SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: Jet A-1

Synonyms: See section 16

Product Description: Fuel for aviation turbine engines fitted to aircraft

SDS Number: 31002

Intended Use: Diesel engine fuel

COMPANY IDENTIFICATION

Supplier: **Polar Oils LP**
250 Malouf Road
Saskatoon, SK S7M 5J3

24 Hour Emergency Telephone: 1-306-242-1001

Transportation Emergency Phone Number: 1-613-996-6666

Product Technical Information: 1-306-242-1001

Supplier General Contact: 1-306-242-1001

SECTION 2 HAZARD IDENTIFICATION

GHS classification in accordance with the Hazardous Products Regulations
Flammable liquids: Category 3
Aspiration hazard: Category 1
Skin irritation: Category 2
Acute toxicity: Category 4
Specific target organ toxicity - single exposure: Category 3 (Narcotic effects)
Carcinogenicity: Category 2
Specific target organ toxicity – repeated exposure: Category 2 (Blood, thymus, Liver)
Long term (chronic) aquatic hazard: Category 2

GHS label elements

Hazard pictograms


Flammable Gas Hazard


Health Hazard


Serious Health Hazard


Aquatic Environment Hazard

Signal Word: Danger

Hazard Statements:

PHYSICAL HAZARDS:
H226 Flammable liquid and vapour.
HEALTH HAZARDS:
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation. H332 Harmful if inhaled.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer.
H373 May cause damage to organs through prolonged or repeated exposure.
ENVIRONMENTAL HAZARDS:
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements:

Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges. P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P302 + P352 IF ON SKIN: Wash with plenty of water.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304 + P340 IF INHALED: Remove people to fresh air and keep breathing comfortable.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P312 Call a POISON CENTER/ doctor if you feel unwell.
P314 Get medical advice/ attention if you feel unwell.
P321 Specific treatment (see supplemental first aid instructions on this label).
P331 Do NOT induce vomiting.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reusing.
P370 + P378 In case of fire: Use appropriate media to extinguish.
P391 Collect spillage.

Storage:

P403 + P233 Store in a well-ventilated place. Keep the container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards which do not result in classification

- Slightly irritating to respiratory system.
- Liquid evaporates quickly and can ignite leading to a flash fire, or an explosion in a confined space.
- Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding auto-ignition temperature, where vapour concentrations are within the flammability range.
- May ignite on surfaces at temperatures above auto-ignition temperature.
- This material is a static accumulator.
- Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
- If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air vapour mixtures can occur.

SECTION 3 COMPOSITION – INFORMATION ON INGREDIENTS

Substance / Mixture: This material is defined as a mixture.

Chemical nature: Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C9 to C16 range.
May also contain several additives at <.01% v/v each

Components

Chemical Name	Common Name	CAS #	Concentration (% w/w)
Kerosene (petroleum), hydrodesulfurized	Kerosene (petroleum), hydrodesulfurized	64742-81-0	>= 0 - <= 100
Kerosene (petroleum)	Straight run kerosene	Not assigned	>= 0 - <= 100
Distillates (petroleum) light hydrocracked	Distillates (petroleum) light hydrocracked	64741-77-1	>= 0 - <= 100
Distillates (petroleum), hydrotreated light	Distillates (petroleum), hydrotreated light	64742-47-8	>= 0 - <= 100

Total aromatic hydrocarbons present are typically in the range of 10-20% v/v

Further information

Contains:

Chemical Name	Identification #	Concentration
Xylene, mixed isomers	1330-20-7	>= 0 - <= 2
Trimethylbenzene (all isomers)	25551-13-7	>= 0 - <= 1
Toluene	108-88-3	>= 0 - <= 0.4
Naphthalene	91-20-3	>= 0 - <= 0.9
Ethylbenzene	100-41-4	>= 0 - <= 2
Cumene	98-82-8	>= 0 - <= 0.2

SECTION 4 FIRST AID MEASURES

GENERAL ADVICE

- Vapourisation of H2S that has been trapped in clothing can be dangerous to rescuers.
- Maintain respiratory protection to avoid contamination from the victims to rescuers.
- Mechanical ventilation should be used to resuscitate if possible.
- Call the emergency number for your location / facility.

IF INHALED

- Remove to fresh air.
- Do not attempt to rescue the victim unless proper respiratory protection is worn.
- If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or Cardiopulmonary Resuscitation (CPR) as required and transport to the nearest medical facility.
- If rapid recovery does not occur, obtain medical attention.
- Casualties suffering ill effects because of exposure to hydrogen sulphide should be removed to fresh air.

IN CASE OF SKIN CONTACT

- Remove contaminated clothing.
- Immediately flush skin with large amounts of water for at least 15 minutes and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

IN CASE OF EYE CONTACT

- Flush eye with copious quantities of water.
- Remove contact lenses, if present and easy to do.
- Continue rinsing. If persistent irritation occurs, obtain medical attention.

INGESTION

- Call the emergency number for your location / facility.
- If swallowed, do not induce vomiting: transport to the nearest medical facility for additional treatment.
- If vomiting occurs spontaneously, keep head below hips to prevent aspiration.
- If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

MOST IMPORTANTSYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

- Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.
- Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, lightheadedness, headache, nausea and loss of coordination.
- Continued inhalation may result in unconsciousness and death.
- Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.
- Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.
- If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.

- If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

PROTECTION OF FIRST AIDERS

- When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

NOTE TO PHYSICIAN

- Call a doctor or poison control center for guidance.
- Treat symptomatically.
- Potential for chemical pneumonitis.
- Hydrogen sulphide (H2S) - CNS asphyxiant.
- May cause rhinitis, bronchitis and occasionally pulmonary oedema after severe exposure.
- CONSIDER: Oxygen therapy. Consult a Poison Control Center for guidance.

SECTION 5 FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA

Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

UNSUITABLE EXTINGUISHING MEDIA

Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

SPECIFIC HAZARDS DURING FIRE FIGHTING

Hazardous combustion products may include:

- A complex mixture of airborne solid and liquid particulates and gases (smoke).
- Oxides of sulphur.
- Unidentified organic and inorganic compounds.
- Carbon monoxide may evolve if incomplete combustion occurs.
- Will float and can be reignited on surface water.
- Flammable vapours may be present even at temperatures below the flash point.
- The vapour is heavier than air, spreads along the ground and distant ignition is possible.

SPECIFIC EXTINGUISHING METHODS

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

- Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected.
- Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space.
- Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

FURTHER INFORMATION

- Keep adjacent containers cool by spraying with water.
- If possible, remove containers from the danger zone.
- If the fire cannot be extinguished the only course of action is to evacuate immediately.
- Prevent fire extinguishing water from contaminating surface water or the ground water system.
- Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.

SECTION 6 ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMREGENCY PROCEDURES

- May ignite on surfaces at temperatures above auto-ignition temperature.
- Do not breathe fumes, vapour.
- Do not operate electrical equipment.
- Shut off leaks, if possible, without personal risks.
- Remove all possible sources of ignition in the surrounding area.
- Evacuate all personnel.
- Attempt to disperse vapour or to direct its flow to a safe location, for example using fog sprays.
- Use appropriate containment to prevent uncontrolled release.
- Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

ENVIRONMENTAL PRECAUTIONS

- Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Take measures to minimize the effects on groundwater.
- Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.
- Do not allow contact with soil, surface or ground water.
- Avoid contact with skin, eyes and clothing. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly.
- Take precautionary measures against static discharges.
- Observe all relevant local and international regulations.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEAN UP

- Take precautionary measures against static discharges. For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal.
- Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely.
- Remove contaminated soil and dispose of safely.
- For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal.
- Do not flush away residues with water.
- Retain as contaminated waste.
- Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely.
- Remove contaminated soil and dispose of safely
- Avoid contact with skin, eyes and clothing.
- Evacuate the area of all non-essential personnel.
- Ventilate contaminated area thoroughly.
- Take precautionary measures against static discharges.
- Observe all relevant local and international regulations.

ADDITONAL ADVICE

- For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
- Notify authorities if any exposure to the public or the environment occurs or is likely to occur. For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.
- Local authorities should be advised if significant spillages cannot be contained.
- Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

SECTION 7 HANDLING AND STORAGE

TECHNICAL MEASURES

- Avoid breathing of or direct contact with material.
- Only use in well-ventilated areas.
- Wash thoroughly after handling.
- For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
- Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Air-dry contaminated clothing in a well-ventilated area before laundering. Contaminated leather articles including shoes cannot be de contaminated and should be destroyed to prevent reuse.
- Prevent spillage.
- Never siphon by mouth.
- Maintenance and Fuelling Activities - Avoid inhalation of vapours and contact with skin.

ADVICE ON SAFE HANDLING

- Ensure that all local regulations regarding handling and storage facilities are followed.
- Extinguish any naked flames.
- Do not smoke.
- Remove ignition sources.
- Avoid sparks.
- Avoid inhaling vapour and/or mists.
- Avoid prolonged or repeated contact with skin.
- When using it, do not eat or drink.
- When handling products in drums, safety footwear should be worn, and proper handling equipment should be used.
- The vapour is heavier than air, spreads along the ground and distant ignition is possible.
- Earth all equipment.
- Use local exhaust ventilation if there is a risk of inhalation of vapours, mists or aerosols.
- Properly dispose of any contaminated rags or cleaning materials to prevent fires.

AVOIDANCE OF CONTACT

Strong Oxidizing agents

PRODUCT TRANSFER

- Avoid splash filling
- Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes.
- Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes.
- Keep containers closed when not in use.
- Conditions, such as filling empty Filter Water Separator vessels, that lead to the formation of hydrocarbon mists are also particularly hazardous.
- Contamination resulting from product transfer may give rise to light hydrocarbon vapour in the headspace of tanks that have previously contained gasoline.
- This vapour may explode if there is a source of ignition.
- Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care.
- Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
- If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
- Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering,

splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation.
- Restrict line velocity during pumping to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s).
- Do NOT use compressed air for filling, discharging, or handling operations.

FURTHER INFORMATION ON STORAGE STABILITY

- Drum and small container storage:
  - Drums should be stacked to a maximum of 3 high.
  - Use properly labeled and closeable containers.
  - Take suitable precautions when opening sealed containers, as pressure can build up during storage.
- Tank storage:
  - Tanks must be specifically designed for use with this product.
  - Bulk storage tanks should be diked (bunded).
  - Locate tanks away from heat and other sources of ignition.
  - The vapour is heavier than air.
  - Beware of accumulation in pits and confined spaces.
  - Electrostatic charges will be generated during pumping.
  - Electrostatic discharge may cause fire.
  - Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
  - The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

PACKAGING MATERIAL

Suitable material:

- For containers, or container linings use carbon steel and low alloy steel.
- Aluminum may also be used for applications where it does not present an unnecessary fire hazard.
- For container linings the following may also be used: Unplasticized polyvinyl chloride (U-PVC), Fluoropolymers (PTFE), Polyvinylidenefluoride (PVDF), Polyetheretherketone (PEEK), Polyamide (PA-11).
- For seals and gaskets use: Fluoroelastomer (FKM), Viton A, and Viton B, Nitrile butadiene (NBR), Buna-N.
- For coating (paint) materials use: High build, amine adduct-cured epoxy.

Unsuitable material:

- For containers or container linings, examples of materials to avoid are Polyethylene (PE, HDPE), Polypropylene (PP), Polymethyl methacrylate (PMMA), Acrylonnitrile butadiene styrene (ABS).
- For seals and gaskets, examples of materials to avoid are: Natural rubber (NR), Ethylene Propylene (EPDM, Polychloroprene (CR) - Neoprene, Butyl (IIR), Chlorosulphonated polyethylene (CSM), e.g. Hypalon

SPECIFIC END USE(S) – SPECFIC USE(S)

Not applicable.

See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).

SECTION 8 EXPOSURE CONTROLS – PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS #	Value type (form of exposure)	Control parameters / permissible concentration	Basis
Kerosene (petroleum) hydrodesulferized	64742-81-0	TWA	525 mg/m3	CA ON OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
Xylene, mixed isomers	1330-20-7	TWAEV	100 ppm 434 mg/m3	CA QC OEL
		STEV	150 ppm 651 mg/m3	CA QC OEL
Trimethylbenzene (all isomers)	25551-13-7	TWA	25 ppm 123 mg/m3	CA AB OEL
		TWAEV	25 ppm	CA QC OEL
		TWA	25 ppm	CA BC OEL
		TWA	10 ppm	ACGIH
Toluene	108-88-3	TWA	20 ppm	ACGIH
		TWA	200 ppm	OSHA Z-2
		CEIL	300 ppm	OSHA Z-2
		Peak	500 ppm (10 minutes)	OSHA Z-2
Distillates (petroleum), light hydrocracked	64741-77-1	TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	525 mg/m3	CA ON OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
Naphthalene	91-20-3	TWA	10 ppm 50 mg/m3	NIOSH REL
		ST	15 ppm 75 mg/m3	NIOSH REL

		TWA	10 ppm 50 mg/m3	OSHA Z-1
		TWA	10 ppm	ACGIH
Distillates (petroleum), hydrotreated light	64742-47-8	TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
		TWA (mist)	5 mg/m3	NIOSH REL
		ST (mist)	10 mg/m3	NIOSH REL
		TWA(mist)	5 mg/m3	OSHA Z-1
Ethylbenzene	100-41-4	TWA	20 ppm	ACIH
		TWA	100 ppm 435 mg/m3	NIOSH REL
		ST	125 ppm 545 mg/m3	NIOSH REL
		TWA	100 ppm 435 mg/m3	OSHA Z-1
Cumene	98-82-8	TWA	50 ppm 245 mg/m3	NIOSH REL
		TWA	50 ppm 245 mg/m3	OSHA Z-1
		TWA	5 ppm	ACGIH

Biological occupational exposure limits

Components	**CAS #**	**Control parameters**	**Biological specimen**	**Sampling time**	**Permissible concentration**	**Basis**
Xylene, mixed isomers	1330-20-7	Methylhippuric acids	Urine	End of shift (As soon as possible after exposure ceases)	0.3 g/g cre atinine	ACGIH BEI
Toluene	108-88-3	Toluene	In blood	Prior to last shift of work week	0.02 mg/l	ACGIH BEI
		Toluene	Urine	End of shift (as soon as possible after exposure ceases)	0.03 mg/l	ACGIH BEI
		o-Cresol	Urine	End of shift (as soon as possible after exposure ceases)	0.3 mg/g creatinine	ACGIH BEI
Ethylbenzene	100-41-4	Sum of mandelic acid and phenyl glyoxylic acid	Urine	End of shift (as soon as possible after exposure ceases)	0.15 g/g creatinine	ACGIH BEI

Biological occupational exposure limits

No biological limit allocated.

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances, biological monitoring may also be appropriate.

Validated exposure measurement methods should be applied by a competent person and samples analyzed by an accredited laboratory.

Examples of sources of recommended exposure measurement methods are given below or con tact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods

http://www.cdc.gov/niosh/

Occupational Safety and Health Administration (OSHA)

USA: Sampling and Analytical Methods

http://www.osha.gov/

Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances

http://www.hse.gov.uk/

Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany

http://www.dguv.de/inhalt/index.jsp

L'Institut National de Recherche et de Securité, (INRS), France

http://www.inrs.fr/accueil

Engineering measures

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.

Appropriate measures include:

- Use sealed systems as far as possible.
- Firewater monitors and deluge systems are recommended.
- Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
- Local exhaust ventilation is recommended.
- Eye washes and showers for emergency use.

General Information

- Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking.
- Routinely wash work clothing and protective equipment to remove contaminants.
- Discard contaminated clothing and footwear that cannot be cleaned.
- Practice good housekeeping.

- Define procedures for safe handling and maintenance of controls.
- Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
- Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
- Drain down system prior to equipment break-in or maintenance.
- Retain drain downs in sealed storage pending disposal or for subsequent recycle.
- Do not ingest.
- If swallowed, then seek immediate medical assistance.

Personal Protective equipment

Respiratory protection

- If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
- Check with respiratory protective equipment suppliers.
- Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
- Select a filter suitable for the combination of organic gases and vapours and particles [Type A/Type P boiling point >65°C (149°F)].
- In areas where hydrogen sulphide vapours may accumulate, a positive-pressure air-supplied respirator is advised.

Hand protection

Remarks

Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. (Breakthrough time of > 240 minutes.) For incidental contact/splash protection Neoprene, PVC gloves may be suitable. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Eye protection

Wear goggles for use against liquids and gas.
Wear a full-faced shield if splashes are likely to occur.

Skin and body Protection

Wear chemical resistant gloves/gauntlets and boots.
Where risk of splashing, also wear an apron.
If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to relevant Standard, and provide employee skin care programs.

Protective Measures

Personal protective equipment (PPE) should meet recommended national standards.
Check with PPE suppliers.

Hygiene Measures

In the interests of air safety, aviation fuels are subject to strict quality requirements and product integrity is of paramount importance. For one source of information on international standards for the quality assurance of aviation fuels, see www.jigonline.com.

Environmental exposure controls – general advice

Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. Minimize release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation. Information on accidental release measures is to be found in section 6.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Colourless to light coloured
Odour: Data not available
Odour Threshold: Data not available

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Pour Point: Method: ASTM D5950 - Not applicable

Boiling Point / Range: 150°C - 300°C

Flammability (Solid, Gas): N/A

Upper Explosive Limit – Upper flammability limit: Typical 6% (V)

Lower Explosive Limit / Lower Flammability limit: Typical 1% (V)

Flash Point [Method]: 38°C – 60°C

Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

Autoignition Temperature: N/D

Decomposition Temperature: N/D

pH: N/A

Kinematic Viscosity: 1 - 2.5 mm2/s (40.0 °C)

Dynamic Viscosity: N/D

Solubility in Water: Negligible

Solubility in other solvents: N/D

Log Pow (n-Octanol/Water Partition Coefficient): 2-10

Vapour Pressure: 1 - 3.7 kPa (38.0 °C)

Relative Density (at 15 °C): N/D

Density: 775 - 840 kg/m3 (15.0 °C)

OTHER INFORMATION

Explosives – not classified

Oxidizing properties: N/D

Evaporation rate: N/D

Conductivity: Electrical conductivity: 50 - 600 pS/m., The conductivity of this material makes it a static accumulator. A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid according to the Hazardous Products Regulations.

SECTION 10 STABILITY AND REACTIVITY

Reactivity: Oxidizes in contact with air.

Chemical Stability: No hazardous reaction is expected when handled and stored according to provisions.

Possibility of hazardous reactions: No hazardous reaction is expected when handled and stored according to provisions

Conditions to avoid: Avoid heat, sparks, open flames and other ignition sources. In certain circumstances products can ignite due to static electricity.

Incompatible materials: Strong oxidizing agents.

Hazardous decomposition products: Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11 TOXICOLOGICAL INFORMATION

Basis for assessment

The information given is based on product data, a knowledge of the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Information on likely routes of exposure

Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Product toxicological information

	Toxicity type	**Lethal concentrations and dosages / Remarks**
	Acute Oral Toxicity	LD 50 (Rat): Remarks: Low toxicity LD50 >2000 mg/kg
	Acute Inhalation Toxicity	LC 50 (Rat): Exposure time: 4 h Remarks: Harmful if inhaled.
	Acute Dermal Toxicity	LD 50 (Rabbit): Remarks: Low toxicity LD50 >2000 mg/kg
	Skin corrosion irritation	Irritating to skin Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
	Serious Eye damage / eye irritation	Slightly irritating to the eye. Based on available data, the classification criteria are not met.
	Respiratory or skin sensitization	Skin: Not a sensitizer. Based on available data, the classification criteria are not met. Respiratory: Not a sensitizer. Based on available data, the classification criteria are not met.
	Germ cell mutagenicity Genotoxicity in vivo	Non mutagenic Based on available data, the classification criteria are not met.
	Carcinogenicity	Limited evidence of carcinogenic effect
	STOT – single exposure	Ingestion may cause drowsiness and dizziness. High concentrations may cause central nervous system de pression resulting in headaches, dizziness and nausea; continued inhalation may

		result in unconsciousness and/or death.
	STOT – repeated exposure	May cause damage to organs or organ systems through pro longed or repeated exposure.
	Aspiration toxicity	Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Classifications by other authorities under varying regulatory frameworks may exist.		
IARC	Group 2B: Possibly carcinogenic to humans Naphthalene Group 2B: Possibly carcinogenic to humans Ethylbenzene Group 2B: Possibly carcinogenic to humans Cumene	91-20-3 100-41-4 98-82-8
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.	
NTP	Reproductive toxicity	Does not impair fertility. Not a developmental toxicant. Based on available data, the classification criteria are not met.

Product Component toxicological information

Components	Toxicity type	Lethal concentrations and dosages / Remarks
kerosene (petroleum), hydrodesulfurized	Acute Oral Toxicity	LD 50 (Rat): > 5,000 mg/kg Remarks: Low toxicity
	Acute Inhalation Toxicity	LC 50 (Rat): > 5 mg/l Exposure time: 4 h Remarks: Low toxicity
	Acute Dermal Toxicity	LD 50 (Rabbit): > 2,000 mg/kg Remarks: Low toxicity
	Skin corrosion irritation	Irritating to skin
	Serious Eye damage / eye irritation	Slightly irritating to the eye. Based on available data, the classification criteria are not met.
	Respiratory or skin sensitization	Not a sensitizer. Based on available data, the classification criteria are not met.
	Genotoxicity in vivo	Remarks: Non mutagenic Based on available data, the classification criteria are not met.
	Carcinogenicity	Not classified as a carcinogen. Repeated skin contact has resulted in irritation

		and skin cancer in animals.
	STOT – single exposure	High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness. Inhalation of vapours or mists may cause irritation to the respiratory system.
	STOT – repeated exposure	Kidney: caused kidney effects in male rats which are not considered relevant to humans
	Aspiration toxicity	Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Classifications by other authorities under varying regulatory frameworks may exist.		
Distillates (petroleum), hydrotreated light	Acute Oral Toxicity	LD 50 (Rat): > 5,000 mg/kg Remarks: Low toxicity
	Acute Inhalation Toxicity	LC 50 (Rat): Exposure time: 4 h Remarks: Low toxicity LC50 greater than near-saturated vapour concentration.
	Acute Dermal Toxicity	LD 50 (Rabbit): > 5,000 mg/kg Remarks: Low toxicity
	Skin corrosion irritation	It causes mild skin irritation. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
	Serious Eye damage / eye irritation	Not irritating to the eye.
	Respiratory or skin sensitization	Not a sensitizer. Based on available data, the classification criteria are not met.
	Genotoxicity in vivo	Non mutagenic
	Carcinogenicity	Tumours produced in animals are not considered relevant to humans. Not a carcinogen. Based on available data, the classification criteria are not met.
	STOT – single exposure	Based on available data, the classification criteria are not met.
	STOT – repeated exposure	Kidney: caused kidney effects in male rats which are not considered relevant to humans
	Aspiration toxicity	Aspiration into the lungs when swallowed or

		vomited may cause chemical pneumonitis which can be fatal.
Classifications by other authorities under varying regulatory frameworks may exist.		

SECTION 12 ECOLOGICAL INFORMATION

Basis for assessment

Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Product ecological information		
Ecotoxicity		
	Toxicity to fish	Toxic LL/EL/IL50 > 1 <= 10 mg/l
	Toxicity to daphnia and other aquatic invertebrates	Toxic LL/EL/IL50 > 1 <= 10 mg/l
	Toxicity to algae/aquatic plants	Toxic LL/EL/IL50 > 1 <= 10 mg/l
	Toxicity to fish (Chronic toxicity)	NOEC/NOEL > 0.01 - <=0.1 mg/l
	Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) irritation	NOEC/NOEL > 0.1 - <=1.0 mg/l
	Toxicity to microorganisms	Practically nontoxic: LL/EL/IL50 > 100 mg/l
Persistence and degradability		
	Biodegradability	Major constituents are inherently biodegradable but contain components that may persist in the environment. The volatile constituents will oxidize rapidly by photochemical reactions in air. Based on available data, the classification criteria are not met. Not Persistent per IMO criteria.
	Bioaccumulative potential	Contains constituents with the potential to bioaccumulate.
	Mobility in soil	Evaporates within a day from water or soil surfaces. Large volumes may penetrate soil and could contaminate groundwater. Contains volatile components.

		Floats on water.
Other adverse effects		
	Results of PBT and vPvB assessment	This mixture does not contain any REACH registered substances that are assessed to be a PBT or a vPvB.
	Additional ecological information	Films formed on water may affect oxygen transfer and dam age organisms.

Product Component Ecological information

Product ecological information		
Ecotoxicity		
kerosene (petroleum), hydrodesulfurized	Toxicity to fish	Toxic LL/EL/IL50 > 1 <= 10 mg/l
	Toxicity to daphnia and other aquatic invertebrates	Toxic LL/EL/IL50 > 1 <= 10 mg/l
	Toxicity to algae/aquatic plants	Toxic LL/EL/IL50 > 1 <= 10 mg/l
	Toxicity to fish (Chronic toxicity)	NOEC/NOEL > 0.01 - <=0.1 mg/l
	Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) irritation	NOEC/NOEL > 0.1 - <=1.0 mg/l
	Toxicity to microorganisms	Practically nontoxic: LL/EL/IL50 > 100 mg/l
Persistence and degradability		
	Biodegradability	Major constituents are inherently biodegradable but contains components that may persist in the environment. The volatile constituents will oxidize rapidly by photochemical reactions in air. Based on available data, the classification criteria are not met. Not Persistent per IMO criteria. International Oil Pollution Compensation (IOPC) Fund definiion: “A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340ºC (645ºF) and (b) at least 95% of which, by volume, distils at a temperature of 370ºC (700ºF) when tested by the ASTM Method D-86/78 or any subsequent revision thereof."
	Bioaccumulative potential	Contains constituents with the potential to bioaccumulate.

	Mobility in soil	Evaporates within a day from water or soil surfaces. Large volumes may penetrate soil and could contaminate groundwater. Contains volatile components. Floats on water.
Other adverse effects		
	Results of PBT and vPvB assessment	This mixture does not contain any REACH registered substances that are assessed to be a PBT or a vPvB.
	Additional ecological information	Films formed on water may affect oxygen transfer and dam age organisms.
Distillates (petroleum), hydrotreated light	Toxicity to fish	Practically nontoxic: LL/EL/IL50 > 100 mg/l
	Toxicity to daphnia and other aquatic invertebrates	Practically nontoxic: LL/EL/IL50 > 100 mg/l
	Toxicity to algae/aquatic plants	Practically nontoxic: LL/EL/IL50 > 100 mg/l
	Toxicity to fish (Chronic toxicity)	Data not available
	Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) irritation	Data not available
	Toxicity to microorganisms	Data not available
Persistence and degradability		
	Biodegradability	Readily biodegradable. Oxidizes rapidly by photo-chemical reactions in air. Not Persistent per IMO criteria. International Oil Pollution Compensation (IOPC) Fund definition: “A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340ºC (645ºF) and (b) at least 95% of which, by volume, distils at a temperature of 370ºC (700ºF) when tested by the ASTM Method D-86/78 or any subsequent revision thereof."
	Bioaccumulative potential	Has the potential to bioaccumulate.
	Mobility in soil	Floats on water. If it enters soil, it will absorb into soil particles and will not be mobile.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues

- Recover or recycle if possible.
- It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
- Do not dispose into the environment, in drains or in water courses.
- Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.
- Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.

MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollution from ships.

Contaminated Packaging

- Send to drum recovery or metal reclaimer.
- Drain the container thoroughly.
- After draining, vent in a safe place away from sparks and fire.
- Residues may cause an explosion hazard if heated above the flash point.
- Do not puncture, cut or weld uncleaned drums.
- Do not pollute the soil, water or environment with the waste container.
- Comply with any local recovery or waste disposal regulations.

Local legislation remarks:

Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG) – Canada

UN Number:	UN1863
Proper Shipping Name:	FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division:	Class 3
Packing Group:	III
Marine pollutant:	No

LAND (DOT) – USA
UN Number: UN1863
Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: Class 3
Packing Group: III

International Air Regulations
IATA / DGR
UN Number: UN1863
Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: Class 3
Packing Group: III
Labels: **3**

International Marine Regulations
IMDG Code
UN Number: UN1863
Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
Hazard Class & Division: Class 3
Packing Group: III
Marine pollutant: Yes
Maritime transport in bulk according to IMO instruments
MARPOL Annex 1 rules apply for bulk shipments by sea.

Special precautions for users

Special Precautions:

Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

Additional Information:

For Canada, this product has been classified solely for domestic road and rail transport under TDG regulation exemption Part 1 – Section 1.45.1, if shipped by vessel or air please ensure that the DG classification is applied and compliant for the mode of transport being used.

Section 1.45.1 states: Part 3 (Documentation) and Part 4 (Dangerous Goods Safety Marks) do not apply to substances that are classified as marine pollutants in accordance with section 2.43 of Part 2 (Classification) if they are in transport solely on land by road vehicle or railway vehicle. However, substances may be identified as marine pollutants on a shipping document and the required dangerous goods safety marks may be displayed when they are in transport by road or railway vehicle.

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
The regulatory information is not intended to be comprehensive.
Other regulations may apply to this material.

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by HPR.

The components of this product are reported in the following inventories:
DSL: All components listed.

SECTION 16 OTHER INFORMATION

List of other abbreviations:
ACGIH: USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI: ACGIH - Biological Exposure Indices (BEI)
CA AB OEL : Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
CA BC OEL: Canada. British Columbia OEL
CA ON OEL: Ontario Table of Occupational Exposure Limits made under the Occupational Health and Safety Act.
CA QC OEL: Québec. Regulation respecting occupational health and safe ty, Schedule 1, Part 1: Permissible exposure values for air borne contaminants
NIOSH REL : USA. NIOSH Recommended Exposure Limits
OSHA Z-1 : USA. Occupational Exposure Limits (OSHA) - Table Z-1 Lim its for Air Contaminants
OSHA Z-2 : USA. Occupational Exposure Limits (OSHA) - Table Z-2
ACGIH / TWA: 8-hour, time-weighted average
CA AB OEL / TWA: 8-hour Occupational Exposure Limit
CA BC OEL / TWA: 8-hour time weighted average
CA ON OEL / TWA: Time-Weighted Average Limit (TWA)
CA QC OEL / TWAEV: Time-weighted average exposure value
CA QC OEL / STEV: Short-term exposure value
NIOSH REL / TWA: Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST: STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-1 / TWA: 8-hour time weighted average
OSHA Z-2 / TWA: 8-hour time weighted average
OSHA Z-2 / CEIL: Acceptable ceiling concentration

OSHA Z-2 / Peak: Acceptable maximum peak above the acceptable ceiling con centration for an 8-hr shift

AIIC - Australian Inventory of Industrial Chemicals
ANTT - National Agency for Transport by Land of Brazil
ASTM - American Society for the Testing of Materials
bw - Body weight
CMR - Carcinogen, Mutagen or Reproductive Toxicant
DIN - Standard of the German Institute for Standardization
DSL - Domestic Substances List (Canada)
ECx - Concentration associated with x% response
ELx - Loading rate associated with x% response
EmS - Emergency Schedule
ENCS - Existing and New Chemical Substances (Japan
ErCx - Concentration associated with x% growth rate response
ERG - Emergency Response Guide
GHS - Globally Harmonized System
GLP - Good Laboratory Practice
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk
IC50 - Half maximal inhibitory concentration
ICAO - International Civil Aviation Organization
IECSC - Inventory of Existing Chemical Substances in China
IMDG - International Maritime Dangerous Goods
IMO - International Maritime Organization
ISHL - Industrial Safety and Health Law (Japan)
ISO - International Organization for Standardization
KECI - Korea Existing Chemicals Inventory
LC50 - Lethal Concentration to 50 % of a test population
LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose)
MARPOL - International Convention for the Prevention of Pollution from Ships
n.o.s. - Not Otherwise Specified
Nch - Chilean Norm
NO(A)EC - No Observed (Adverse) Effect Concentration
NO(A)EL - No Observed (Adverse) Effect Level
NOELR - No Observable Effect Loading Rate
NOM - Official Mexican Norm
NTP - National Toxicology Program
NZIoC - New Zealand Inventory of Chemicals
OECD - Organization for Economic Co-operation and Development

OPPTS - Office of Chemical Safety and Pollution Prevention
PBT - Persistent, Bioaccumulative and Toxic substance
PICCS - Philippines Inventory of Chemicals and Chemical Substances
(Q)SAR - (Quantitative) Structure Activity Relationship
REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals
SADT - Self-Accelerating Decomposition Temperature
SDS - Safety Data Sheet
TCSI - Taiwan Chemical Substance Inventory
TDG - Transportation of Dangerous Goods
TECI - Thailand Existing Chemicals Inventory
TSCA - Toxic Substances Control Act (United States)
UN - United Nations
UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods
vPvB - Very Persistent and Very Bioaccumulative
WHMIS - Workplace Hazardous Materials Information System

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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