Safety Data Sheet (CANADA)

1. Identification

Product Identifier:	Ethane
Other Means of Identification:	Methyl methane, Ethyl hydride
Product use:	Feedstock for the production of ethylene by steam cracking; sometimes used as a refrigerant
Restrictions on use:	Do not use for purposes other than those listed above
Manufacturer:	Keyera and Affiliates
Address:	Suite 600, Sunlife Plaza West 144 – 4th Avenue SW Calgary, AB, T2P 3N4
SDS Information:	1-780-449-7910
Emergency Contact (24 hours):	1-613-996-6666 (CANUTEC, Canada) 1-800-424-9300 (CHEMTREC, U.S.)

2. Hazards Identification

GHS Hazards

Pictogram	Classification	Hazard Statements
	Flammable Gases – Category 1	Extremely flammable gas.
	Specific Target Organ Toxicity, Single Exposure – Category 3	May cause drowsiness or dizziness.
No pictogram	Simple Asphyxiant	May displace oxygen and cause rapid suffocation.

If ethane is shipped as a liquefied compressed gas, the following additional hazards exist:

GHS Hazards

Pictogram	Classification	Hazard Statements
	Gases Under Pressure – Liquefied Gas	Contains gas under pressure; may explode if heated.

Other Hazards

- May cause frostbite upon sudden release of liquefied gas.

Signal Word: Danger

Precautionary Statements:

Prevention

- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources – No smoking.
- Avoid breathing gas.
- Use only outdoors or in a well-ventilated area.

Response

- Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
- In case of leakage, eliminate all ignition sources.

- If inhaled: Remove person to fresh air and keep comfortable for breathing.
- Call a doctor/physician if you feel unwell.

Storage

- Store in a well-ventilated place.
- Keep container tightly closed.
- Store locked up.
- Protect from sunlight (for gases under pressure/ liquefied compressed gas).

Disposal

- Dispose of contents/container in accordance with applicable local, provincial/state, and federal regulations.

3. Composition/Information on Ingredients

Chemical Name: Ethane

Common Name/Synonyms: Methyl methane, Ethyl hydride

Ingredient Name	Volume %	CAS No.
Methane	0.5 – 2.5	74-82-8
Ethane	91 – 98	74-84-0
Propane	0.1 – 0.5	74-98-6
Carbon Dioxide	0.5 – 3.0	124-38-9
Methanol	< 0.1	67-56-1

4. First Aid Measures

Immediate Medical Attention and Special Treatment:
Treat symptomatically and supportively. Refer also to Table below.

First Aid:	
Inhalation:	Remove person to fresh air and keep comfortable for breathing. Call a doctor/physician if feeling unwell.
Skin:	If cold, liquefied ethane is on skin (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: get medical advice/attention.
Eyes:	If cold liquefied ethane is on eyes: rinse cautiously with water for several minutes. If eye irritation persists: get medical advice/attention.
Ingestion:	Not expected to be a route of exposure.

Most Important Effects and Symptoms, Acute or Delayed:
All the components methane, ethane, propane and carbon dioxide are potential asphyxiants: can displace oxygen and cause rapid suffocation.

Exposure Route	**Health Effects**	**Symptoms of Exposure**
Inhalation:	May affect the Central Nervous System CNS May act as an asphyxiant by displacing oxygen in the ambient air, causing suffocation.	Drowsiness, dizziness. Loss of consciousness, death.
Skin:	Sudden release of liquefied gas may cause burn or frostbite.	numbness, cold or burning sensation, white, pale, greyish-yellow or red skin, blistering in severe cases.
Eyes:	Contact with liquefied gas may cause burn or eye damage.	numbness, cold or burning sensation, blistering to blindness in severe cases.
Ingestion:	Not expected to be a route of exposure.	None.

5. Fire Fighting Measures

Flammability: Yes.	**Hazardous Combustion Products:** Carbon monoxide (CO), carbon dioxide (CO_2), and acrid smoke.
Explosion: Sensitive to impact: No	**Sensitive to static discharge:** Yes

Extinguishing Media:
Small Fire: dry chemical or CO_2.
Large Fire: water spray or fog.

Unsuitable Extinguishing Media:

- Foam.
- Water jet: Do not direct water at source of leak or safety devices, especially with liquefied compressed gas, to avoid icing.

Special Protective Equipment for Firefighters:

- Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face-piece.
- Wear thermal protective clothing when the fire involves liquefied ethane.

Precautions for Firefighters:

- **DO NOT EXTINIGUISH A LEAKING GAS FIRE UNLESS THE LEAK CAN BE STOPPED.**
- If tank, rail car or tank truck is involved in a fire, ISOLATE and consider initial evacuation in all directions for 1600 meters (1 mile).
- Move container from fire area if you can do it without risk.
- Apply cooling water to sides of containers exposed to flames until well after fire is out.
- Cool fire-exposed containers with flooding quantities of water applied from as far a distance as possible.
- Stay away from ends of tanks.
- Containers exposed to fire may explode or vent through pressure-relief devices.
- Refer to Guide 115 of the Emergency Response Guidebook (Transport Canada/US Dept. of Transportation).

Unusual Fire and Explosion Hazards:

- The highly flammable vapors are slightly heavier than air and may accumulate in low areas and /or spread along ground to distant ignition sources and flash back.

6. Accidental Release Measures

Protective Equipment:

Gloves:	Recommended: neoprene and nitrile; insulating gloves (for liquefied gas). Not recommended: polyvinyl chloride PVC.
Clothing:	Flame-retardant coverall e.g. Nomex, Proban. Protective apron and trousers worn over coveralls for handling NGL.
Respirator:	NIOSH Approved Supplied-Air Respirator or SCBA where large quantities are released, and the exposure level is unknown or where an oxygen-deficient atmosphere may exist.
Eye:	Safety glasses with side shields, safety goggles or face shields.

Precautions:

- Direct addition of water to liquefied gas will cause flash vaporization resulting in an explosion (either immediately or delayed) known as a "boiling liquid, expanding vapor explosion (BLEVE)".
- Do not breathe vapors.
- Do not touch spilled liquefied gas with bare skin to avoid frostbite/freeze burn.
- The gas and the liquefied gas are highly flammable: must be kept from sparks, open flame, hot surfaces, and all sources of ignition and heat.
- The highly flammable vapors are slightly heavier than air and may accumulate in low areas and /or spread along ground to distant ignition sources and flash back.

Emergency Procedures:

- Shut off leak/release source, if it can be done safely.
- Remove all sources of ignition. Ventilate area of leak or spill.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering.
- Evacuate area of all unnecessary personnel.
  Small spill: will evaporate.
  Large spill: consider downwind evacuation of at least 800 meters (½ mile.)
  If tank, rail car or tank truck is involved in a fire, ISOLATE and consider initial evacuation in all directions for 1600 meters (1 mile).
- Emergency personnel must wear appropriate personal protective equipment.
- If possible, turn leaking containers so that gas escapes instead of liquid.

Containment and Clean-up:

- Use non-sparking tools and equipment.
- Contain and recover liquid if it can be done safely: Collect spillage with an inert material (e.g., vermiculite, dry sand, earth), and place in metal container which can be grounded.
- Do not use combustible materials, such as sawdust, as absorbent.
- If a leak/spill has not ignited, use water spray to disperse vapor or divert vapor cloud draft.
- Do not direct water at spill or source of leak. Avoid water runoff to contact liquefied gas – this may cause spreading of vapors.
- Prevent vapors or liquefied gas from spreading to sewers, ventilation systems, confined spaces.
- Dispose of contents/container in accordance with applicable local, provincial/state, and federal regulations.
- Refer to Guide 115 of the Emergency Response Guidebook (Transport Canada/US Dept. of Transportation).

7. Handling and Storage

Handling Precautions :

- Use only outdoors or in a well-ventilated area.
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources – No smoking.
- Do not breathe vapors.
- Use non-sparking tools and equipment.
- Wear protective gloves/ protective clothing/ eye protection/ face protection when handling liquefied ethane.

Storage Precautions:

Locations

- Store in a cool, dry, well-ventilated location, away from any area of fire-hazard.
- Outside or detached storage is preferred.
- Storage and use areas should be No Smoking areas.
- Store locked-up.

Containers

- Keep container tightly closed.
- Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death

.

Other precautions

- Separate from incompatibles like oxidizers e.g. chlorine gas and oxygen.

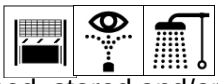
8. Exposure Controls / Personal Protection

EXPOSURE LIMITS

	Authority	15 MINS STEL or Ceiling	8-HOURS
Methane* (CAS 74-82-8)	Alberta	-	-
	Ontario, BC	-	1000 ppm
Ethane* (CAS 74-84-0)	ACGIH TLV	Refer to "Minimal Oxygen Content" Appendix F of ACGIH*	
	Alberta, Ontario, BC	-	1000 ppm
Propane* (CAS 74-98-6)	Alberta, Ontario, BC	-	1000 ppm
Carbon dioxide* (CAS 124-38-9)	Alberta	30000 ppm (54000 mg/m^3)	5000 ppm (9000 mg/m^3)
	Ontario	30000 ppm	5000 ppm
	BC	-	5000 ppm (9000 mg/m3)

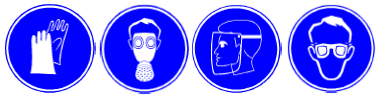
* Identified as chemicals which may cause asphyxia according to ACGIH.
According to the U.S. National Institute for Occupational Safety & Health, an oxygen deficient atmosphere is one with an ambient ρO2 less than 132 torr. at sea level the minimum requirement is 19.5% oxygen (148 torr ρO2). The partial pressure of oxygen decreases significantly with increase in altitude.

ENGINEERING CONTROLS



- Ventilate area where product is used, stored and/or handled to maintain airborne concentrations below the LEL and OEL, especially in confined spaces.
- Exhaust/ventilate to the outside.
- Ventilation equipment must be explosion proof.
- Ventilation system should be grounded and separate from other exhaust ventilation systems. Adequate make-up air must be provided.

PERSONAL PROTECTIVE EQUIPMENT



Gloves: Recommended: neoprene and nitrile;
Not recommended: polyvinyl chloride PVC.
Use insulating gloves when handling liquefied compressed gas.

Clothing: Flame-retardant coverall e.g. Nomex, Proban. Protective apron and trousers worn over coveralls for handling liquefied propane.

Respirator: NIOSH Approved Supplied-Air Respirator or SCBA where large concentration is anticipated, and the exposure level is unknown or where an oxygen-deficient atmosphere may exist.

Eye: Safety glasses with side shields, safety goggles or face shields.

9. Physical and Chemical Properties

Chemical Formula: C_2H_6	**Molecular Weight:** 32.07		**Chemical Family:** Hydrocarbon
Appearance: Colorless gas. Colorless liquid when pressurized.	**Odor:** Odorless	**Odor Threshold:** None (ethane is odorless)	**Evaporation Rate:** >1 (Butyl Acetate = 1)
pH: Not applicable	**Melting/Freezing Point:** -183.3°C (-297.9°F)		**Boiling Point:** -88.7°C (-127.7°F)
Flashpoint and Method: -135°C (-211°F) Cleveland Open Cup	**Flammability:** Yes		**Boiling Range:** Not available
Upper-Lower Explosive Limit: 12.5% (UEL), 3.0% (LEL)	**Vapor Density:** 0.079 lb/ft^3 or 1.265 kg/m^3 @ 21°C (70°F) & 1 atm		**Density (as Liquid)** 34.1lb/ft^3 or 546 kg/m^3 @ boiling pt. & 1 atm
Vapor Pressure: 544 psig or 3751 kPa or 37.5 bars @ 21°C (70°F)	**Specific Gravity, Gas (air = 1)** 1.04 @ 15.6°C (60°F) & 1 atm		**Specific Gravity, Liquid (water = 1)** 0.446 @ 0/4°C (32/39.2°F) & 1 atm
Soluble in water (@20°C): Slightly soluble	**Critical Temp & Pressure** 32.2°C (90°F) & 48.8 bar		**Percent Volatile:** 100 by volume
Partition Coefficient n-octanol/water: Not available	**Auto-Ignition Temperature:** Not available		**Decomposition Temp.:** Not available
Viscosity: Not available	**Henry's Law Constant:** Not available		**Isobaric Heat Capacity:** Not available

10. Stability and Reactivity

Reactivity:
Avoid incompatible materials: may react violently with oxidizers.

Chemical Stability:
- Stable under normal temperatures and pressures.
- At high temperature and low pressure, ethane may decompose to form hydrogen.

Possibility of Hazardous Reactions:
Polymerization has not been reported to occur under normal temperature and pressure conditions.

Conditions to Avoid:
Extreme temperatures and incompatible materials.

Incompatible Materials:
- Reacts violently with oxidizing agents such as perchlorates, peroxides, permanganates, nitrates
- Ethane and chlorine dioxide mixture will explode spontaneously; ethane and chlorine mixture has been known to explode.

Hazardous Decomposition Products:
- No decomposition if stored and applied as directed.
- Combustion forms carbon monoxide, carbon dioxide, irritating and toxic fumes/gases.

11. Toxicological Information

Exposure Route	Acute Health Effects	Symptoms of Exposure
Inhalation:	Effects on the Central Nervous system (CNS) may range from mild (respiratory depression) to severe effects (asphyxiation)	may range from rapid breathing, dizziness to respiratory arrest, loss of consciousness (narcosis) and death in extreme cases.
Skin:	In gas form: no known effects.	-
	In liquid form: burn or frostbite.	numbness, cold or burning sensation, white, pale, greyish-yellow or red skin, blistering in severe cases.
Eye:	In gas form: no known effects.	-
	In liquid form: burn or frostbite.	numbness, cold or burning sensation, blistering to blindness in severe cases.
Ingestion:	Not expected to be a route of exposure.	None.

Chronic Exposure:

Inhalation:
Not known.

Skin:
Not known to be a skin-sensitizer.

Medical Conditions Aggravated by Exposure:
Not known.

Sensitization: No	**Reproductive Toxicology:** No	**Teratogenicity:** No	**Mutagenicity:** No	**Irritancy:** No
Carcinogenicity: No	**Target Organs:** Single exposure: central nervous system (CNS) Repeated exposure: no data available.			

Lethality Tests:

Chemical Name	CAS No.	LD50	LC50
Ethane	74-84-0	Not available	Rat, inhalation: 658 mg/L 4 hrs.
Propane	74-98-6	Not available	Rat, inhalation: 658 mg/L 4 hrs. Rat, inhalation: >800000ppm, 15-mins (oxygen was also added to maintain a level of ~20vol%)

12. Ecological Information

Persistence & Degradability: Not expected to persist in the environment.	**Bioaccumulative Potential:** No.
Mobility: No data available.	**Other Adverse Effects:** See below.

Terrestrial Fate:

- Photolysis and hydrolysis are not expected to be important in soil.
- Not expected to bioaccumulate.
- Not expected to stay in soil because the released gas will evaporate and dissipate quickly.

Aquatic Fate:

- Spills/releases will spread on the water surface and will evaporate.
- Hydrolysis is not expected to be an important environmental fate process since the alkanes lack functional groups that hydrolyze under environmental conditions.

Atmospheric Fate:

- If released to air, methane, ethane and propane will exist solely as gas in the atmosphere.
- Methane is considered a GHG Green House Gas with Global Warming Potential GWP.
- Ethane and propane are Volatile Organic Compounds (VOC) which are known to react with oxides of nitrogen (NOx) in the presence of sunlight, to form ozone O3, a pollutant in the lower atmosphere.
- In general VOCs have short lifetimes in the atmospheres. A few VOCs, like ethane and acetone, are longer-lived and impact tropospheric chemistry on hemispheric scales.
- Ethane has an average lifetime in the atmosphere of 2 months (versus 9 years for methane). In the atmosphere, it is destroyed rapidly by reacting with hydroxide radicals.

Eco Toxicity Tests:
Not available.

13. Disposal Considerations

Waste Disposal:

- Dispose of waste material at an approved waste treatment/disposal facility in accordance with applicable local, provincial, and federal regulations.
- Excess/waste ethane can be disposed by incineration in a waste gas incinerator or flare.
- Ethane can also be reused as fuel for boilers and heaters.

14. Transport Information

TDG (CANADA) CLASSIFICATION

PROPER SHIPPING NAME: Ethane
CLASS: 2.1 **UN NUMBER:** UN1035
PACKING GROUP: None **LABEL/PLACARD:**

TDG SPECIAL PROVISION: None

MARINE POLLUTANT: No.

15. Regulatory Information

CANADA

	Methane	Ethane	Propane	Carbon dioxide
	CAS# 74-82-8	CAS# 74-84-0	CAS# 74-98-6	CAS# 124-38-9
DSL Domestic Substance List	yes	yes	yes	yes
NPRI National Pollutant Release Inventory	no	no	yes	no
E2 Environmental Emergency list of substance	yes	yes	yes	no
Canada CEPA 2009 GHG & Alberta Specified Gas Reporting Reg.	yes	no	no	yes

16. Other Information

NFPA Hazard Rating:
Health 1, Flammability 4, Instability 0

Prepared for: Keyera Health and Safety
Issue Date/ Revision No: August 31, 2015/ Revision #3

Revisions:	Dates:	Main Changes
• Original:	January 3, 2011	
• 1st revision:	October 31, 2013	Reformat
• 2nd revision:	June 30, 2015	Canada GHS format
• 3rd revision	August 31, 2015	Changed emergency contact no; removed UN3161

Glossary

ACGIH – American Conference of Governmental Industrial Hygiene
DOT – US Department of Transportation
DSL – Domestic Substance List (Canada)
E2 – Environmental Emergencies (Canada)
GHS – Globally Harmonized System
IARC – International Agency for Research on Cancer
IDLH – Immediately Dangerous to Life and Health
NIOSH – National Institute for Occupational Safety & Health
NPRI – National Pollutant Release Inventory (Canada)
NTP – National Toxicology Program
OSHA – Occupational Safety & Health Administration of the US Depart of Labour
PEL – Permissible Exposure Limit
SARA – Superfund Amendments and Reauthorization Act of 1986
STEL – Short Term Exposure Limit
TRI – US Toxic Release Inventory
TSCA – Toxic Substance Control Act
TWA – Time Weighed Average

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~ End of Safety Data Sheet ~