Material Safety Data Sheet  
Kerosene

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Kerosene  
Synonyms: Dual Purpose, K1, Dyed K1, Diesel Fuel-No.1, Arctic, Dyed Highway, On-Road, Off-Road jet Fuel-A, B, A-1, A-50, High Sulfur, Military, Jet A & B Aviation Turbine Fuel, Jet A-1 Aviation Fuel (Combustible), Aviation Fuel (Flammable), Jet Q Turbine Fuel, Turbine Fuel No., 1, FO#1, Low Aromatic Feedstock, SRK Sovent, Arctic Grade Fuel Oil (DFA), Range Oil, Coal Oil, JP-4, JP-5, JP-8, K2, Gas Oil, Light Hydrocracked, Diesel, 888100004861

MSDS Number: 888100004861  
Version: 2.2

Product Use Description: Fuel  
Company: For Tesoro Refining & Marketing Co.  
300 Concord Plaza Drive, San Antonio, TX 78216-6999

Tesoro Call Center: (877) 783-7676  
Chemtrec (Emergency Contact): (800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Regulatory status: This material is considered hazardous by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200).

Signal Word: Warning

Hazard Summary: Harmful or fatal if swallowed. Harmful by inhalation. Irritating to eyes, respiratory system and skin. Combustible. Affects central nervous system.

Potential Health Effects

Eyes: May cause eye irritation.

Skin: May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Ingestion: Aspiration hazard if liquid is inhaled into lungs, particularly from vomiting after ingestion. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure and even death. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death may occur.
**Inhalation**: May cause nose, throat, and lung irritation. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death. Burning any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

**Chronic exposure**: Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

**Target Organs**: Respiratory system, Eyes, Skin, and Irritation from skin exposure may aggravate existing open skin wounds, skin disorders, and dermatitis conditions. Chronic respiratory, cardiovascular, and liver disease may be aggravated by exposure.

### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosene (petroleum)</td>
<td>8008-20-6</td>
<td>100%</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>0.04%</td>
</tr>
</tbody>
</table>

### SECTION 4. FIRST AID MEASURES

**Inhalation**: Move to fresh air. If not breathing, give artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

**Skin contact**: Take off all contaminated clothing immediately. Wash off immediately with soap and plenty of water. Wash contaminated clothing before re-use. If skin irritation persists, seek medical attention.

**Eye contact**: Remove contact lenses. In case of eye contact, immediately flush with low pressure, cool water for at least 15 minutes, opening eyelids to ensure flushing. Seek medical advice.

**Ingestion**: Do NOT induce vomiting. If vomiting does occur naturally, keep head below the hips to reduce the risks of aspiration. Obtain medical attention. Do not give liquids. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

**Notes to physician**: Symptoms: Aspiration may cause pulmonary edema and pneumonitis. Treatment: Do not induce vomiting, use gastric lavage only., Remove from further exposure and treat symptomatically.

### SECTION 5. FIRE-FIGHTING MEASURES

**Form**: Liquid

**Flash point**: 38 - 41 °C (100 - 106 °F)

**Auto Ignition temperature**: 210 °C (410 °F)

**Lower explosive limit**: 0.7 % (V)
Upper explosive limit : 4 % (V)

Suitable extinguishing media : Carbon dioxide (CO2), Water spray, Dry chemical, Foam. Keep containers and surroundings cool with water spray. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Specific hazards during fire fighting : Fire Hazard. Do not use a solid water stream as it may scatter and spread fire. Cool closed containers exposed to fire with water spray. Sealed containers may rupture when heated. Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition sources.

Special protective equipment for fire-fighters : Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA-approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Further information : Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN if applicable. Consider wind direction; stay upwind and uphill, if possible. Evacuate nonessential personnel and remove or secure all ignition sources. Evaluate the direction of product travel, diking, sewers, etc. to contain spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Environmental precautions : Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Methods for cleaning up : Take up with sand or oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

CERCLA Hazardous substances and corresponding RQs :

<table>
<thead>
<tr>
<th>Substance</th>
<th>RQ Code</th>
<th>RQ Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>100 lbs</td>
</tr>
</tbody>
</table>

SECTION 7. HANDLING AND STORAGE

Handling : Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

Advice on protection against : Hydrocarbon liquids including this product can act as a non-conductive flammable
fire and explosion
l
liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage
tanks or other containers. Precautions to prevent static-initiated fire or explosion
during transfer, storage or handling, include but are not limited to these examples:

(1) Ground and bond containers during product transfers. Grounding and
bonding may not be adequate protection to prevent ignition or explosion of
hydrocarbon liquids and vapors that are static accumulators.

(2) Special slow load procedures for "switch loading" must be followed to
avoid the static ignition hazard that can exist when higher flash point
material (such as fuel oil or diesel) is loaded into tanks previously
containing low flash point products (such gasoline or naphtha).

(3) Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initiated fire or explosion, see
NFPA 77, Recommended Practice on Static Electricity (2007), and API
Recommended Practice 2003, Protection Against Ignitions Arising Out of Static,

Dust explosion class
: Not applicable

Requirements for storage areas and containers
: Keep away from flame, sparks, excessive temperatures and open flame. Use
approved containers. Keep containers closed and clearly labeled. Empty or
partially full product containers or vessels may contain explosive vapors. Do not
pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a
well-ventilated area. The storage area should comply with NFPA 30 "Flammable
and Combustible Liquid Code". The cleaning of tanks previously containing this
product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile
Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning
Petroleum Storage Tanks".

Advice on common storage
: Keep away from food, drink and animal feed. Incompatible with oxidizing agents.
Incompatible with acids.

Other data
: Emergency eye wash capability should be available in the near proximity to
operations presenting a potential splash exposure.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

<table>
<thead>
<tr>
<th>List</th>
<th>Components</th>
<th>CAS-No.</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA Z1</td>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>PEL</td>
<td>10 ppm 50 mg/m³</td>
</tr>
<tr>
<td>ACGIH</td>
<td>Kerosene (petroleum)</td>
<td>8008-20-6</td>
<td>TWA</td>
<td>200 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>91-20-3</td>
<td>STEL</td>
<td>15 ppm</td>
</tr>
</tbody>
</table>

Engineering measures
: Use adequate ventilation to keep gas and vapor concentrations of this product
below occupational exposure and flammability limits, particularly in confined
spaces. Use only intrinsically safe electrical equipment approved for use in
classified areas. Emergency eye wash capability should be available in the vicinity
of any potential splash exposure.

Eye protection
: Goggles and face shield as needed to prevent eye and face contact.

Hand protection
: Gloves constructed of nitrile, neoprene, or PVC are recommended.

Skin and body protection
: Chemical protective clothing such as DuPont TyChem®, Barricade or equivalent,
recommended based on degree of exposure. Consult manufacturer specifications for further information.

**Respiratory protection**: A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection. Use a NIOSH/MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

**Work / Hygiene practices**: Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Light yellow to white</td>
</tr>
<tr>
<td>Odor</td>
<td>Characteristic Petroleum distillate</td>
</tr>
<tr>
<td>Flash point</td>
<td>38 - 41 °C (100 - 106 °F)</td>
</tr>
<tr>
<td>Auto Ignition temperature</td>
<td>210 °C (410 °F)</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>No decomposition if stored and applied as directed.</td>
</tr>
<tr>
<td>Lower explosive limit</td>
<td>0.7 % (V)</td>
</tr>
<tr>
<td>Upper explosive limit</td>
<td>4 % (V)</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>0.8 (H20=1)</td>
</tr>
<tr>
<td>Freezing point</td>
<td>-18 °C (0 °F)</td>
</tr>
<tr>
<td>Boiling point</td>
<td>160 - 300 °C (320 - 572 °F)</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>0.029 psia at 38 °C (100 °F)</td>
</tr>
<tr>
<td>Relative Vapor Density</td>
<td>4.5 (Air = 1.0)</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble</td>
</tr>
</tbody>
</table>
**Percent Volatiles**: 100%

**Conductivity**
- **Diesel Fuel Oils at terminal load rack**: At least 25 pS/m
- **Ultra Low Sulfur Diesel (ULSD) without conductivity additive**: 0 pS/m to 5 pS/m
- **ULSD at terminal load rack with conductivity additive**: At least 50 pS/m but conductivity may decrease from environmental factors such as temperature drop.
- **JP-8 at terminal load rack**: 150 pS/m to 600 pS/m

**SECTION 10. STABILITY AND REACTIVITY**

**Conditions to avoid**: Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers.

**Materials to avoid**: Keep away from strong oxidizers such as nitric and sulfuric acids.

**Hazardous decomposition products**: Carbon monoxide, carbon dioxide and noncombusted hydrocarbons (smoke).

**Thermal decomposition**: No decomposition if stored and applied as directed.

**Hazardous reactions**: Note: Stable under normal conditions.

**SECTION 11. TOXICOLOGICAL INFORMATION**

**Carcinogenicity**
- **NTP**: Naphthalene (CAS-No.: 91-20-3)
- **IARC**: Kerosene is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene as a probable human carcinogen.
  - Kerosene (petroleum) (CAS-No.: 8008-20-6)
  - Naphthalene (CAS-No.: 91-20-3) (CAS-No.:)
- **CA Prop 65**: WARNING! This product contains a chemical known to the State of California to cause cancer.
  - Naphthalene (CAS-No.: 91-20-3)
- **Skin irritation**: Irritating to skin.
- **Eye irritation**: Irritating to eyes.
- **Further information**: Kerosene is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene as a probable human carcinogen. Kerosene does not have a measurable effect on human reproduction or development. Some petroleum distillates have been found to cause adverse reproductive effects in laboratory animals. Acute and chronic exposure to kerosene may result in CNS effects including irritability, restlessness, ataxia, drowsiness, convulsions, coma and death. The most common health effect associated with chronic kerosene exposure is dermatitis.

**Component**
- **Kerosene (petroleum)** 8008-20-6
- **Acute oral toxicity** LD50 rat
  - Dose: 5 mg/kg
- **Acute dermal toxicity** LD50 rabbit
  - Dose: 2,001 mg/kg
### SECTION 12. ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Component:</th>
<th>Naphthalene 91-20-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to algae:</td>
<td>EC50</td>
</tr>
<tr>
<td>Species:</td>
<td></td>
</tr>
<tr>
<td>Dose:</td>
<td>33 mg/l</td>
</tr>
<tr>
<td>Exposure time:</td>
<td>24 h</td>
</tr>
</tbody>
</table>

### SECTION 13. DISPOSAL CONSIDERATIONS

| Disposal: | Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements. |

### SECTION 14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>CFR:</th>
<th>Proper shipping name: Kerosene</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN-No.</td>
<td>1223</td>
</tr>
<tr>
<td>Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
</tbody>
</table>
TDG

Proper shipping name: Kerosene
UN-No.: UN1223
Class: 3
Packing group: III

IATA Cargo Transport

UN UN-No.: UN1223
Description of the goods: Kerosene
Class: 3
Packaging group: III
ICAO-Labels: 3
Packing instruction (cargo aircraft): 310
Packing instruction (cargo aircraft): Y309

IATA Passenger Transport

UN UN-No.: UN1223
Description of the goods: Kerosene
Class: 3
Packaging group: III
ICAO-Labels: 3
Packing instruction (passenger aircraft): 309
Packing instruction (passenger aircraft): Y309

IMDG-Code

UN-No.: UN 1223
Description of the goods: Kerosene
Class: 3
Packaging group: III
IMDG-Labels: 3
EmS Number: F-E S-E
Marine pollutant: Yes

SECTION 15. REGULATORY INFORMATION

OSHA Hazards: Toxic by inhalation.
Highly toxic by ingestion
Moderate skin irritant
Severe eye irritant
Flammable

TSCA Status: On TSCA Inventory

DSL Status: All components of this product are on the Canadian DSL list.

SARA 311/312 Hazards: Acute Health Hazard
Chronic Health Hazard
Fire Hazard

California Prop. 65: WARNING! This product contains a chemical known to the State of California to
cause cancer.
Naphthalene 91-20-3

SECTION 16. OTHER INFORMATION

Further information
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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Revision Date : 11/04/2008

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