

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Propane With Odorant

MANUFACTURER/SUPPLIER:

Provident Energy Ltd.
2100, 250 – 2nd Street SW
Calgary, Alberta
T2P 0C1

EMERGENCY TELEPHONE NUMBER:

1-800-998-2251

EMERGENCY SPILL INFORMATION:

1-613-996-6666 CANUTEC (Canada)
1-800-424-9300 CHEMTREC (U.S.A.)

PRODUCT USE: Fuel, refrigerant, organic synthesis, aerosol propellant.

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Component</u>	<u>CAS #</u>	<u>Range % by Wt</u>
Propane	74-98-6	100
Ethyl mercaptan	75-08-1	Trace

(See Section 8.0 “ Exposure Controls/Personal Protection”, for exposure guidelines)

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Danger! Extremely flammable. Released gas can travel considerable distances to a source of ignition and flash back. Simple asphyxiant: at very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. Compressed gas. Liquid can cause frostbite. Caution: Ethyl mercaptan may not provide adequate warning in all situations

POTENTIAL HEALTH EFFECTS:

- EYE CONTACT:** Extremely cold material; liquid can cause frostbite.
- SKIN CONTACT:** Liquid can cause frostbite.
- INHALATION:** At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. See “Toxicological Information” (Section 11.0).
- INGESTION:** Not applicable for gases.

4. FIRST-AID MEASURES

- EYE:** Immediately flush eye (while holding eyelid open) with lukewarm water for at least 20 minutes. Then get immediate medical attention.
- SKIN:** Contact with liquid: Immediately flush affected area with lukewarm water for at least 20 minutes. Do not rub area or use dry heat. Thaw frozen clothing, then gently remove. Remove any other clothing that may restrict circulation. Get immediate medical attention.

INHALATION : Using proper rescue procedures for reduced oxygen atmospheres, immediately remove victim to uncontaminated area. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Get immediate medical attention.

INGESTION : Not applicable for gases.

5. FIRE-FIGHTING MEASURES

FLASHPOINT: -104°C (-156°F) (closed cup)

LOWER EXPLOSIVE LIMIT (LEL) 2.1%

UPPER EXPLOSIVE LIMIT (UEL): 9.5%

AUTOIGNITION TEMPERATURE: 450°C (842°F)

MEANS OF EXTINCTION: Evacuate area and fight fire from a safe distance. Approach fire from upwind to avoid hazardous decomposition products. Stop flow of gas if possible; if not, allow to burn. Extinguishing the fire before the source of vapour is shut off can create an explosive mixture in air. Do NOT direct water into the liquid spill. Dry chemical or carbon dioxide can be used. Water spray may be used to cool adjacent areas. Firefighters should wear complete turnout gear, including a positive pressure self-contained breathing apparatus (SCBA).

UNUSUAL FIRE AND EXPLOSION HAZARDS: Product (a gas) is heavier than air. It can travel considerable distances to a source of ignition and flashback.

PRECAUTIONS: Keep away from sources of ignition (e.g., heat and open flames). Use with adequate ventilation. Ground and bond all lines and equipment.

HAZARDOUS COMBUSTION PRODUCTS: Carbon monoxide and carbon dioxide.

CONDITIONS OF FLAMMABILITY: Extremely flammable gas. Will ignite easily in the presence of any source of ignition over a wide range of concentrations and even at very low temperatures. Containers may explode when heated.

EXPLOSION DATA / SENSITIVITY TO MECHANICAL IMPACT: Not sensitive.

EXPLOSION DATA / SENSITIVITY TO STATIC DISCHARGE: Very sensitive. Can accumulate static charge due to flow or agitation.

6. ACCIDENTAL REALEASE MEASURES

Remove or shut off all sources of ignition. Ventilate area. Wear supplied air respirator or SCBA and spray with water to disperse vapours. Caution: When in contact with refrigerated / cryogenic liquids, many materials become brittle and are likely to break without warning.

7. HANDLING AND STORAGE

HANDLING: Use in a well-ventilated area, away from all sources of ignition including smoking. Ground and bond all lines and equipment. Use a non-sparking ventilation system, explosion-proof equipment, and intrinsically safe electrical equipment.

STORAGE: Outside storage is recommended. Store in a cool, dry, ventilated area away from sunlight and sources of ignition. Do not store above 49 ° C (120 ° F). Do not store in areas containing flammable or combustible materials, oxidizing agents or materials that fuel combustion.

SPECIAL PRECAUTIONS: Avoid strong oxidizers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EYES : Wear chemical goggles and face shield when handling the product in liquid form. Do not wear contact lenses.

SKIN: Wear long-sleeved shirt or jacket and long pants that are not tucked into boots or shoes, and insulated gloves suitable for low temperatures, when handling the liquid product.

INHALATION : Use the product in a well ventilated area. When ventilation may not be appropriate, wear an airline respirator or SCBA.

ENGINEERING CONTROLS: Contain the product within the process to avoid leaks as much as possible. Ventilate the workplace (mechanical ventilation, general and / or local) wherever the product is used, stored, and/or handled to keep the airborne concentrations well below the applicable exposure limit. It is recommended to keep the airborne concentrations to half or less of the applicable exposure limit (the threshold for intervention).

Ventilation system should be a non-sparking type and should be vented directly to the outdoors. It should also be grounded and be separate from other exhaust ventilation systems. Adequate make-up air must be provided.

EXPOSURE GUIDELINES :

<u>Component</u>	<u>ACGIH TLV</u>	<u>OSHA PEL-TWA</u>
Propane	1000 ppm TLV-TWA	1000 ppm
Ethyl Mercaptan	0.5 ppm	10 ppm

Where propane is released to air, care must be taken to ensure that oxygen concentrations remain acceptable.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOUR:	Colourless Gas. Sulfide odor, reminiscent of garlic or rotting cabbage.
pH (1% SOLUTION IN WATER):	Not available.
VAPOR PRESSURE:	953 kPa @ 25°C
VAPOR DENSITY:	1.56 at 0°C (32°F) (Air =1)
BOILING POINT:	-42°C (-44°F)
MELTING POINT:	-187.6°C (-305.7°F)
COEFFICIENT OF WATER/OIL DISTRIBUTION:	2.36
SOLUBILITY IN WATER:	Slight, 0.1 to 1.0%
SPECIFIC GRAVITY (WATER = 1):	0.493 at 25°C (77°F)

ODOUR THRESHOLD: 0.76 ppb (ethyl mercaptan - odorant)
 EVAPORATION RATE: Fast

10. STABILITY AND REACTIVITY

STABILITY: Stable.
CONDITIONS TO AVOID: Keep away from ignition sources (e. g. heat, sparks and flame).
MATERIALS TO AVOID: Avoid chlorine, chlorine dioxide, fluorine and other strong oxidizing agents.
HAZARDOUS DECOMPOSITION: None identified.
HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

ROUTES OF EXPOSURE : Inhalation
TOXICITY TO ANIMALS : LD₅₀ Not available
 LC₅₀ >800,000 ppm (rat, 15 minutes)

ACUTE EFFECTS TO HUMANS:

EYES: The liquid will cause frostbite on contact. May cause blindness or permanent damage to eyes.
SKIN: Contact with concentrated (liquefied) gas escaping from a high pressure cylinder or pipe, or contact with the product in liquid form can cause frostbite. Mild frostbite may be perceived as irritation. Contact with liquid product will produce severe frostbite.
INHALATION: At very high concentrations, propane can produce anesthetic effects, ie fatigue, headache, drowsiness, dizziness and light-headedness.
INGESTION : Not applicable

ADDITIONAL TOXICOLOGICAL DATA: This product is a simple asphyxiant, i.e. in very high concentrations it can reduce the concentration of oxygen in the air to dangerous levels. The effects of oxygen deficiency are: 12-16% increased breathing and pulse rate, slight disturbance of muscle coordination, 10-14%, emotional upset, abnormal fatigue, difficulty breathing, 6-10%, nausea, vomiting, collapse or loss of consciousness less than 6%, convulsive movements, possible respiratory collapse and death.

CARCINOGENICITY : Not a carcinogen.

EFFECTS OF CHRONIC EXPOSURE TO THE PRODUCT : No known chronic effects.

IRRITATION : Mild irritation, if any to the eyes, nose and respiratory tract.

SENSITIZATION :	Some cases of low cardiac sensitization in laboratory animals, namely that high concentration can cause increases in heart rate in animals under stress.
REPRODUCTIVE TOXICITY:	No known effects on reproduction.
TERATOGENICITY:	No teratogenic effects known.
MUTAGENICITY:	Not mutagenic.
TOXICOLOGICALLY SYNERGISTIC EFFECTS :	None known.

12. ECOLOGICAL INFORMATION

Not available.

13. DISPOSAL CONSIDERATIONS

Vent to a safe location. Dilute dissipating gas until the concentration is well below the LEL.

14. TRANSPORT INFORMATION

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

Shipping Name:	Propane
Hazard Class :	2.1
UN Number :	UN1978
Packing Group :	Not applicable

INTERNATIONAL INFORMATION:

U.S. DEPT. OF TRANSPORTATION

Shipping Name:	Liquefied Petroleum Gas (Propane)
Hazard Class :	2.1
UN Number :	UN1075

SEA (IMO/IMDG)

Shipping Name:	Propane
Hazard Class :	2.1
UN Number :	UN1978

AIR (ICAO/IATA)

Shipping Name:	Propane
Hazard Class :	2
UN Number :	UN1978 (Prohibited on passenger aircraft)

15. REGULATORY INFORMATION

CANADIAN INVENTORY (DSL) :

All of the components of this product are listed on the DSL.

WHMIS CLASS : A Compressed Gas
 B Flammable Gas

US Inventory (TSCA): Listed on inventory.

16. OTHER INFORMATION

By: **Provident Energy Ltd.**
 (403) 296-2233

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To our knowledge, the information provided in this sheet is accurate. We have reviewed all the information contained herein we received from sources outside our company. We believe that this information is adequate but cannot guarantee its accuracy and completeness. Precautions in health and safety of this form may not be acceptable to all individuals and all situations. The obligation to evaluate and use this product safely and to comply with applicable laws up to the user. No statement included in this MSDS shall be construed as permission or recommendation to use any product in a manner to infringe existing patents. There is no guarantee, either expressed or implied.
