MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**ETHANE**
Version #	02
Issue date	01-06-2012
Revision date	07-17-2012
Supersedes date	01-06-2012
CAS #	74-84-0
MSDS Number	304
Product use	This product is intended for use as a refinery feedstock, fuel or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.
Synonym(s)	Ethyl Hydride, Bimethyl, Methylmethane, Dimethyl
Manufacturer/Supplier	Valero Marketing & Supply Company and Affiliates P.O. Box 696000 San Antonio, TX 78269-6000
General Assistance	210-345-4593
Emergency	24 Hour Emergency 866-565-5220 1-800-424-9300 (CHEMTREC USA)

2. Hazards Identification

Physical state	Gas.
Appearance	Compressed liquefied gas.
Emergency overview	DANGER Flammable gas - may cause flash fire. Contents under pressure. Gas reduces oxygen available for breathing. Contact with liquefied gas might cause frostbites, in some cases with tissue damage. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Static accumulating flammable materials can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite material and vapor may cause flash fire (or explosion).
OSHA regulatory status	This product is hazardous according to OSHA 29 CFR 1910.1200.
Potential health effects	
Routes of exposure	Inhalation. Eyes. Skin.
Eyes	Direct contact with cold gas may cause eye damage from frostbite.
Skin	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Inhalation	Breathing of high concentrations may cause dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels.
Ingestion	Health injuries are not known or expected under normal use.
Target organs	Central nervous system.
Chronic effects	High concentrations, prolonged or repeated exposure: May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage.
Signs and symptoms	Narcosis. Behavioral changes. Decrease in motor functions.
Potential environmental effects	This material is not expected to be harmful to aquatic life.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Ethane	74-84-0	95 - 100
Propane	74-98-6	0 - 5
Methane	74-82-8	0 - 2

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact Wash frost-bitten areas with plenty of water. Do not remove clothing. Get medical attention immediately.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a physician or poison control center immediately.

Ingestion Ingestion is not a typical route of exposure for gases or liquefied gases.

Notes to physician Treat symptomatically.

5. Fire Fighting Measures

Flammable properties Containers may explode when heated. Gas may travel considerable distance to a source of ignition and flash back. May form explosive mixtures with air.

Extinguishing media

Suitable extinguishing media Dry powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Protection of firefighters

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. ALWAYS stay away from tanks engulfed in flame. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Move containers from fire area if you can do it without risk. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

6. Accidental Release Measures

Personal precautions Stay upwind. Ventilate closed spaces before entering. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the MSDS.

Environmental precautions Stop leak if possible without any risk. Sewers must be covered and basements and workpits evacuated. Contact local authorities in case of spillage to drain/aquatic environment.

Methods for cleaning up Ventilate well, stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted.

7. Handling and Storage

Handling

Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulfide (H2S) and flammability. Provide adequate ventilation. Avoid contact with eyes, skin, and clothing. Material may deplete oxygen from the air to dangerously low levels. Avoid breathing gas. Wear appropriate personal protective equipment. The product is extremely flammable. May form explosive mixtures with air. Avoid heat, sparks, open flames and other ignition sources. Ground container and transfer equipment to eliminate static electric sparks. Observe good industrial hygiene practices.

Storage

Flammable compressed gas storage. Keep away from heat, sparks and open flame. Keep in a cool, well-ventilated place. Store away from incompatible materials.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Material	Type	Value
ETHANE (CAS 74-84-0)	TWA	1000 ppm
Components	**Type**	**Value**
Ethane (CAS 74-84-0)	TWA	1000 ppm
Methane (CAS 74-82-8)	TWA	1000 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Propane (CAS 74-98-6)	PEL	1800 mg/m3 1000 ppm

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Material	Type	Value
ETHANE (CAS 74-84-0)	TWA	1000 ppm
Components	**Type**	**Value**
Ethane (CAS 74-84-0)	TWA	1000 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Material	Type	Value
ETHANE (CAS 74-84-0)	TWA	1000 ppm
Components	**Type**	**Value**
Ethane (CAS 74-84-0)	TWA	1000 ppm
Methane (CAS 74-82-8)	TWA	1000 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Material	Type	Value
ETHANE (CAS 74-84-0)	TWA	1000 ppm
Components	**Type**	**Value**
Ethane (CAS 74-84-0)	TWA	1000 ppm
Methane (CAS 74-82-8)	TWA	1000 ppm
Propane (CAS 74-98-6)	TWA	1000 ppm

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Propane (CAS 74-98-6)	TWA	1800 mg/m3 1000 ppm

Engineering controls

Observe Occupational Exposure Limits and minimize the risk of inhalation. Use explosion-proof equipment.

Personal protective equipment

Eye / face protection

Risk of contact: Wear goggles/face shield.

Skin protection

Risk of contact: Wear cold insulating gloves. Suitable gloves can be recommended by the glove supplier. Wear suitable protective clothing.

Respiratory protection

In case of inadequate ventilation, use air-supplied full-mask. Seek advice from local supervisor.

General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. Observe any medical surveillance requirements.

9. Physical & Chemical Properties

Appearance	Compressed liquefied gas.
Physical state	Gas.
Form	Compressed liquefied gas.
Color	Colorless.
Odor	Weak odor. Sweetish.
Odor threshold	Not available.
pH	Not available.
Vapor pressure	Not available.
Vapor density	1.1 (Air=1)
Boiling point	Not available.
Melting point/Freezing point	-277.9 °F (-172.15 °C)
Solubility (water)	Insoluble in the cold water.
Specific gravity	0.546 (Water= 1)
Flash point	-211.3 °F (-135.15 °C)
Flammability limits in air, upper, % by volume	12.5 %
Flammability limits in air, lower, % by volume	3 %
Auto-ignition temperature	986 °F (530 °C)
VOC	100
Percent volatile	Essentially 100%
Partition coefficient (n-octanol/water)	Not applicable.
Molecular weight	30.08 g/mol
Molecular formula	C2-H6

10. Chemical Stability & Reactivity Information

Chemical stability	Stable at normal conditions. Heat may cause the containers to explode.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Strong acids, alkalis and oxidizing agents. Reducing agents.
Hazardous decomposition products	Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Possibility of hazardous reactions	Hazardous polymerization does not occur. Hazardous reactions do not occur.

11. Toxicological Information

Toxicological data

Components	Species	Test Results
Propane (CAS 74-98-6)		
Acute		
Inhalation		
LC50	Rat	> 1442.847 mg/l, 15 Minutes

Sensitization	Not assigned.
Acute effects	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
Carcinogenicity	This material is not classified as a carcinogen by IARC, ACGIH, NTP or OSHA.
Mutagenicity	Not assigned.
Reproductive effects	Not assigned.

Symptoms and target organs Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").

12. Ecological Information

Ecotoxicity The product is a volatile organic compound which has a photochemical ozone creation potential.

Environmental effects An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Aquatic toxicity Not expected to be harmful to aquatic organisms.

Persistence and degradability Not available.

Bioaccumulation / Accumulation Not available.

Partition coefficient Not applicable.

Methane	1.09
Ethane	1.81
Propane	2.36

Mobility in environmental media The product is a volatile substance, which may spread in the atmosphere.

13. Disposal Considerations

Waste codes D001

Disposal instructions Dispose in accordance with all applicable regulations.

Waste from residues / unused products Dispose of in accordance with local regulations.

14. Transport Information

DOT

Basic shipping requirements:

UN number UN1035
Proper shipping name Ethane
Hazard class 2.1
Additional information:
Packaging exceptions 306
Packaging non bulk 304
Packaging bulk 302

IATA

UN number UN1035
UN proper shipping name Ethane
Transport hazard class(es) 2.1
ERG code 10L

IMDG

UN number UN1035
UN proper shipping name ETHANE
Transport hazard class(es) 2.1
EmS No. F-D, S-U

TDG

Proper shipping name ETHANE
Hazard class 2.1
UN number UN1035

15. Regulatory Information

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.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

Ethane: 100
Propane: 100
Methane: 100

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - Yes
Reactivity Hazard - No

Section 302 extremely hazardous substance (40 CFR 355, Appendix A)
No

Section 311/312 (40 CFR 370)
Yes

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15)
Not controlled

Canadian regulations
This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status
Controlled

WHMIS classification
B1 - Flammable Gases

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

State regulations
US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

WARNING: Byproducts of the combustion of propane contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

California requires all "persons in the course of doing business" whose products are sold in California to comply with Proposition 65 (Cal. Health and Safety Code Sections 25249.6 et seq.). Accordingly, resellers of this product in California shall comply with Proposition 65, including the provision of any necessary warnings for exposure to chemicals listed by the State of California: http://oehha.ca.gov/prop65/prop65_list/files/P65single111811.pdf

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

US - New Jersey RTK - Substances: Listed substance

Ethane (CAS 74-84-0) Listed.
Methane (CAS 74-82-8) Listed.

Propane (CAS 74-98-6)	Listed.

US. Massachusetts RTK - Substance List

Ethane (CAS 74-84-0)	Listed.
Methane (CAS 74-82-8)	Listed.
Propane (CAS 74-98-6)	Listed.

US. New Jersey Worker and Community Right-to-Know Act

Ethane (CAS 74-84-0)	500 LBS
Methane (CAS 74-82-8)	500 LBS
Propane (CAS 74-98-6)	500 LBS

US. Pennsylvania RTK - Hazardous Substances

Ethane (CAS 74-84-0)	Listed.
Methane (CAS 74-82-8)	Listed.
Propane (CAS 74-98-6)	Listed.

Mexico regulations This safety data sheet was prepared in accordance with the Official Mexican Standard (NOM-018-STPS-2000).

16. Other Information

HMIS® ratings
Health: 1*
Flammability: 4
Physical hazard: 0

NFPA ratings
Health: 1
Flammability: 4
Instability: 0