



SAFETY INFORMATION BULLETIN

-- BE AWARE --

-- BE INFORMED --

-- BE SAFE --

-- COMMUNICATE WITH YOUR CUSTOMERS --

This bulletin is provided to furnish the Customers, and other using Williams Midstream Natural Gas Liquids, Inc. ("WMNGL") truck terminals, with information about some of the properties of Propane (LP-Gas) and the Ethyl Mercaptan used to odorize Propane loaded at truck terminals operated by WMNGL.

This information must be understood by you and your employees responsible for handling odorized Propane. It should also be given to all to whom you supply, consign, and/or sell Propane.

Propane is a component of both natural gas and crude oil. It is produced by processing natural gas or refining crude oil. Propane is a safe, efficient, clean burning fuel with approximately 2½ times the BTU content per cubic foot (approximately 2500 BTU) of Methane (the main component of natural gas). Propane, if improperly handled, stored or used, can cause fires or explosions. Proper safety precautions must always be followed. National Fire Protection Association (NFPA) Bulletins No. 54 and No. 58 are recommended sources of safety information and practices for the proper handling and storage of Propane.

CHARACTERISTICS OF PROPANE

- Propane gas in its natural state is a colorless, odorless vapor at normal ambient temperatures and atmospheric pressure. An odorizing compound is added to Propane used for domestic or industrial fuel to enable it to be detected at very low concentrations in air. Detectable concentrations of odorized propane in air are well below those that will allow combustion.
- Propane gas vapors are about 1½ times heavier than air, yet they mix easily with air. However, without moving air currents, Propane gas settles down toward the lowest floor level until normal diffusion mixes it with air. When Propane changes from a liquid to a gas, it increases in volumes approximately 270 times.
- Propane is not toxic; however, as the gas takes the place of air, it becomes a simple asphyxiant and can cause suffocation from lack of oxygen. Liquid Propane is lighter than water. It is about one-half as heavy as an equal volume of water.
- Propane is normally transported as a liquid in pipelines or in specially designed pressure containers meeting the requirements of the United States Department of Transportation (DOT). Only containers specifically designed and approved for Propane should be used to store or transport Propane.
- Propane is normally vaporized from a liquid to a vapor at the consumer's ultimate storage tank. One gallon of liquid Propane will make about 35 cubic feet of Propane gas.

CAUTION

- When Propane is mixed with air in the proper ratios, a combustible mixture is formed. (2.1% minimum Propane in Air to 9.5% maximum Propane in Air.)
- WMNGL IS PROVIDING THE FOLLOWING INFORMATION DERIVED FROM PUBLICATIONS AND REPORTS AVAILABLE IN INDUSTRY AND PRIVATE AND PUBLICLY-FUNDED STUDIES LITERATURE. HOWEVER, WMNGL DOES NOT CLAIM ANY SPECIAL EXPERTISE IN THE HAZARDS OF ODORANT USE. IF YOU DESIRE MORE INFORMATION IN THIS AREA, YOU SHOULD CONSULT INDUSTRY AND GOVERNMENT PUBLICATIONS, RESEARCH REPORTS, AND EXPERTS IN THE FIELD. SOME OF THE POSSIBLE SOURCES ARE SHOWN ON EXHIBIT 3.

HAZARDS ASSOCIATED WITH ODORIZATION OF PROPANE

- An odorant, Ethyl Mercaptan, is added to Propane to give it a distinctive gassy odor that can be readily detected in very low concentrations. At WMNGL terminals, unless a customer makes prior alternate arrangements, the only odorant our terminals are designed to add is Ethyl Mercaptan. Since most Propane systems are static, unlike natural gas systems, Ethyl Mercaptan is the preferred odorant because it has physical characteristics most nearly approaching Propane which do not change when mixed with the Propane. Most odor producing materials, including Ethyl Mercaptan, have certain limitations and because of this, no odorant is recognized to be 100% effective in all cases for all people.
- Research studies indicate that a small percentage of the total population, especially the elderly, simply cannot smell some odors, even the very intense odor Ethyl Mercaptan. Certain environmental and/or physical conditions such as competing odors, common colds, allergies, smoking, inattentiveness, eating, sleeping, drinking alcohol, etc., may lessen one's ability to smell or cover up the smell of odorized Propane. Exposure to high concentrations of Ethyl Mercaptan may shock, or even temporarily paralyze, one's sense of smell. Also, continued exposure to a low level of odorized Propane may slow or dull a person's ability to detect a higher level of odorized propane. SPECIAL PRECAUTIONS SHOULD BE TAKEN WITH PERSONS USING PROPANE WHO MAY HAVE AN IMPAIRED SENSE OF SMELL.
- Some odorants, including Ethyl Mercaptan, can be converted to other chemical compounds. These compounds may still provide an odor which serves as a warning of gas presence; however, they may not exhibit the same high intensity odor of Ethyl Mercaptan. This process, called oxidation, may take place in a few hours, or more slowly over a long period of time if air (oxygen), water, or certain types of rust (iron oxide) are present in a container in which odorized Propane is placed. IT IS MOST IMPORTANT THAT ALL PROPANE CONTAINERS BE PROPERLY PURGED OF AIR AND WATER BEFORE USE, AND THAT THE CONTAINER CONTAINS NO RUST OR OTHER OXIDIZING COMPOUND ON THE INTERNAL SURFACES. SPECIAL ATTENTION TO THIS SHOULD BE GIVEN WHEN SMALL CONTAINERS SUCH AS 20 POUND CYLINDERS ARE INVOLVED.

- Some odorants, including Ethyl Mercaptan, may be adsorbed or absorbed under certain conditions and cause their effectiveness as a warning agent to be reduced. For example, if there is a leak in an underground pipe, the movement of the gas through the soil can cause the odorant to be adsorbed onto the soil. Also, under certain circumstances, the odorant may be partially adsorbed onto new tank surfaces, onto new piping, or onto some building materials, such as masonry surfaces. The reduction of odor intensity due to oxidation or being adsorbed or absorbed is sometimes referred to as “odor fade”.
- Appliances using Propane fuel must be installed properly or there will be an increased risk of fire from Propane in the case of a leak. If possible, below grade installations (basements) should be limited or avoided since a leak may result in stratification of odorized gas that is more difficult to detect. Appliances should always be installed in places with good circulation and proper venting. Since Propane gas is heavier than air and carries with it Ethyl Mercaptan or other odorants, the Propane can stratify in environments with little or no air movement (such as basements), thus giving a different amount of odor intensity at different heights within the area. In all cases regardless of where the appliance is installed, people should smell near floor level first to detect the gassy odor of Propane, before lighting or servicing any appliance, or introducing any ignition source into the area.
- If even a slight gassy odor of Ethyl Mercaptan is detected, Propane gas vapor is also likely to be present and immediate emergency action should be taken. However, the opposite may not be true. A combustible mixture of propane may still be present even if no gassy odor is detected. Any suspected Propane gas leak, even without an odor detected, requires immediate emergency action. **EXTREME CAUTION IS CALLED FOR SINCE THE POTENTIAL FOR DEATH OR SERIOUS INJURY FROM A FLASH FIRE OR EXPLOSION IF A LEAK IS SUSPECTED OR A GASSY ODOR IS IGNORED IS VERY GREAT.**

ADDITIONAL WARNING INFORMATION IS GIVEN BELOW.

- Any source of ignition can cause a flammable Propane mixture to ignite. Suspected leak areas and buildings should be evacuated immediately and all existing sources of open flames (such as pilot lights, matches, candles, lighters, cigarettes, cigars, or pipes) extinguished if possible to do so without entering an area where a leak is suspected or where Propane is accumulated. The use of electrical switches, thermostats, fans, and motors, flashlights and battery operated equipment, telephones and static electricity discharges (friction of certain clothing) can all be a potential ignition source and should be avoided. If the Propane is supplied by an outside tank and no leak is suspected near the tank, then the tank service valve should be shut off to eliminate the Propane supply.
- Underwriter Laboratories - listed electronic hydrocarbon gas detectors are being marketed by some vendors. Many are particularly designed for the detection of Propane gas in the home or in camper-trailers and recreational vehicles. If properly installed and maintained, this equipment may provide the Propane gas user with an extra level of protection from leaks that might go undetected by smell alone. WMNGL has not tested these devices and does not recommend or endorse any brand or model.
- WMNGL cannot possibly have knowledge of how customers, their consignees, and truck transport carriers using its system will handle, store, transfer, distribute, trade, sell or use the odorized Propane moved through the WMNGL terminal. Where the odorized Propane has been properly transported, handled, stored, and used, Ethyl Mercaptan has proven to be an effective warning device. However, if the odorized Propane has not been properly handled or has been stored in an improperly prepared storage

container after leaving the WMNGL terminal the effectiveness of Ethyl Mercaptan as a warning device may be diminished and an undetected dangerous condition could possibly exist.

- The odorants used in Propane normally do not indicate the degree of danger or the relative intensity of a potential hazard. Therefore, if you smell any odor at all, vacate the premises and call for professional help from your LP-Gas company and the fire department.
- WMNGL urges each customer using the WMNGL terminals to provide to their employees, their customers and other persons or firms to whom they may transfer the odorized Propane, full and adequate information regarding the characteristics of Propane and the odorant used as a warning device and any limitations of the odorant used, including Ethyl Mercaptan.

This Safety Information Bulletin has been prepared Williams Midstream Natural Gas Liquids and is intended to enhance the safe use of Propane. Williams Midstream Natural Gas Liquids has taken all reasonable precautions to ensure the accuracy of the information contained in this bulletin. However, Williams Midstream Natural Gas Liquids assumes no liability for any errors, omissions, or defects whatsoever in the content, or for any damage or injury resulting from the utilization of this Bulletin.

Additional information regarding the safe handling and use of Propane is available from the National Propane Gas Association, 1600 Eisenhower Lane, Suite 100, Lisle, Illinois 60532.

MATERIAL SAFETY DATA SHEET

Natural Gas Odorizing, Inc.

Baytown, TX 77522-1429

Emergency Telephone Numbers:

Page 1 of 4

Natural Gas Odorizing, Inc. 713-424-5568
Chemtrec 800-424-9300

SECTION I. PRODUCT IDENTIFICATION & EMERGENCY INFORMATION

PRODUCT NAME: ETHYL MERCAPTAN SYNONYM: Ethanethiol
CHEMICAL NAME: ETHYL MERCAPTAN
CHEMICAL FAMILY: Mercaptan
PRODUCT APPEARANCE: Water White Liquid, Gassy Odor

SECTION II. HAZARDOUS COMPONENTS OF MIXTURE

Table with 6 columns: INGREDIENTS, Gas #, %, By Wt., OSHA PEL, ACGIH TLV. Row 1: Ethyl Mercaptan, 75-08-1, 99.3 Min., STEL 2ppm, CL 10ppm, 0.5ppm.

SECTION III. HEALTH INFORMATION AND PROTECTION

First Aid & Nature of Hazard

Inhalation: Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. If symptoms develop, obtain medical attention.

Eye Contact: Flush eyes with running water for at least 15 minutes. If irritancy develops, obtain medical attention.

Skin Contact: Wash with soap and water.

Ingestion: No hazard in normal industrial use.

Personal Protection

Ventilation Requirements: Use with adequate ventilation.

Eye: Safety glasses, Face shield, Goggles.

Hand (Glove Type): PVC, Neoprene, Butyl rubber & other.

Respirator Type (Use only NIOSH approved equipment): Self-contained, Supplied air.

MATERIAL SAFETY DATA SHEET

ETHYL MERCAPTAN

Natural Gas Odorizing, Inc.
Baytown, TX 77522-1429

Other Protective Equipment: N/A

Toxicity

Oral (Acute): LD50: 1960 mg/kg (rats)

Dermal (Acute): Non-lethal at 2000 mg/kg (rats)

Eye: Slight irritation (rabbits) reversible

Inhalation (Acute): LC50 4420 ppm (rats) 4 hr.
 2770 mg/kg (mouse)

Chronic, Subchronic, etc.: N.E.

SECTION IV. FIRE & EXPLOSION HAZARD

Flashpoint: -38°F. (Setaflash)

Flammable Limits (Est.): Lower -2.8% Upper -18% (Est.)

Autoignition Temperature: 572°F.

Extinguishing Media: Water-spray, Water fog, CO₂, Dry Chemical, Foam.

Special Fire Fighting Procedures: Shut off source. Wear self-contained breathing apparatus in fire area.

SECTION V. SPILL, LEAK, AND DISPOSAL

Eliminate sources of ignition. Prevent additional discharge of material if possible to do so without hazard. Contain spill, keep out of water sources and sewers. Neutralize by adding household bleach (Clorox, Purex) to the spill area. Absorb in dry, inert material (sand, clay, sawdust, etc.).

Wast Disposal - Insure conformity with all applicable regulations; incinerate if permitted.

SECTION VI. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Boiling Point/Range: 94° - 98°F.

Melting Point:: N.E.

Molecular Wt. (Est.): 62

Vapor Press. psia: 16.14 @ 100°F.

Solubility in H₂O: Negligible

Evaporation Rate: N.E.

MATERIAL SAFETY DATA SHEET

ETHYL MERCAPTAN

Natural Gas Odorizing, Inc.
Baytown, TX 77522-1429

<u>Appearance & Color:</u>	Water White Liquid, Gassy Odor
<u>Freezing Point:</u>	<-50°F.
<u>Specific Gravity (H₂O=1):</u>	0.845
<u>% Volatiles by Volume:</u>	100
<u>Sp. Gravity of Vapor at 1 ATM, (Air=1):</u>	2.1

SECTION VII. REACTIVITY DATA

<u>Stability:</u>	Stable
<u>Hazardous Polymerization Occur:</u>	Will Not Occur
<u>Conditions to Avoid Instability:</u>	N.A.
<u>Conditions to Avoid Hazardous Polymerization:</u>	N.A.
<u>Materials and Conditions to Avoid Incompatibility:</u>	Strong oxidizers, heat, open flames, sparks, ignition sources.
<u>Hazardous Decomposition Products:</u>	Sulfur Dioxide (combustion)

SECTION VIII. STORAGE & HANDLING

Store in cool, dry, well ventilated area. Protect from sources of ignition. Bond and ground during liquid transfer. Use product in closed system. Wash thoroughly after handling. Empty container may contain combustible materials.

SECTION IX. TRANSPORT & STORAGE

DEPARTMENT OF TRANSPORTATION:

<u>Shipping Name:</u>	Ethyl Mercaptan
<u>Hazard Class:</u>	Div. 3 (Flammable Liquid)
<u>ID Number:</u>	UN2363
<u>Marking:</u>	Ethyl Mercaptan/UN2363
<u>Label:</u>	Flammable Liquid
<u>Placard:</u>	Flammable/2363
<u>Shipping Description:</u>	Ethyl Mercaptan, Flammable Liquid, UN2363
<u>NFPA Code:</u>	Health=2, Flammability=4, Reactivity=0

MATERIAL SAFETY DATA SHEET

ETHYL MERCAPTAN

Natural Gas Odorizing, Inc.
Baytown, TX 77522-1429

SECTION X. REGULATORY INFORMATION

TSCA: Product and/or Components Reported in EPA TSCA INVENTORY, 1980.

CERCLA: Under the Comprehensive Response, Compensation, and Liability act, (CERCLA), certain releases to air, land, or water may be reportable to the National Response Center at 800-424-8802. Circumstances surrounding the release and cleanup determine reportability. The reportable spill quantity of this product is pounds. This product contains: no reportable components.

SARA TITLE III: Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:
Fire.
This product contains the following Section 313 Reportable Ingredients:

<u>COMPONENT</u>	<u>GAS NO.</u>	<u>MAX %</u>
NONE		

CARCINOGENICITY: Not listed as a carcinogen by IARC, NTP, OSHA, ACGIH

N.A. = Not Applicable, N.E. = Not Established
(Est.) = Estimated

MSDS Revision Date: 01/02/92
Reviewed By: J. T. Johnson, President

Supersedes: 01/12/89

(EM)

EXHIBIT 3

Resource Listing of Beneficial Safety and Warning Documents

The following documents may prove beneficial in explaining and/or expanding on the safety and warning information contained herein:

Title 49 CFR Transportation, Chapter 1, Research and Special Programs Administration, Department of Transportation 173.315.

NFPA #54 - National Fuel Gas Code and NFPA #58 - Storage and Handling of Liquefied Petroleum Gases, published by the National Fire Protection Association, (consult latest editions).

“How’s Your Nose”, NPGA #3120, a scratch-n-sniff pamphlet published by the National Propane Gas Association.

“Safety Information for Users of Propane”, NPGA #0033, a scratch-n-sniff propane safety pamphlet published by the National Propane Gas Association.

U.S. Energy Research and Development Administration: A New Look at Odorization Levels for Propane Gas. Bartlesville Energy Research Center; BERCC/R1-77/1, September 1977.

Gas Engineer’s Handbook, Fuel Gas Engineering Practices, Chapter 11, by J.S. Powell and F.E. Vandaveer, the Industrial Press (1965).

Safety Handbook and LP-Gas Training Guide books. National Propane Gas Association.

State and local laws, regulations and codes.

NPGA Bulletin No. 133, “Purging New Containers”.

Cain, Williams S. And Amos Turk, “Smell of Danger: An Analysis of LP-Gas Odorization”, American Industrial Hygiene Association Journal, March 1985.

Amoore, J.E., “Properties of Olfactory System”. Presented at Institute of Gas Technology Symposium on Odorization, July 1976.