, 6 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5320 ppm, 8 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400 ppm, 24 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26700 ppm, 1 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12200 ppm, 2 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8000 ppm, 4 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8000 mg/l, 4 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5879 - 6281 ppm, 6 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.7 mg/l, 4 Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5580 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.6 g/kg</td>
</tr>
<tr>
<td>Xylene (o, m, p isomers) (CAS 1330-20-7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dermal</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>12126 mg/kg, 24 Hours</td>
</tr>
<tr>
<td><em>Inhalation</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>Mouse</td>
<td>5300 ppm, 6 Hours</td>
</tr>
<tr>
<td></td>
<td>Rat</td>
<td>5922 ppm, 4 Hours</td>
</tr>
<tr>
<td>Components</td>
<td>Species</td>
<td>Test Results</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Oral LD50</td>
<td>Mouse</td>
<td>5251 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Rat</td>
<td>3523 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Fish</td>
<td>10 ml/kg</td>
</tr>
</tbody>
</table>

### Skin corrosion/irritation
Causes skin irritation.

### Serious eye damage/eye irritation
Based on available data, the classification criteria are not met.

### Respiratory or skin sensitization

<table>
<thead>
<tr>
<th>Respiratory sensitization</th>
<th>Skin sensitization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on available data, the classification criteria are not met.</td>
<td>This substance may have a potential for sensitization which may provoke an allergic reaction among sensitive individuals.</td>
</tr>
</tbody>
</table>

### Germ cell mutagenicity
May cause genetic defects.

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.

### Carcinogenicity
May cause cancer.

**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.

**NTP Report on Carcinogens**
- Benzene (CAS 71-43-2): Known To Be Human Carcinogen.
- Naphthalene (CAS 91-20-3): Reasonably Anticipated to be a Human Carcinogen.

- Benzene (CAS 71-43-2): Cancer

### Reproductive toxicity
Suspected of damaging fertility or the unborn child.

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. 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.

### Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

### Specific target organ toxicity - repeated exposure
Based on available data, the classification criteria are not met.

### Aspiration hazard
May be fatal if swallowed and enters airways.

### Chronic effects
Cancer hazard. Can cause cancer. Contains a substance which may have a mutagenic effect. Suspected of damaging fertility or the unborn child. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.

### Further information
Symptoms may be delayed.

### 12. Ecological information
**Ecotoxicity**
Toxic to aquatic life with long lasting effects.

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (CAS 71-43-2)</td>
<td>Aquatic</td>
<td>Crustacea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish</td>
</tr>
</tbody>
</table>
Components | Species | Test Results
--- | --- | ---
**Cyclohexane (CAS 110-82-7)**
**Aquatic**
Fish | LC50 | Fathead minnow (Pimephales promelas) 3.961 - 5.181 mg/l, 96 hours

**Ethylbenzene (CAS 100-41-4)**
**Aquatic**
Crustacea | EC50 | Water flea (Daphnia magna) 1 - 4 mg/l, 48 hours
Fish | LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) 4 mg/l, 96 hours

**Hydrogen sulfide (CAS 7783-06-4)**
**Aquatic**
Fish | LC50 | Lake whitefish (Coregonus clupeaformis) 0.002 mg/l, 96 hours

**Naphthalene (CAS 91-20-3)**
**Aquatic**
Crustacea | EC50 | Water flea (Daphnia magna) 1.09 - 3.4 mg/l, 48 hours
Fish | LC50 | Pink salmon (Oncorhynchus gorbuscha) 0.95 - 1.62 mg/l, 96 hours

**Toluene (CAS 108-88-3)**
**Aquatic**
Crustacea | EC50 | Water flea (Daphnia magna) 5.46 - 9.83 mg/l, 48 hours
Fish | LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) 5.8 mg/l, 96 hours

**Xylene (o, m, p isomers) (CAS 1330-20-7)**
**Aquatic**
Fish | LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) 8 mg/l, 96 Hours

**Persistence and degradability**
None known.

**Bioaccumulative potential**
Not available.

**Partition coefficient n-octanol / water (log Kow)**
- 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

**Mobility in soil**
Not available.

**Other adverse effects**
Not available.

### 13. Disposal considerations

**Disposal instructions**
Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. 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.

**Hazardous waste code**
- D001: Waste Flammable material with a flash point <140 °F
- D018: Waste Benzene

**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

**Waste from residues / unused products**
Dispose of in accordance with local regulations.

**Contaminated packaging**
Offer rinsed packaging material to local recycling facilities.
14. Transport information

DOT

UN number UN1223
UN proper shipping name Kerosene
Transport hazard class(es)
  Class - Combustible Liquid
  Subsidiary risk -
  Label(s) 3
Packing group III
Environmental hazards
  Marine pollutant Yes
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions 144, B1, IB3, T2, TP2
Packaging exceptions 150
Packaging non bulk 203
Packaging bulk 242

IATA

UN number UN1223
UN proper shipping name Kerosene
Transport hazard class(es)
  Class 3
  Subsidiary risk -
Packing group III
Environmental hazards Yes
ERG Code 3L
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN1223
UN proper shipping name KEROSENE
Transport hazard class(es)
  Class 3
  Subsidiary risk -
Packing group III
Environmental hazards
  Marine pollutant Yes
EmS F-E, S-E
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.

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.

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

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Benzene (CAS 71-43-2) Cancer
Central nervous system
Blood
Aspiration
Skin
Eye
respiratory tract irritation
Flammability

CERCLA Hazardous Substance List (40 CFR 302.4)

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

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

SARA 302 Extremely hazardous substance

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>Reportable quantity</th>
<th>Threshold planning quantity, lower value</th>
<th>Threshold planning quantity, upper value</th>
</tr>
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<tbody>
<tr>
<td>Hydrogen sulfide</td>
<td>7783-06-4</td>
<td>100</td>
<td>500 lbs</td>
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</table>

SARA 311/312 Hazardous chemical

SARA 313 (TRI reporting)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Xylene (o, m, p isomers)</td>
<td>1330-20-7</td>
<td>0 - 2</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>100-41-4</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>110-82-7</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>0 - 0.5</td>
</tr>
</tbody>
</table>

Other federal regulations

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)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
- Hydrogen sulfide (CAS 7783-06-4)

Safe Drinking Water Act (SDWA)
- Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number
- Toluene (CAS 108-88-3) 6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))
- Toluene (CAS 108-88-3) 35 %WV

DEA Exempt Chemical Mixtures Code Number
- Toluene (CAS 108-88-3) 594

US state regulations
- WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List
- Benzene (CAS 71-43-2)
- Cyclohexane (CAS 110-82-7)
- Ethylbenzene (CAS 100-41-4)
- Hydrogen sulfide (CAS 7783-06-4)
- Kerosene (CAS 8008-20-6)
- Naphthalene (CAS 91-20-3)
- Toluene (CAS 108-88-3)
- Xylene (o, m, p isomers) (CAS 1330-20-7)

US. New Jersey Worker and Community Right-to-Know Act
- Benzene (CAS 71-43-2)
- Cyclohexane (CAS 110-82-7)
- Ethylbenzene (CAS 100-41-4)
- Hydrogen sulfide (CAS 7783-06-4)
- Kerosene (CAS 8008-20-6)
Naphthalene (CAS 91-20-3)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Benzene (CAS 71-43-2)
Cyclohexane (CAS 110-82-7)
Ethylbenzene (CAS 100-41-4)
Hydrogen sulfide (CAS 7783-06-4)
Kerosene (CAS 8008-20-6)
Naphthalene (CAS 91-20-3)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

**US. Rhode Island RTK**

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

**US. California Proposition 65**

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

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

---

**International Inventories**

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

* "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).

**16. Other information, including date of preparation or last revision**

**Issue date**
13-May-2013

**Revision date**
03-September-2014

**Version #**
05

**NFPA ratings**

Kerosene

913634  Version #: 05  Revision date: 03-September-2014  Print date: 03-September-2014

Prepared by 3E Company
References

ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

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