MATERIAL SAFETY DATA SHEET

JP-8 Aviation Turbine Fuel

1. PRODUCT AND COMPANY INFORMATION

PRODUCT NAME:  JP-8 Aviation Turbine Fuel
Inventory ID:  JP8
Synonyms:  MTF JP8 30 WOPA JP8 LS30
Intended Use:  Ground Test Only, Aviation Turbine Fuel

COMPANY INFORMATION
MACH-DYNAMICS
494 Main Street
Susquehanna, PA 18847
Phone:  (570) 213-5603
Fax:  (570) 213-5574
Contact:  Mark Gingerella

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING!
FLAMMABLE LIQUID AND VAPOR
SKIN IRRITANT
ASPIRATION HAZARD
COMPONENT IS CANCER HAZARD

APPEARANCE:  Colorless
Physical Form:  Liquid
Odor:  Mild Hydrocarbon

POTENTIAL HEALTH EFFECTS

EYE:  Contact may cause mild eye irritation including stinging, watering, and redness.

SKIN:  Mild to moderate skin irritant. Contact may cause redness, itching, burning, and skin damage. Prolonged or repeated contact may cause drying and cracking of the skin, dermatitis (inflammation), burns, and severe skin damage. No harmful effects from skin absorption have been reported.
INHALATION (BREATHING): Expected to have low degree of toxicity by inhalation.

INGESTION (SWALLOWING): No harmful effects reported from ingestion. ASPIRATION HAZARD – This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.

SIGNS AND SYMPTOMS: Effects of over exposure may include irritation of the respiratory tract, irritation of the digestive tract, nausea, vomiting, signs of nervous system depression (e.g. headaches, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

PRE-EXISTING MEDICAL CONDITIONS: Conditions aggravated by exposure may include skin disorders, respiratory (asthma-like) disorders.

See Section 11 for additional Toxicity Information.

### 3. COMPOSITION/CHEMICAL INFORMATION

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Concentration Wt. %</th>
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<tbody>
<tr>
<td>Kerosene C9-16</td>
<td>8006-20-6</td>
<td>99.9</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>

### 4. FIRST AID MEASURES

**General Advice:**
Move out of dangerous area. Show this Material Safety Data Sheet to the doctor in attendance. Do not leave the victim unattended.

**EYE:** Immediately flush eyes with plenty of water for at least 15 minutes while holding eyelids open. Protect unharmed eye. Seek medical aid if irritation persists.

**SKIN:** Flush skin with soap and water while removing contaminated clothing. If irritation occurs, seek immediate medical attention. Do not reuse clothing or shoes until thoroughly cleaned.

**INGESTION (Swallowing):** ASPIRATION HAZARD. DO NOT induce vomiting, or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with head down. If possible do not leave victim unattended and observe closely for adequacy of breath.

**INHALATION (BREATHING):** First aid is not normally required. If breathing difficulties develop immediately remove victim to fresh air. If victim is not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Seek immediate medical attention.

**NOTES TO PHYSICIAN:** None
5. FIRE FIGHTING MEASURES

NFPA 704 Hazard Class
Health: 2    Flammability: 2    Instability: 0
(0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

UNUSUAL FIRE & EXPLOSION HAZARDS: This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition such as: static electricity, pilot lights or mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe. Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or sewers. If container is not properly cooled, it can rupture in the heat of a fire.

FIRE FIGHTING INSTRUCTIONS: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by OSHA/DOT, a SCBA (self-contained breathing apparatus) should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area. Keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

SEE SECTION 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: WARNING Flammable. Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. The use of explosion proof electrical equipment is recommended.

SPILL PRECAUTIONS: Stay upwind and away from spill/release. Notify persons down wind of the spill/release. Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protection equipment including respiratory protection, as conditions warrant (see Section 8).

ENVIRONMENTAL PRECAUTIONS
Wear appropriate protective equipment including respiratory protection, as conditions warrant. Prevent product from entering drains, sewers, and water courses. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers or lakes or drains inform respective authorities. Dike far ahead of the spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate absorbent material.

METHODS FOR CLEANING UP
Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center at phone number 800-424-8802.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Keep away from heat, sparks, and flame. Surfaces that are hot may ignite liquid even in the absence of sparks or flame. Extinguish pilot lights, cigarettes, and turn off all other sources of ignition prior to use, and until all vapors are gone. Keep containers tightly closed and upright to prevent leakage.

HANDLING
Open containers slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Section 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practices.

“Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition as the containers may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

STORAGE
Recommended storage temperature at 45° F to 75° F. Keep containers tightly closed. Store in a well-ventilated, cool dry place, out of direct sunlight. Store only in approved containers.

REQUIREMENTS FOR STORAGE AREAS AND CONTAINERS
Post “No smoking or Open Flame”. Keep container tightly closed in a dry and well ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations/working materials must comply with the technological safety standards.

COMMENTS: KEEP OUT OF REACH OF CHILDREN! Empty containers retain product residue and can be dangerous. Do not pressurize, cut weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks static electricity, or other sources of ignition.
8. EXPOSURE CONTROLS/PERSO...
**PH**: Not applicable  
**Vapor Pressure**: $< 1$  
**Vapor Density**: $> 1$ (air =1)  
**Boiling Point/Range**: $> 90^\circ$ F ($>32^\circ$ C)  
**Melting/Freezing Point**: No data  
**Solubility in Water**: Negligible  
**Partition Coefficient**: No data (n-octanol/water, Kow)  
**Specific Gravity**: $0.80 @ 60^\circ$ F ($15.6^\circ$ C)  
**Bulk Density**: 6.67 lbs/gal  
**Percent Volatile**: $100\% @ 545^\circ$ F ($285^\circ$ C)  
**Evaporation Rate**: $> 1$ (nBuAc=1)  
**Flash Point**: $> 115^\circ$ F ($>46^\circ$ C) Tag Closed Cup (TCC)  
**LEL (vol % in air)**: 0.7  
**UEL (vol % in air)**: 5.0  
**Auto Ignition Temperature**: No data

### 10. STABILITY AND REACTIVITY

**STABLE**: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable liquid and vapor. Vapor can cause flash fire.

**HAZARDOUS POLYMERIZATION**: Will not occur

**CONDITIONS TO AVOID**: Avoid all sources of ignition; heat, sparks, flame and contact with strong oxidants. Prevent vapor accumulation (see Sections 5 and 7).

**HAZARDOUS DECOMPOSITION PRODUCTS**: The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g. oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. See Section 11 for additional information on hazards of engine exhaust.

**INCOMPATIBLE MATERIALS**: Strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc.

### 11. TOXICOLOGICAL INFORMATION

**CHRONIC DATA**

**Kerosene C9-16**  
**Carcinogenicity**: Petroleum middle distillates have been shown to cause skin tumors in mice following repeated and prolonged skin contact. Follow-up studies have shown that these tumors are produced through a non-genotoxic mechanism associated with frequent cell damage and repair, and that they are not likely to cause tumors in the absence of prolonged skin irritation. Animal studies have also shown that washing the skin with soap and water can reduce the tumor response. Middle distillates with low polynuclear aromatic hydrocarbon content have not been identified as a carcinogen by NTP, IARC or OSHA. Diesel exhaust has been identified as a probable cancer hazard by IARC.

**Naphthalene**  
**Carcinogenicity**: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and
female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has been identified as a carcinogen by IARC and NTP.

ACUTE DATA

Kerosene C9-16:
Oral LD50: > 5 g/kg (rat)
Dermal LD50: > 2,000 mg/kg (rabbit)
Inhalation LC50: > 5,000 ppm (rat)

12. ECOLOGICAL INFORMATION

When No. 1 distillates (kerosene, jet fuel, heating oils) escape into the environment due to leaks or spills, most of their constituent hydrocarbons will evaporate and be photodegraded by reaction with hydroxyl radicals in the atmosphere. The half-lives in air for many of the individual hydrocarbons is less than one day. Less volatile hydrocarbons can persist in the aqueous environment for longer periods. They remain floating on the surface of the water; those that reach soil or sediment biodegrade relatively slowly. Soil contaminated with jet fuel can develop adapted microbial species able to use the fuel as a carbon source; soil serration and nutrient supplementation can enhance the biodegradation.

Reported LC50/EC50 values for water-soluble fractions of kerosene and jet fuels are usually in the range of 10 to 100 mg/liter. Adverse effects on the gills, pseudobranch, kidney and nasal mucosa have been reported in fish involved in spills of jet fuel. Juvenile clams may be particularly sensitive to marine sediments contaminated as a result of spilled jet fuel. Direct toxicity and fouling of sea birds from jet fuel can occur if birds dive through floating layers of spilled fuel.

Phytotoxic effects of jet fuel have been reported following exposure of plants to sprays or vapors. Lack of seed germination and inhibition of seeding growth may also occur. There is evidence for moderate bioaccumulation of the water-soluble hydrocarbons present in jet fuel.

Since paraffinic hydrocarbons have low solubility in water and exhibit moderate to rapid rates of biodegradation, they are not expected to persist or accumulate in the environment. Mobility in aquatic and terrestrial environments is estimated to be low due to the low water solubility and high vapor pressure. If spilled, the more volatile components will evaporate rapidly.

It is estimated, based on testing of other materials, that the water accommodated fraction (WAF) would cause moderate toxicity in fish (96 hr LC50 about 8 mg/L), aquatic invertebrates (48 hr EC50 about 32 mg/L in Daphnia), and algae (98 hr EC50 about 10 mg/L).
13. DISPOSAL INFORMATION

The information in this MSDS pertains only to the product as shipped.

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced would not be a federally regulated RCRA “listed” hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the characteristic(s) shown below. See Section 7 and 8 for information on handling, storage and personal protection, and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulations as a hazardous waste.

EPA WASTE NUMBER(s)
D001 – Ignitability characteristics.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseate could be considered to be hazardous wastes.

RCRA/EPA WASTE INFORMATION: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

14. TRANSPORT INFORMATION

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g. technical names, etc). Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the MSDS and the bill of lading.

DOT (DEPARTMENT OF TRANSPORTATION)
PROPER SHIPPING NAME: UN1863, Fuel, aviation, turbine engine, Class 3, PG III
(UN#, Proper Shipping Name, Class, Packing Group)

Bulk Packaging/Placard marking: Combustible Liquid or Flammable/1863
Note: This product may be reclassified as a Combustible Liquid for domestic land transportation under 49 CFR 173.150(f).

*** MACH-DYNAMICS verifies that the material was supplied and shipped in the proper packages in accordance with DOT and federal regulations that are applicable to the mode of transportation selected. The shipper must verify that the packaging supplied is acceptable to be re-shipped in per the federal regulations applicable to the mode of transportation for re-shipment. Regulations may change depending on mode of transportation selected.***

IMDG
Not regulated if Flash Point is > 60° C cc
UN1863, Fuel, aviation, turbine engine, Class 3, PG III (>46° C)
Labels: Flammable liquid
Placards/marking (bulk): Flammable/1863
Packaging – Non-Bulk: P001
EMS: F-E, S-E
Note: Additional Federal compliance requirements may apply, see 49 CFR 171.12

IATA/ICAO

Not regulated if Flash Point is > 60° C cc
UN1863, Fuel, aviation, turbine engine, Class 3, PG III (>46° C)
Labels: Flammable liquid
Placards/marking (bulk): Flammable/1863
Packaging – Non-Bulk: UN1863, Fuel, aviation, turbine engine, Class 3, PG III
ERG Code: 3L
Note: Additional Federal compliance requirements may apply, see 49 CFR 171.12

15. REGULATORY INFORMATION

CERCLA/SARA 302 Reportable Quantity:
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302 and 40 CFR 372

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
311/312 HAZARD CATEGORIES: This product should be reported as an immediate (acute) health hazard, delayed (chronic) health hazard, and a fire hazard.
FIRE: Yes
ACUTE: Yes
CHRONIC: Yes
Pressure: No
Reactive: No

CERCLA/SARA Section 313 and 40CFR 372 REPORTABLE INGREDIENTS:
Naphthalene 91-20-3 <1% by weight de minimis: 0.1%

EPA (CERCLA) Reportable Quantity (in pounds)
EPA’s Petroleum Exclusion applies to this material (CERCLA 101(14)).

California Proposition 65
WARNING! This material may contain detectable quantities of the following chemicals known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5)

<table>
<thead>
<tr>
<th>Component</th>
<th>Type of Toxicity</th>
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<tbody>
<tr>
<td>Toluene</td>
<td>Developmental Toxicant</td>
</tr>
<tr>
<td>Benzene</td>
<td>Cancer, Developmental Toxicant, male Reproductive Toxicant</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>Cancer</td>
</tr>
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</table>
CANADIAN REGULATIONS
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHIMS HAZARD CLASS
B3 – Combustible Liquids

NATIONAL CHEMICAL INVENTORIES
All components are either listed on the US TSCA, or are not regulated under TSCA
All components are listed on the Canadian DSL

U.S. Export Control Classification Number: ITAR 121.1 C5 S4

US STATE REGULATIONS

Pennsylvania Right-To-Know
Ingredients
- Kerosene C9-16 8006-20-6
- Naphthalene 91-20-3

New Jersey Right-To-Know
Ingredients
- Kerosene C9-16 8006-20-6
- Naphthalene 91-20-3

16. OTHER INFORMATION

APPROVED BY: Mark Gingerella

TITLE: President / QC Manager

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<th>HMIS RATING</th>
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<td>Health</td>
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