Material Safety Data Sheet

Revision Issued: 2/28/07	Supercedes: 12/31/2006	First Issued: 1/20/1996

Section I – Product and Company Identification

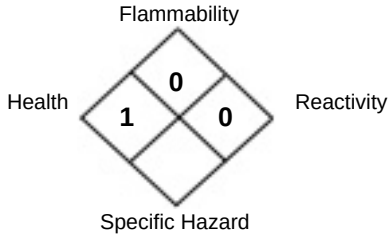
Product Name: **DAP (Diammonium Phosphate)**

PotashCorp MSDS No.: 4
ERG No.: N/A

1101 Skokie Blvd., Northbrook, IL 60062
Phone (800) 241-6908 / (847) 849-4200

Suite 500, 122 – 1st Avenue South
Saskatoon, Saskatchewan Canada S7K7G3
Phone (800) 667-0403 from Canada
(800) 667-3930 from USA

Emergencies (800) 424-9300 (CHEMTREC)
Web Site www.potashcorp.com
Health Emergencies, Contact Your Local Poison Center



NFPA Code

Common Name: Diammonium Phosphate	**Formula:** $(NH_4)_2HPO_4$	**Synonym:** DAP, DAPLG	**Uses:** Agricultural

Section II – Composition / Information On Ingredients

Chemical Name	CAS No.	Exposure Limits								% by Weight
		OSHA PEL		TLV – TWA		STEL		CEIL		
		mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	
Diammonium Phosphate, as P_2O_5 ***	7783-28-0	15/5 *		10/3 **						46
Total Nitrogen, as N ***										18
Fluorides, as F		2.5		2.5						1

* For particulates not otherwise regulated, standard is 15 mg/m³ total dust and 5 mg/m³ for respirable fraction.
** For particulates (insoluble) not otherwise specified, adopted value is 10mg/m³ for inhalable fraction and 3 mg/m³ for respirable fraction.
*** Product contains diammonium phosphate as essential ingredient with small amounts of monoammonium phosphate, ammonium sulfate, urea, and aluminum/calcium/iron/magnesium phosphate compounds.

Section III – Hazard Identification

Potential Acute Health Effects:			
Eyes and Skin:	Contact may cause eye irritation and prolonged contact with skin may cause some irritation.		
Inhalation:	High dust concentrations of air-borne material may cause irritation of the nose and upper respiratory tract with symptoms such as sore throat and coughing. Inhalation of decomposition gases can cause irritation and corrosive effects on the respiratory system. Some lung effects may be delayed.		
Ingestion:	Ingestion of small quantities are unlikely to cause toxic effect. Large quantities may give rise to gastro-intestinal disorders.		
Potential Chronic Health Effects:	No adverse effects are known.		
CARCINOGENICITY LISTS	**IARC Monograph:** No	**NTP:** No	**OSHA:** No

Section IV – First Aid Measures	
Eyes:	Immediately flush eyes (holding eyelids apart) with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.
Skin:	Wash skin thoroughly with soap and water.
Ingestion:	Do not induce vomiting. Drink large amounts of water (or milk if available) to dilute stomach contents. Small quantities are unlikely to cause toxic effect. Get medical attention if a large amount of DAP is ingested (small children, more than 50g).
Inhalation:	Remove from source of exposure to dusts. Obtain medical attention if the effects occur. Persons who have inhaled decomposition gases (e.g. in a fire) should obtain immediate medical attention.

Section V – Fire Fighting Measures			
Flash Point:	Non-flammable	**Autoignition Temperature:**	Not Applicable
Lower Explosive Limit:	Not Applicable	**Upper Explosive Limit:**	Not Applicable
Unusual Fire and Explosion Hazards:	DAP is a non-flammable inorganic salt and is not flammable however when strongly heated, DAP will decompose giving off ammonia.		
Extinguishing Media:	Chemical type foam, CO_2 (Carbon Dioxide), dry chemical, water fog.		
Special Firefighting Procedures and Equipment:	Keep personnel removed from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).		

Section VI – Accidental Release Measures	
Small Spill:	Spillage should be swept up and placed in chemical waste container to be disposed at an appropriate waste disposal facility according to current applicable laws and regulations and product characteristics at time of disposal. Adequate ventilation is required.
Large Spill:	Contain spill and transfer the material to appropriate containers for reclamation or disposal. Dispose of material at an appropriate waste disposal facility according to current applicable laws and regulations and product characteristics at time of disposal. Adequate ventilation is required.
Release Notes:	If spill could potentially enter any waterway, including intermittent dry creeks, contact the local authorities. If in the U.S., contact the US COAST GUARD NATIONAL RESPONSE CENTER toll free number 800-424-8802. In case of accident or road spill notify: CHEMTREC IN USA at 800-424-9300; CANUTEC in Canada at 613-996-6666 CHEMTREC in other countries at (International code)+1-703-527-3887.
Comments:	See Section XIII for disposal information and Section XV for regulatory requirements. Large and small spills may have a broad definition depending on the user's handling system. Therefore, the spill category must be defined at the point of release by technically qualified personnel.

Section VII – Handling and Storage	
Ventilation:	Use with adequate ventilation.
Handling:	Use appropriate personal protective equipment as specified in Section VIII. Avoid excessive generation of dust and avoid unnecessary exposure to the atmosphere to prevent moisture pick-up.
Storage:	Store in dry, well ventilated area, away from potential sources of heat and fire.

Section VIII – Exposure Controls/ Personal Protection	
Engineering Controls:	Avoid high dust concentration and provide ventilation where necessary.
Personal Protection:	
Eye Protection:	Wear tight fitting goggles in dusty areas to reduce dust exposure to the eyes.
Protective Clothing:	Wear suitable gloves when handling this product over long periods. If skin irritation occurs, wear long sleeves.
Respiratory Protection:	Wear NIOSH approved respiratory protective equipment when exposure exceeds the OSHA nuisance dust standard of 15 mg/m^3 or the ACGIH nuisance dust limit of 10 mg/m^3 for the eight hour time weighted average. When stored in closed area, a self-contained breathing apparatus is required to protect against ammonia gas.
Other Protective Clothing or Equipment:	Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Section IX – Physical and Chemical Properties

Appearance/Color/Odor:	Granular solid with color ranging from gray to brown/black. Product has ammonia odor when confined.	**Boiling Point:**	Decomposes
Melting Point/Range:	155ºC	**Boiling Point Range:**	Not Applicable
Solubility in Water:	588 g/L @ 20^{o}C	**Vapor Pressure (mmHg):**	<1 mm Hg @ 20^{o}C
Specific Gravity:	1.6 @ 20^{o}C	**Molecular Weight:**	132
Vapor Density:	Not Available	**% Volatiles:**	Gradually losses 8% nitrogen
Bulk Density:	58 lbs/ft^{3} (Loose) 67 lbs/ft^{3} (Tamped)	**Evaporation Rate:**	Not Applicable
pH:	8 in 1% solution	**Freezing Point:**	Not Applicable
Viscosity:	Not Applicable	**Density:**	Not Available

Section X – Stability and Reactivity

Stability:	This product is stable under normal conditions of storage, handling and use.
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	Welding or hot work on equipment or plant which may have contained fertilizer should not be done without first washing thoroughly to remove all fertilizer.
Materials to Avoid (Incompatibles):	Alkalis, strong acids, copper and its alloys.
Hazardous Decomposition Products:	Ammonia is released upon reaction with strong bases or from thermal decomposition.

Section XI – Toxicological Information

Significant Routes of Exposure:	Eyes, Skin, Respiratory System, Digestive Tract	
Toxicity to Animals:	**Acute Oral Toxicity:**	(Rat) OECD Guideline 425: LD_{50} > 2,000 mg/kg bw
	Acute Inhalation Toxicity:	No data available
	Acute Toxicity: Other Routes:	No data available
	Acute Dermal Toxicity:	(Rat) OECD Guideline 402: LD_{50} > 5,000 mg/kg bw.
	Repeated Dose Toxicity:	(Rat) OECD Guideline 422: NOAEL = 250 mg/kg/day
	Eye & Skin Irritation/Corrosion:	Irritant
Special Remarks on Toxicity to Animals:	Low to very low toxicity based on the standard Federal Insecticide Fungicide and Rodenticide Act (FIFRA) ratings for mammals.	
	Developmental Toxicity/Teratogenicity:	(Rat) OECD Guideline 422: NOAEL = 1,500 mg/kg/day.
	Bacterial Genetic Toxicity In-Vitro: Gene Mutation:	(*S. typhimurium*) Bacterial reverse mutation assay (OECD 471): Negative
	Non-Bacterial Genetic Toxicity In-Vitro: Chromosomal Aberration:	(Chinese hamster ovaries) Chromosome aberration test (OECD 473): Negative
	Toxicity to Reproduction:	(Rat) OECD Guideline 422: NOAEL = 1,500 mg/kg/day.
	Carcinogenicity:	No data available
Other Effects on Humans:	Phosphate compounds such as DAP are generally recognized as safe (GRAS) by FDA for use as a food additive for both human food and ruminant feed according to prescribed conditions.	
Special Remarks on Chronic Effects on Humans	No data available	
Special Remarks on Other Effects on Humans:	No data available	

Section XII – Ecological Information

Ecotoxicity:	**EPA Ecological Toxicity rating :**	Slightly toxic to practically non-toxic to aquatic organisms based on the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) acute toxicity ratings.
	Acute Toxicity to Fish:	(Coho salmon, Chinook salmon, Rainbow trout, Bluegill, Large mouth bass, Tilapia, Fathead minnow) 96-hr: LC_{50} = 90 - 1,875 mg/L
	Chronic Toxicity to Fish:	No data available
	Acute Toxicity to Aquatic Invertebrates:	(Amphipod) 96-hr: LC_{50} = 40-52 mg/L; (Snails, worm) 96-hr: LC_{50} = 1,005 - 2,472 mg/L.
	Chronic Toxicity to Aquatic Invertebrates:	No data available
	Toxicity to Aquatic Plants:	(*Selenastrum capricornutum*) 72-hr: NOEC (stimulation) = 3.57 mg DAP/L; NOEC (toxicity) = 97.1 mg DAP/L.
	Toxicity to Bacteria:	No data available
	Toxicity to Soil Dwelling Organisms:	No data available
	Toxicity to Terrestrial Plants:	No data available
Environmental Fate:	**Stability in Water:**	Stable
	Stability in Soil:	Stable
	Transport and Distribution:	Calculated, fugacity level III: 6.5×10^{-15} to air, 45.3% to water, 54.6% to soil, 0.0755% to sediment. Phosphates, whether water or citrate soluble, are translocated in the soil only over very short periods and are then immobilized.
Toxicity:	Inorganic phosphates have the potential to increase the growth of freshwater algae, whose eventual death will reduce the available oxygen for aquatic life.	
Degradation Products:	**Biodegradation:**	The Phosphorus cycle is well understood. Phosphates are converted to calcium or iron/aluminum phosphates or are incorporated with the organic soil matter.
	Photodegradation:	No data available

Section XIII – Disposal Considerations

Product Disposal:	Dispose of waste at an appropriate waste disposal facility according to applicable laws and regulations. Collect in appropriate containers. Dispose of at an appropriate waste disposal facility in accordance with current applicable laws and regulations and product characteristics at time of disposal.
General Comments:	None

Section XIV – Transportation Information

	USDOT	**TDG - Canada**
Proper Shipping Name:	Not Regulated	Not Regulated
Hazard Class:		
Identification Number:		
Packing Group (Technical Name):		
Labeling / Placarding:		
Authorized Packaging:		
Notes:		
European Transportation:		

Section XV – Regulatory Information

UNITED STATES: SARA Hazard Category:	This product has been reviewed according to the EPA Hazard Categories promulgated under Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA title III) and is considered, under applicable definitions, to meet the following categories:									
	Fire:	No	**Pressure Generating:**	No	**Reactivity:**	No	**Acute:**	Yes	**Chronic:**	No
	40 CFR Part 355 - Extremely Hazardous Substances:	None								
	40 CFR Part 370 - Hazardous Chemical Reporting:	Applicable								
	All intentional ingredients listed on the TSCA inventory.									

SARA Title III Information: This product contains the following substances subject to the reporting requirements of Title III (EPCRA) of the Superfund amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

Chemical	CAS NO.	Percent by Weight	CERCLA RQ (lbs)	SARA (1986) Reporting		
				311	312	313
Diammonium Phosphate, as P_2O_5	7783-28-0	46		Yes	Yes	No

CERCLA/Superfund, 40 CFR Parts 117, 302:	If this product contains components subject to substances designated as CERCLA reportable Quantity (RQ) Substances, it will be designated in the above table with the RQ value in pounds. If there is a release of RQ Substance to the environment, notification to the National response Center, Washington D.C. (1-800-424-8802) is required.	
CANADA:	**WHMIS Hazard Symbol and Classification:**	This product is not WHMIS controlled.
	Ingredient Disclosure List:	This product does not contain ingredient(s) on this list.
	Environmental Protection:	All intentional ingredients are listed on the DSL (Domestic Substance List).
EINECS#:	(Diammonium Phosphate) 231-987-8	
California: Prop 65:	This is not a chemical known to cause cancer, nor is it listed.	

Section XVI – Other Information

NFPA Hazard Ratings:	**Health:** 1	**Fire:** 0	**Reactivity:** 0	**Special Hazards:**
	0 = Insignificant	**1 = Slight**	**2 = Moderate**	**3 = High** **4 = Extreme**
COMMENTS:				
Section(s) changed since last revision:	IX, XV			

Although the information contained is offered in good faith, SUCH INFORMATION IS EXPRESSLY GIVEN WITHOUT ANY WARRANTY (EXPRESS OR IMPLIED) OR ANY GUARANTEE OF ITS ACCURACY OR SUFFICIENCY and is taken at the user's sole risk. User is solely responsible for determining the suitability of use in each particular situation. PCS Sales specifically DISCLAIMS ANY LIABILITY WHATSOEVER FOR THE USE OF SUCH INFORMATION, including without limitation any recommendation which user may construe and attempt to apply which may infringe or violate valid patents, licenses, and/or copyright.

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product Name **Irving Jet Fuel A-1**

Synonym(s) Aviation turbine fuel
Distillate fuel oils, light

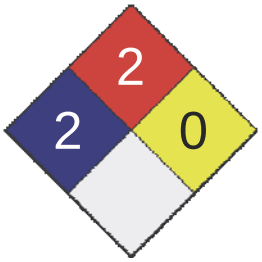
CAS # Mixture

Product use Fuel

Manufacturer Irving Oil Refining G.P.
Box 1260
Saint John, NB E2L 4H6 CA
Phone: (506) 202-2000
Refinery: (506) 202-3000
Emergency Phone: 1-800-424-9300 (CHEMTREC)

LEGEND HMIS/NFPA	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0

Health	/ 2
Flammability	2
Physical Hazard	0
Personal Protection	B



2. Hazards Identification

Emergency overview DANGER
COMBUSTIBLE LIQUID AND VAPOR. EYE AND SKIN IRRITANT.
CONTAINS MATERIAL WHICH MAY CAUSE CANCER.

Potential short term health effects

Routes of exposure Eye, Skin contact, Skin absorption, Inhalation, Ingestion.

Eyes Causes irritation.

Skin Causes irritation. May be absorbed through the skin.

ACGIH - Threshold Limit Values - Skin Notations

Benzene	71-43-2	Skin - potential significant contribution to overall exposure by the cutaneous route
Jet fuel	8008-20-6	Skin - potential significant contribution to overall exposure by the cutaneous route

Inhalation Excessive intentional inhalation may cause respiratory tract irritation and central nervous system effects (headache, dizziness).

Ingestion Harmful if swallowed. May cause stomach distress, nausea or vomiting. Aspiration of material into lungs can cause chemical pneumonitis. Ingestion of high levels may produce kidney damage.

Target organs Blood. Eyes. Kidney. Liver. Respiratory system. Skin.

Chronic effects Prolonged or repeated exposure to dilutions can cause drying, defatting and dermatitis.

Signs and symptoms Symptoms may include redness, edema, drying, defatting and cracking of the skin. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

3. Composition / Information on Ingredients

Ingredient(s)	CAS #	Percent
Jet fuel	8008-20-6	60 - 100
Benzene	71-43-2	< 0.1

Composition comments *Jet fuel is a complex mixture of hydrocarbons. Its exact composition depends on the source of the crude oil from which it was produced and the refining methods used. Jet fuel contains hundreds of individual organic chemicals. This section identifies only some of the well-known chemical constituents.

*Sulphur: <8 ppm
*Hydrogen sulphide: Nil

4. First Aid Measures

First aid procedures

Eye contact	Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.
Skin contact	Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.
Inhalation	If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.
Ingestion	Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.
Notes to physician	Symptoms may be delayed.
General advice	Keep away from sources of ignition. No smoking. If you feel unwell, seek medical advice (show the label where possible). 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. Avoid contact with eyes and skin. Keep out of reach of children.

5. Fire Fighting Measures

Flammable properties	Combustible by WHMIS/OSHA criteria. Vapors may travel to a source of ignition and flash back. Containers may explode when heated.
Extinguishing media	
Suitable extinguishing media	Carbon dioxide. Dry chemical. Foam.
Unsuitable extinguishing media	Not available
Protection of firefighters	
Specific hazards arising from the chemical	Container may explode in heat of fire. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Cool containers with flooding quantities of water until well after fire is out.
Protective equipment for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus. Cool containers with flooding quantities of water until well after fire is out.
Hazardous combustion products	May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Aromatic hydrocarbons.
Explosion data	
Sensitivity to mechanical impact	Not expected to be sensitive to mechanical impact.
Sensitivity to static discharge	Vapor: Yes.

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Do not touch or walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep people away from and upwind of spill/leak.
Methods for containment	Stop leak if you can do so without risk. Prevent entry into waterways, sewers, basements or confined areas. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water.
Methods for cleaning up	Before attempting clean up, refer to hazard data given above. Small spills may be absorbed with non-reactive absorbent and placed in suitable, covered, labelled containers. Prevent large spills from entering sewers or waterways. Contact emergency services and supplier for advice. Never return spills in original containers for re-use. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
Other information	Keep unnecessary personnel away.

7. Handling and Storage

Handling

Use good industrial hygiene practices in handling this material. Non-sparking equipment. Explosion-proof ventilation. Intrinsically safe electrical equipment. Ground and bond containers when transferring material.
Have clean emergency eye wash and shower available in work area.

Storage

Keep out of reach of children.
Containers should be vented and equipped with a flame arrester. Store in a cool, dry, well-ventilated place. Keep away from heat, open flames or other sources of ignition.

Shipping: Stable during transport. May be transported hot.

8. Exposure Controls / Personal Protection

Exposure limits

Ingredient(s)	Exposure Limits
Benzene	**ACGIH-TLV** TWA: 0.5 ppm STEL: 2.5 ppm **OSHA-PEL** TWA: 1 ppm STEL: 5 ppm Ceiling: 25 ppm
Jet fuel	**ACGIH-TLV** TWA: 200 mg/m3 Skin: 100 mg/m3 **OSHA-PEL** Not established

Engineering controls

Mechanical ventilation should be used when handling this product in enclosed spaces. Local exhaust ventilation may be necessary.

Personal protective equipment

Eye / face protection

Face shield or chemical goggles. Eye wash fountain is recommended.

Hand protection

Nitrile rubber. Viton™. Polyethylene.

Skin and body protection

Use of protective coveralls and long sleeves is recommended.
If clothing or footwear becomes contaminated with the product, remove it immediately and completely decontaminate it before re-use, or discard it.

Respiratory protection

For confined spaces, wear a NIOSH-approved (or equivalent) full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.
Respirator should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134), CAN/CSA-Z94.4 and ANSI's standard for respiratory protection (Z88.2).

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.

9. Physical and Chemical Properties

Appearance	Clear.
Color	Colorless
Form	Liquid
Odor	Jet fuel
Odor threshold	0.55 mg/m3 for sulphur free product
Physical state	Liquid
pH	Not applicable
Melting point	Not available
Freezing point	-47 - -60 °C (-52.60 - -76.00 °F)
Boiling point	157 - 300 °C (314.60 - 572.00 °F)
Flash point	38 - 72 °C (100.40 - 161.60 °F) Closed Cup

Pour point	Not available
Evaporation rate	Not available
Flammability limits in air, lower, % by volume	0.7 %
Flammability limits in air, upper, % by volume	5 %
Vapor pressure	10.5 mmHg @ 38°C
Vapor density	4.5 (Air=1)
Specific gravity	0.775 - 0.840 @ 15°C
Octanol/water coefficient	3.3 to > 6 (log Poct)
Solubility (H2O)	Not available
Auto-ignition temperature	210 °C (410.00 °F)
VOC (Weight %)	Not available
Viscosity	2.0 - 8.0 CST @ -20°C
Percent volatile	Not available

10. Stability and Reactivity

Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	Heat, open flames, static discharge, sparks and other ignition sources. Do not mix with other chemicals.
Incompatible materials	Acids. Oxidizers.
Hazardous decomposition products	May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Aromatic hydrocarbons.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Component analysis - LC50

Ingredient(s)	LC50
Benzene	13050 ppm rat; 13700 mg/l/4h rat
Jet fuel	5.2801 mg/m3 rat; 5.2801 mg/l/4h rat

Component analysis - Oral LD50

Ingredient(s)	LD50
Benzene	690 mg/kg rat; 4700 mg/kg mouse
Jet fuel	5000 mg/kg rat; 16300 mg/kg guinea pig

Effects of acute exposure

Eye	May cause irritation.
Skin	Causes irritation. May be absorbed through the skin.

ACGIH - Threshold Limit Values - Skin Notations

Benzene	71-43-2	Skin - potential significant contribution to overall exposure by the cutaneous route
Jet fuel	8008-20-6	Skin - potential significant contribution to overall exposure by the cutaneous route

Inhalation	Excessive intentional inhalation may cause respiratory tract irritation and central nervous system effects (headache, dizziness).
Ingestion	Harmful if swallowed. May cause stomach distress, nausea or vomiting. Aspiration of material into lungs can cause chemical pneumonitis. Ingestion of high levels may produce kidney damage.
Sensitization	Non-hazardous by WHMIS/OSHA criteria.
Chronic effects	Blood and nervous system disorders may occur after prolonged skin contact.

Carcinogenicity Contains potential carcinogens. Benzene and certain polycyclic aromatic hydrocarbons (PAHs) are known carcinogens.

ACGIH - Threshold Limit Values - Carcinogens

Benzene	71-43-2	A1 - Confirmed Human Carcinogen
Jet fuel	8008-20-6	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC - Group 1 (Carcinogenic to Humans)

Benzene	71-43-2	Supplement 7 [1987]; Monograph 29 [1982]

NTP (National Toxicology Program) - Report on Carcinogens - Known Human Carcinogens

Benzene	71-43-2	Known Human Carcinogen

NTP (National Toxicology Program) - Report on Carcinogens - Reasonably Anticipated to be Human Carcinogens

Benzene	71-43-2	Suspect Carcinogen

U.S. - California - Proposition 65 - Carcinogens List

Benzene	71-43-2	carcinogen, initial date 2/27/87

Mutagenicity Non-hazardous by WHMIS/OSHA criteria.

Reproductive effects Non-hazardous by WHMIS/OSHA criteria.

Teratogenicity Non-hazardous by WHMIS/OSHA criteria.

Synergistic Materials Other CNS depressants can be expected to produce additive or synergistic effects. May increase the photosensitizing ability of certain chemicals, such as dinitrochlorobenzene (DNCB).

12. Ecological Information

Ecotoxicity Components of this product have been identified as having potential environmental concerns.

Ecotoxicity - Freshwater Algae Data

Benzene	71-43-2	72 Hr EC50 Selenastrum capricornutum: 29 mg/L

Ecotoxicity - Freshwater Fish Species Data

Benzene	71-43-2	96 Hr LC50 Pimephales promelas: 10.7-14.7 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss:5.3 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus:22.49 mg/L [static]; 96 Hr LC50 Poecilia reticulata:28.6 mg/L [static]; 96 Hr LC50 Pimephales promelas:22330-41160 µg/L [static]; 96 Hr LC50 Lepomis macrochirus:70000-142000 µg/L [static]

Ecotoxicity - Water Flea Data

Benzene	71-43-2	48 Hr EC50 water flea: 356 mg/L [Static]; 48 Hr EC50 Daphnia magna: 10 mg/L

Environmental effects Not available

Aquatic toxicity Not available

Persistence / degradability Non-persistent/ Group 1

Bioaccumulation / accumulation Not available

Partition coefficient 3.3 to > 6 (log Poct)

Mobility in environmental media Not available

Chemical fate information Not available

Other adverse effects Not available

13. Disposal Considerations

Waste codes Not available

Disposal instructions Review federal, provincial, and local government requirements prior to disposal.

Waste from residues / unused products Not available

Contaminated packaging Not available

14. Transport Information

U.S. Department of Transportation (DOT)

Basic shipping requirements:

Proper shipping name	Fuel, aviation, turbine engine
Hazard class	3
UN number	UN1863
Packing group	III
Additional information:	
Special provisions	144, B1, IB3, T2, TP1
Packaging exceptions	150
ERG number	128

Transportation of Dangerous Goods (TDG - Canada)

Basic shipping requirements:

Proper shipping name	FUEL, AVIATION, TURBINE ENGINE
Hazard class	3
UN number	UN1863
Packing group	III
Additional information:	
Special provisions	17,82

15. Regulatory Information

Canadian federal regulations

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Canada - CEPA - Schedule I - List of Toxic Substances

Benzene	71-43-2	Present

Canada - WHMIS - Ingredient Disclosure List

Benzene	71-43-2	0.1 %

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.

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

Benzene	71-43-2	10 Lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

Benzene	71-43-2	0.1 % de minimis concentration

U.S. - CWA (Clean Water Act) - Hazardous Substances

Benzene	71-43-2	Present

U.S. - CWA (Clean Water Act) - Priority Pollutants

Benzene	71-43-2	Present

U.S. - CWA (Clean Water Act) - Toxic Pollutants

Benzene	71-43-2	Present

Occupational Safety and Health Administration (OSHA)

29 CFR 1910.1200 hazardous chemical	Yes

CERCLA (Superfund) reportable quantity

Benzene: 10.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	Yes
Clean Air Act (CAA)	Not available
Clean Water Act (CWA)	Not available
WHMIS status	Controlled
WHMIS classification	Class B - Division 3 - Combustible Liquid, Class D - Division 2B
WHMIS labeling	

State regulations WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

U.S. - California - 8 CCR Section 339 - Director's List of Hazardous Substances

Benzene	71-43-2	Present

U.S. - California - Proposition 65 - Carcinogens List

Benzene	71-43-2	carcinogen, initial date 2/27/87

U.S. - California - Proposition 65 - Developmental Toxicity

Benzene	71-43-2	developmental toxicity, initial date 12/26/97

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

Benzene	71-43-2	male reproductive toxicity, initial date 12/26/97

U.S. - Connecticut - Carcinogenic Substances

Benzene	71-43-2	Present

U.S. - Illinois - Toxic Air Contaminant Carcinogens

Benzene	71-43-2	IRIS A Carcinogen; NTP Known Carcinogen; ACGIH A2 Carcinogen; IARC Group 1 Carcinogen

U.S. - Illinois - Toxic Air Contaminants

Benzene	71-43-2	Present

U.S. - Louisiana - Reportable Quantity List for Pollutants

Benzene	71-43-2	10 Lb final RQ (receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule); 4.54 kg final RQ (receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule)

U.S. - Massachusetts - Right To Know List

Benzene	71-43-2	Carcinogen; Extraordinarily hazardous
Jet fuel	8008-20-6	Present

U.S. - Michigan - Critical Materials List

Benzene	71-43-2	100 Lb Annual usage threshold

U.S. - Minnesota - Hazardous Substance List

Benzene	71-43-2	Carcinogen

U.S. - New Jersey - Right to Know Hazardous Substance List

Benzene	71-43-2	sn 0197
Jet fuel	8008-20-6	sn 1091

U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

Benzene	71-43-2	10 Lb RQ (air); 1 lb RQ (land/water)

U.S. - North Carolina - Control of Toxic Air Pollutants

Benzene	71-43-2	0.00012 mg/m3 (carcinogens)

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

Benzene	71-43-2	Present

U.S. - Pennsylvania - RTK (Right to Know) List

Benzene	71-43-2	Environmental hazard; Special hazardous substance
Jet fuel	8008-20-6	Present

U.S. - Rhode Island - Hazardous Substance List

Benzene	71-43-2	Toxic (skin); Flammable (skin); Carcinogen (skin)
Jet fuel	8008-20-6	Flammable

Inventory name

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

Disclaimer

Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

Issue date 29-Oct-2009

Effective date 31-Oct-2009

Expiry date 31-Oct-2012

Prepared by Dell Tech Laboratories Ltd. (519) 858-5021

Other information For an updated MSDS, please contact the supplier/manufacturer listed on the first page of the document.

Irving Jet Fuel A-1

Combustible liquid. Eye and skin irritant.

Keep away from sources of ignition. No smoking. Avoid contact with eyes and skin. Wear rubber gloves and safety glasses with side shields. Keep out of reach of children.

EYE: Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.

SKIN: Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.

INHALATION: If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.

INGESTION: Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.

READ MATERIAL SAFETY DATA SHEET BEFORE USING PRODUCT

==========

Liquide combustible. Il peut causer des effets toxiques chroniques. Irritant pour les yeux et la peau. Conserver à l'écart de toutes sources d'ignition. Ne pas fumer. Éviter le contact avec les yeux et la peau. Porter des gants en caoutchouc et des lunettes de sécurité pourvues de protections latérales. Tenir hors de la portée des enfants.

YEUX: Rincer à grande eau froide. Enlever les verres de contact, le cas échéant, et continuer à rincer. Obtenir de l'attention médicale si l'irritation persiste.

PEAU: Rincer à grande eau froide. Laver à l'eau et au savon. Obtenir de l'attention médicale si l'irritation persiste.

INHALATION: En cas de symptômes, placer la victime à l'air frais. Si les symptômes persistent, obtenir de l'attention médicale. Si la victime ne respire pas du personnel qualifié devrait immédiatement commencer la réanimation cardio-pulmonaire.

INGESTION: Ne pas faire vomir. Si le vomissement se produit spontanément, incliner la victime vers l'avant pour réduire le risque d'inhalation. Ne jamais rien faire boire ou avaler à une victime inconsciente, ou si la victime a des convulsions. Appeler un médecin.

LIRE LA FICHE SIGNALÉTIQUE AVANT D'UTILISER CE PRODUIT

iSOC® Technology

Material Safety Data Sheet: Propane

Product Name: Propane	**CAS:** 74-98-6
Propane; Liquefied Petroleum Gas (LPG); Dimethylmethane	**DOT I.D No.:** UN 1978
Chemical Name and Synonyms: Propane	**DOT Hazard Class:** Division 2.1
Formula: C_3H_8	**Chemical Family:** Aliphatic Hydrocarbon

HEALTH HAZARD DATA

Time Weighted Average Exposure Limit:

Propane is defined as a simple asphyxiant (ACGIH 1997). OSHA 1995 PEL (8 Hr. TWA) = 1,000 Molar PPM

Symptoms of Exposure:

Inhalation: Moderate concentrations so as to exclude an adequate supply of oxygen to the lungs causes dizziness, drowsiness and eventual unconsciousness. It is also a narcotic which acts as a depressant on the central nervous system.

Contact with rapidly evaporating liquid causes frostbite or cryogenic “burns.”

Toxicological Properties:

- Breathing high concentrations causes a narcotic effect; however, the major property is the exclusion of an adequate supply of oxygen to the lungs.
- Hydrogen is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.
- Frostbite effects are change in color of the skin to gray or white possibly followed by blistering.

Recommended First Aid Treatment:

Prompt medical attention is mandatory in all cases of overexposure to nitrogen. Rescue personnel should be equipped with self-contained breathing apparatus and be cognizant of extreme fire and explosion hazard.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

Dermal Contact or Frostbite: Remove contaminated clothing and flush affected areas with lukewarm water. Do not use hot water.

Hazardous Mixtures of other Liquids, Solids or Gases: Propane is flammable in air.	
PHYSICAL DATA	
Boiling Point: -43.7°F (-42.1°C)	**Liquid Density at Boiling Point:** 36.3 lb/ft3 (585 kg/m3)
Vapor Pressure @ 70°F (21.1°C) = 127 psia (875 kPa)	**Gas Density at 70°F. 1 atm** .117 lb/ft3 (1.87 kg/m3)
Solubility in Water: Negligible	**Freezing Point:** -305.8°F (-187.7°C)
Evaporation Rate: Unknown; 99.9 + % volatile	**Specific Gravity (AIR=1)** @ 70°F (21.1°C) = 1.56
Appearance and Odor: Colorless, odorless gas	

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method used): Gas	**Auto Ignition Temperature:** 896°F (480°C)	**Flammable Limits % by Volume:** LEL 2.2 UEL 9.5
Extinguishing Media: Water, carbon dioxide, dry chemical		**Electrical Classification:** Class 1, Group D
Special Fire fighting Procedures: If possible, stop the flow of propane. Use water spray to cool surrounding containers.		
Unusual Fire and Explosion Hazards: Propane is heavier than air and may travel a considerable distance to a source of ignition. Should flame be extinguished and flow of yes continue, increase ventilation to prevent flammable mixture formation in low areas or pockets.		

REACTIVITY DATA

Stability: Stable

Incompatibility (Materials to Avoid): Oxidizers

Hazardous Decomposition Products: None

Hazardous Polymerization: Will not occur

Conditions to Avoid: None

SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled:

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

Waste disposal methods:

Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify type): Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.

Ventilation: Hood with forced ventilation

Local Exhaust: To prevent accumulation above the TWA

Mechanical (Gen.): In accordance with electrical codes

Protective Gloves: Plastic or rubber

Eye Protection: Safety goggles or glasses

Other Protective Equipment: Safety shoes, safety shower

SPECIAL PRECAUTIONS

Special Labeling Information:

DOT Shipping Name: Propane
DOT Hazard Class: Division 2.1
DOT Shipping Label: Flammable Gas
I.D. No.: UN 1978

Special Handling Recommendation:

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the

cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow in the cylinder. For additional handling recommendations, consult Compressed Gas Association's Pamphlets I P-1, P-14, and Safety Bulletin SB-2.

Special Storage Recommendations:

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in -first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area. For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.

Other Recommendations or Precautions:

Earth-ground and bond all lines and equipment associated with the propane system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

Special Packaging Recommendations:

Propane is non-corrosive and may be used with any common structural material.

UNLEADED GASOLINE (ALL GRADES)
MATERIAL SAFETY DATA SHEET

Petrocom Energy Group, LLC
1330 Post Oak Blvd., Suite 2350
Houston, Texas 77056
Phone: 713-418-3000
Fax: 713-418-3001

Revision Date: 03/05/2008

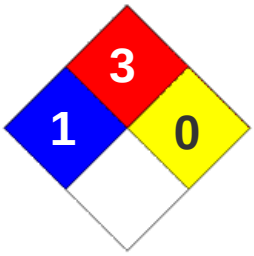
Section 1: Product Identification

Name: Unleaded Gasoline
Synonyms: Regular/Midgrade/Premium Gasoline, Motor Fuel, Reformulated Gasoline, RFG, Conventional Gasoline.
CAS No.: 86290-81-5
MSDS No.: PEG-UNL
Use: Motor fuel

Section 2: Product Composition

Component	CAS Number	Amount (%)
Gasoline	86290-81-5	0 – 100
Benzene	71-43-2	0 – 5
Toluene	108-88-3	0 – 30
Xylene (all isomers)	1330-20-7	0 – 25
Hexane (other isomers)	Mixture	5 – 25
n-Hexane	110-54-3	0 – 3
Cyclohexane	110-82-7	0 – 3
Octanes (all isomers)	Mixture	0 – 20
Heptane (all isomers)	142-82-5	0 – 15
Ethanol	64-17-5	0 – 10
Pentanes (all isomers)	Mixture	0 – 20
Trimethylbenzenes (all isomers)	95-63-6	0 – 5
Ethylbenzene	100-41-4	0 – 5
Cumene	98-82-8	0 – 5
Methyl Tertiary Butyl Ether (MTBE)	1634-04-4	0 – 16
Tertiary Amyl Methyl Ether (TAME)	994-05-8	0 – 6

Section 3: Hazards Identification

Emergency Overview	Hazard Rankings
DANGER! Extremely Flammable liquid and vapor Harmful if swallowed Skin Irritant May cause eye and respiratory irritation Cancer Hazard – Contains material which can cause cancer	**NFPA** 

Physical form: Liquid
Appearance: Clear to amber
Odor: Strong, Gasoline

Potential Health Effects

Eyes: Contact with eyes may cause irritation, redness, tearing, stinging, watering and blurred vision.

Skin: Contact with skin may cause irritation, itching, redness and skin damage. Prolonged or repeated contact may cause drying and cracking of the skin, and may also cause dermatitis and inflammation. (See also section 11).

Inhalation: Breathing high concentration can be harmful. Throat and lung irritation may occur. Central nervous system effects including nausea, euphoria, dizziness, headache, fatigue, drowsiness or unconsciousness may occur due to long term or high concentration exposure to vapors.

Ingestion: Toxic if swallowed. This product may cause nausea, vomiting, dizziness, drowsiness, diarrhea if swallowed. Central nervous system effects may be caused. Swallowing this product can result in severe lung damage and/or death.

Signs / Symptoms: When overexposed to this product effects such as nausea, vomiting, blurred vision, respiratory failure, central nervous system depression, unconsciousness, tremor, death may occur.

See toxicological Information (section 11)

Section 4: First Aid Measures

Eye contact: Flush eyes immediately with fresh, cool water for at least 15 minutes. If irritation or redness or any symptoms persist, seek medical attention.

Skin contact: Remove contaminated clothes and shoes. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, wash affected area thoroughly with soap and water. If irritation or redness develops, seek medical attention.

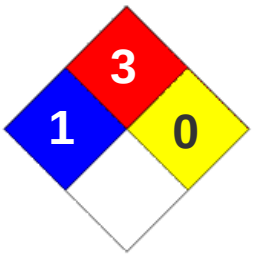
Inhalation (Breathing): If inhaled, immediately move person to fresh air. If there is difficulty breathing, give oxygen. If not breathing, immediately give artificial respiration. Seek medical attention.

Ingestion (Swallowing): This product may be harmful or fatal if swallowed. This product may cause nausea, vomiting, diarrhea and restlessness. Do not induce vomiting. Do not give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is unconscious or drowsy, place on the left side with the head down. Seek immediate medical attention.

Notes to Physician: This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material.
Inhalation overexposure can produce toxic effects. Monitor respiratory distress. If difficulty in breathing evaluate upper respiratory tract inflammation, bronchitis and pneumonitis. Administer supplemental oxygen as required.
If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Cinsuder activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubtion or by placement of the body in a Trendelenburg and left lateral decubitus position.

Section 5: Fire Fighting Measures

NFPA Hazard Class: Health = 1 ; Flammability = 3 ; Instability = 0
(0 – Minimal ; 1 – Slight ; 2 – Moderate ; 3 – Serious ; 4 – Severe)



Auto – ignition temperature : >260 ˚C (500 ˚F)

Flash point **:** Closed cup: **-**43 ˚C (-45 ˚F)

Flammable limits **:** Lower: approximately 1.4%
Upper: approximately 7.6%

Products of combustion **:** Carbon monoxide, carbon dioxide, nitrogen and sulfur oxides, smoke, fumes, unburned hydrocarbons and other products of incomplete combustion.

Special properties **:** Flammable liquid! This material can be ignited by heat, sparks, flames or other sources of ignition. Vapors may travel long distances to a source where they can ignite and flash back, or explode. A mixture of vapor and air can create an explosion hazard in confined spaces. If container is not properly cooled, it can rupture n the heat of a fire.

Extinguishing media **:** Use of dry chemical, carbon dioxide, or foam is recommended to extinguish fire. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may not extinguish the fire, unless it is used by experienced fire fighters and under favorable conditions.

Protective Equipment for Fire Fighters **:** Fire fighters should wear appropriate protective equipment and self contained breathing apparatus (SCBA) with a full face piece operated in positive pressure mode.

Section 6: Accidental Release Measures

Personal precautions: This material is extremely flammable. Eliminate all ignition sources. Keep all hot metal surfaces away from spill/release. All equipment used when handling this material must be grounded.

Spill precautions: Stay upwind and away from spill. Notify persons down wind of the spill, isolate spill area and keep unauthorized personnel out. If it can be done with minimal risk, try to stop spill. Always wear protective equipment, including respiratory protection. Contact emergency personnel.

Environmental precautions: Prevent spilled material from entering sewers, drains, soil, and natural waterways. Use foam or spills to minimize vapors (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 is recommended.

Section 7: Handling and Storage

Handling: Flammable liquid and vapor. To be used only as a motor fuel. Avoid inhalation of vapors and contact with skin. Wash hands thoroughly after handling this material. Use in a well ventilated area away from all ignition sources. Use product with caution around heat, sparks, static electricity and open flames. Static electricity may ignite vapors and cause fire.

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 ignition sources. The may explode and cause injury and/or death. Empty drums should be completely drained, properly bunged, and returned promptly to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Storage: Store in approved containers only. Keep in tightly closed containers in cool, dry, well ventilated areas. Keep isolated away from heat, sources of ignition and hot metal surfaces.

Section 8: Exposure Controls / Personal Protection

Engineering controls: Provide ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below their occupational exposure limits. Eyewash stations and safety showers should be located near the work-station.

Personal Protection

Eye Protection: Keep away from eyes. Safety glasses complying with approved standards should be worn. Chemical type goggles should be worn.

Skin Protection: Keep away from skin. Skin protection should be worn. Chemical resistant, impervious gloves should be worn. Always follow good personal hygiene practices after handling the material.

Respiratory Protection: Approved respiratory equipment must be used if a risk assessment indicates it is necessary. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn.

General Protection: Use this material in well ventilated areas. Ventilation equipment should be explosion proof also.

Component	Applicable Workplace Exposure Limits
Gasoline	ACGIH – TWA: 300 ppm (8 hours) STEL: 500 ppm (15 minutes)
Benzene	ACGIH – TWA: 0.5 ppm (8 hours) STEL: 2.5 ppm (15 minutes) OSHA – TWA: 1 ppm (8 hours) STEL: 5 ppm (15 minutes)
Toluene	ACGIH – TWA: 20 ppm (8 hours) OSHA – TWA: 200 ppm (8 hours) CEIL: 300 ppm PEAK: 500 ppm (10 minutes)
Xylene (all isomers)	ACGIH – TWA: 100 ppm (8 hours) STEL: 150 ppm (15 minutes) OSHA – TWA: 100 ppm (8 hours)
Hexane (other isomers)	ACGIH – TWA: 500 ppm (8 hours) STEL: 1000 ppm (15 minutes)
n-Hexane	ACGIH – TWA: 50 ppm (8 hours) OSHA – TWA: 500 ppm (8 hours)
Cyclohexane	ACGIH – TWA: 100 ppm (8 hours) OSHA – TWA: 300 ppm (8 hours)
Octanes (all isomers)	ACGIH – TWA: 300 ppm (8 hours) OSHA – TWA: 500 ppm (8 hours)
Heptane (all isomers)	ACGIH – TWA: 400 ppm (8 hours) STEL: 5000 ppm (15 minutes) OSHA – TWA: 500 ppm (8 hours)
Ethanol	ACGIH – TWA: 1000 ppm (8 hours) OSHA – TWA: 1000 ppm (8 hours)
Pentanes (all isomers)	ACGIH – TWA: 600 ppm (8 hours) OSHA – TWA: 1000 ppm (8 hours)
Trimethylbenzenes (all isomers)	ACGIH – TWA: 25 ppm (8 hours)
Ethylbenzene	ACGIH – TWA: 100 ppm (8 hours) STEL: 125 ppm (15 minutes) OSHA – TWA: 100 ppm (8 hours)
Cumene	ACGIH – TWA: 50 ppm (8 hours) OSHA – TWA: 50 ppm (8 hours)
Methyl Tertiary Butyl Ether (MTBE)	ACGIH – TWA: 50 ppm (8 hours)
Tertiary Amyl Methyl Ether (TAME)	ACGIH – TWA: 20 ppm (8 hours)

Section 9: Physical and Chemical Properties

Physical State:	Liquid.
Color:	Transparent, clear to amber liquid.
Odor:	Strong. Characteristic gasoline odor.
pH:	Not applicable
Boiling Point:	>26 ˚C (>78 ˚F)
Melting Point:	Not applicable.
Specific gravity:	0.66 to 0.75 (Water = 1)
Vapor density:	3 to 4 (Air = 1)
Vapor pressure:	220-450 mm Hg at 20˚C (68˚F) / 6-15 Reid-psia at 37.8˚C (100˚F)
Volatility:	720 – 770 g/l VOC (w/v)
Viscosity (at 40 ˚C):	< 1
Flash Point:	< -45 ˚F / < 43˚C
Bulk Density:	6.0 – 6.4 lbs/gal
Solubility in water:	Negligible

Section 10: Stability and Reactivity

Stability:	Stable. Extremely flammable liquid and vapor. Vapor can cause fire.
Conditions to avoid:	Keep away from heat, flame and all other possible sources of ignition.
Materials to avoid:	Keep away from strong oxidizing agents such as acids, chlorine, hydrogen peroxide and oxygen.
Hazardous decomposition products:	Please refer to the combustion products identified in Section 5 of this MSDS.
Hazardous Polymerization:	Not expected to occur.

Section 11: Toxicological Information

Toxicology Information

Oral toxicity:	Almost non-toxic. LD 50: > 2000 mg/kg (species: rats)
Dermal toxicity:	Almost non-toxic. LD 50: > 2000 mg/kg (species: rabbits)
Inhalation toxicity:	Almost non-toxic. LD 50: > 5 mg/l (species: rats)
Eye irritation:	Almost non-irritating. Draize score: > 6 and < 15 (species: rabbits)
Skin irritation:	Irritant. Primary irritation index: > 3 and < 5 (species: rabbits)
Other data:	Inhalation of high concentrations of vapors or mists may cause respiratory system irritation and damage. It may also result in the damage and depression of the central nervous system and may cause death. Prolonged contact with the material may cause severe skin irritation.
Subchronic toxicity:	Dermal studies resulted in significant irritation but not systematic toxicity (species: rabbits). Inhalation exposures (90 day, approximately 1500 ppm vapor) produced light hydrocarbon nephropathy but no significant systemic toxicity (species: rats).
Neurotoxicity:	Repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments. However, no persistent neurotoxic effects were observed in subchronic inhalation studies of gasoline.
Reproductive toxicity:	An inhalation study with rats exposed to 0, 400 and 1600 ppm of wholly vaporized unleaded gasoline, 6 hours per day on day 6 through 16 of gestation, showed no teratogenic effects nor indication of toxicity to either the mother or the fetus. Another inhalation study in rats exposed to 3000, 6000, or 9000 ppm of gasoline vapor, 6 hours per day on day 6 through 20 of gestation, also showed no teratogenic effects nor indications of toxicity to either the mother or the fetus.
Chronic toxicity:	A lifetime mouse skin painting study of unleaded gasoline applied at 50 microliters, three time weekly, resulted in some severe skin irritation and changes, but no statistically significant increase in skin cancer or cancer to any other organ. Lifetime inhalation of wholly vaporized unleaded gasoline over 2000 ppm has caused increased liver tumors in female mice and increased kidney tumors in male rats. The EPA has concluded that mechanism by which wholly vaporzied unleaded gasoline causes kidney damage is unque to the male rat. The effects in that species (kidney damage and cancer) should not be used in human risk assessment.

Other toxic effects on humans

Extremely hazardous in case of ingestion.
Very hazardous in case of eye contact.
Hazardous in case of skin contact.
Slightly hazardous in case of inhalation.

Carcinogenic effects:

Contains material that may cause cancer depending on the level and duration of exposure.

Target organs:

Contains material that may cause damage to humans organs such as (but not limited to) blood, kidneys, lungs, liver, eye, skin, nervous system and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity:

This material may be toxic to aquatic organisms such as algae and daphnia. It has also shown to be toxic to fish.

Environmental fate:

The material is expected to be readily biodegradable. When released into the environment, some of the constituents of gasoline will volatilize and be photo degraded in the atmosphere. Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions, photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

Section 13: Disposal Considerations

Waste disposal:

Avoid disposal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product and any of its by products should always comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements.
This material would likely be identified as a federally regulated RCRA hazardous waste. See sections 7 and 8 for further information on handling, storage and personal protection. See section 9 for the material's physical and chemical properties.

Section 14: Transportation Information

This material is U.S Department of Transportation (DOT) regulated material.

Shipping name: Gasoline, 3, UN 1203, PG II
Gasohol, 3, NA 1203, PG II (for gasoline blended with less than 20% ethanol).

Hazard class: 3 DOT Class: Flammable liquid

Packing Group: II

UN / NA Number: UN1203 / NA1203

Emergency Response Code: 128

Label:

Section 15: Regulatory Information

TSCA Inventory: This product and/or its components are listed on the Toxic Substances Control Act (TSCA)

SARA 302 / 304: Emergency planning and notification The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for “Extremely Hazardous Substances” listed in 40 CFR 302.4 and CFR 355. No components were identified.

SARA 311 / 312: Hazard identification SARA Title III requires facilities subject to this subpart to submit aggregate information on chemicals by “Hazard Category” as defined in 40 CFR 370.2. This material would be classified under: Fire, Acute (immediate) Health Hazard, Chronic (Delayed) Health Hazard.

CERCLA / SARA 313: Toxic and chemical notification and release reporting

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372

Component	CAS Number	Amount (%)
Benzene	71-43-2	0 – 5
Toluene	108-88-3	0 – 30
Xylene (o, m, p isomers)	1330-20-7	0 – 25
n-Hexane	110-54-3	0 – 3
Cyclohexane	110-82-7	0 – 3
1, 2, 4 Trimethylbenzenes	95-63-6	0 – 5
Ethylbenzene	100-41-4	0 – 5
Cumene	98-82-8	0 – 5
Methyl Tertiary Butyl Ether (MTBE)	1634-04-4	0 – 16

California Proposition 65: 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):
Benzene (CAS NO. 71-43-3)
Toluene (CAS No. 108-88-3)
Ethylbenzene (CAS No. 100-41-4)
Naphthalene (CAS No. 91-20-3)

Canadian Regulations: WHMIS Hazard Class: B2 – Flammable Liquids
D2A – Very Toxic Material

Section 16: Other Information

Issue date: March 5, 2008
Previous issue date: No previous date
Version: 1
MSDS Code: PEG-UNL

Legend:
ACGIH = American Conference of Governmental Industrial Hygienists
CAS = Chemical Abstracts Service Registry
CEIL = Ceiling Limit
CERCLA = The Comprehensive Environmental Response, Compensation and Liability Act
EPA = Environmental Protection Agency
NFPA = National Fire Protection Association
OSHA = Occupational Safety and Health Administration
SARA = Superfund Amendments and Reauthorization Act
STEL = Short Term Exposure Limit (15 minutes)
TWA = Time Weighted Average (8 hours)
WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer:
The information presented in this Material Safety Data Sheet (MSDS) d on data believed to be accurate as of the issuance date of this MSDS. No warranty is expressed or implied for the accuracy or completeness of the above provided information. Petrocom Energy Group, LLC does not assume any liability for any damage or injury arising out of product use by others. The end user of the product has the responsibility for evaluating the accuracy of the data, and determining the safety, toxicity and suitability of the product under any conditions.

MSDS Number: **U4725** * * * * * *Effective Date:* ***09/09/09*** * * * * * *Supercedes:* ***05/04/07***

UREA

1. Product Identification

Synonyms: Carbamide resin; Isourea; Carbonyl diamide; Carbonyldiamine
CAS No.: 57-13-6
Molecular Weight: 60.06
Chemical Formula: (NH2)2CO
Product Codes:
J.T. Baker: 4111, 4202, 4203, 4204, 4206, 4208, 5594
Mallinckrodt: 3192, 7729, 7816, 8642, 8644, 8647, 8648

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Urea	57-13-6	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 1 - Slight
Reactivity Rating: 2 - Moderate
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May be

absorbed into the bloodstream with symptoms similar to ingestion.
Ingestion:
Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. May also cause headache, confusion and electrolyte depletion.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
A study of 67 workers in an environment with high airborne concentrations of urea found a high incidence of protein metabolism disturbances, moderate emphysema, and chronic weight loss.
Aggravation of Pre-existing Conditions:
Supersensitive individuals with skin or eye problems, kidney impairment or asthmatic condition should have physician's approval before exposure to urea dust.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if symptoms occur.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Reactions with incompatibles may pose an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

7. Handling and Storage

To preserve product integrity, store at 25C, excursions permitted between 15C and 30C. Store in a tightly closed container. Protect container from physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Urea:
-AIHA Workplace Environmental Exposure Limit (WEEL):
10 mg/m3, 8-hour TWA
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If heat is involved, an ammonia/methylamine, dust/mist cartridge may be necessary.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
White crystals or white powder.
Odor:
Develops odor of ammonia.
Solubility:
Very soluble in water.
Specific Gravity:
1.32 @ 20C/4C
pH:
7.2 (10% in water)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:

Decomposes.
Melting Point:
132 - 135C (270 - 275F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Urea decomposes upon heating and can form products including ammonia, oxides of nitrogen, cyanuric acid, cyanic acid, biuret, carbon dioxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Urea reacts with calcium hypochlorite or sodium hypochlorite to form the explosive nitrogen trichloride. It is incompatible with sodium nitrite, gallium perchlorate, strong oxidizing agents (permanganate, dichromate, nitrate, chlorine), phosphorus pentachloride, nitrosyl perchlorate, titanium tetrachloride and chromyl chloride.
Conditions to Avoid:
Incompatibles.

---

11. Toxicological Information

Urea: Oral rat LD50: 8471 mg/kg. Investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Urea (57-13-6)	No	No	None

---

12. Ecological Information

Environmental Fate:
When released to soil, this material will hydrolyze into ammonium in a matter of days to several weeks. When released into the soil, this material may leach into groundwater. When released into water, this material may biodegrade to a moderate extent. When released into water, this material is not expected to evaporate significantly. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal 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.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Urea (57-13-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Urea (57-13-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Urea (57-13-6)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Urea (57-13-6)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Avoid breathing dust.
Keep container closed.
Avoid contact with eyes, skin and clothing.
Use only with adequate ventilation.
Wash thoroughly after handling.