



MATERIAL SAFETY DATA SHEET
KERR-MCGEE CORPORATION
Exploration and Production Division

Natural Gas (Sweet)

For more detailed information on the hazards of this product, contact Regulatory Compliance Department or Medical Services Department at the address below. Technical Information Bulletin is also available.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Brand Name Natural Gas (Sweet)
 Chemical Name Natural Gas
 Common Name Natural Gas
 Formula CH₄ - C₆H₁₄
 Molecular Weight N/A

NFPA RATINGS

Health 1
 Flammability 4
 Reactivity 0

MANUFACTURER

Kerr-McGee Corporation
 Exploration and Production Division
 Kerr-McGee Center
 Oklahoma City, OK 73125

EMERGENCY TELEPHONE NUMBER

(405) 270-1313 (24 hours)

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NUMBER	WEIGHT %
Methane	74-82-8	70 - 85
Ethane	74-84-0	4 - 9
Nitrogen	7727-37-9	0 - 12
Propane	74-98-6	3 - 8
Butane	106-97-8	<3
Pentane	109-66-0	<1
Hexane	110-54-3	<2

(Note: See Section 8 of this MSDS for Exposure Guidelines)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER! Flammable gas. May cause flash fire. Gas reduces oxygen available for breathing.

Vapors may travel to a source of ignition and flash back.

Breathing large quantities may cause central nervous system depression.

In case of fire, let tank, tank car or tank truck burn unless leak can be stopped; with smaller tanks or cylinders, extinguish/isolate from other flammable materials. For small fires, use dry chemical or CO₂. For large fires, use water spray, fog, or regular foam.

GENERAL HAZARD

Readily forms flammable mixtures with air. Its vapors may travel long distances to a source of ignition and flash back. Very dangerous fire and explosion hazard when exposed to heat or flame.

EXTINGUISHING MEDIA

For small fires, use dry chemical or CO₂. For large fires, use water spray, fog, or regular foam.

SPECIAL FIREFIGHTING INSTRUCTIONS

Let tank, tank car, or tank truck burn unless leak can be stopped; with smaller tanks or cylinders, extinguish/isolate from other flammable materials. Move containers from area if it can be done without risk. Cool fire-exposed equipment and surfaces with water until well after fire is out. Stay away from tank ends. For a massive fire, use unmanned hose holder or monitor nozzles. If this is impossible, withdraw from area and let fire burn.

Withdraw immediately in case of a rising sound from venting safety devices or any discoloration of tank due to fire.

FIREFIGHTING EQUIPMENT

As in any fire, wear NIOSH/MSHA approved, pressure-demand self-contained breathing apparatus and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Wear appropriate protective equipment (See Section 8).

Eliminate all potential sources of ignition. Evacuate all non-essential personnel to an area upwind. Stop source of release if you can do so without risk. Ventilate enclosed areas to prevent formation of flammable or oxygen deficient atmospheres. Water spray may be used to reduce vapors. Avoid vapor cloud, even with proper respiratory protective equipment.

Releases are expected to cause only localized, non-persistent environmental damage. Waste mixtures containing these gases should not be allowed to enter drains or sewers where there is danger of their vapors being ignited.

7. HANDLING AND STORAGE

HANDLING

Wear appropriate protective equipment (See Section 8).

Use explosion proof equipment suitable for hazardous locations (as defined in the National Electrical Code, NFPA 70).

STORAGE

Store and use gas containers only in well ventilated area. Storage areas should not exceed 100 EF and be protected from dampness, salt and corrosive chemicals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use explosion proof equipment suitable for hazardous locations (as defined in the National Electrical Code, NFPA 70). Maintain ventilation to keep air concentration below exposure limits (see below). Provide adequate ventilation to prevent accumulation of explosive mixture and to avoid oxygen deficient atmospheres.

PERSONAL PROTECTION

- Respirator: Under exposure conditions where oxygen content may be reduced to below 19.5%, or airborne concentrations may exceed exposure limits, use a self-contained breathing apparatus operated in pressure demand mode. Odor can not be used to adequately warn of potentially hazardous air concentrations.
- Eye Protection: Safety glasses, chemical goggles or face shield as appropriate for working conditions.
- Gloves: Wear neoprene gloves.
- Clothing: Use insulated or neoprene protective clothing.
- Other: Eye wash.

EXPOSURE CONTROLS

COMPONENT	OSHA PEL		ACGIH TLV	
	TWA	STEL	TWA	STEL
Butane	N/E	N/E	800 ppm	N/E
Ethane	N/E	N/E	N/E	N/E
Propane	1,000 ppm	N/E	N/E	N/E
Pentane	1,000 ppm	N/E	600 ppm	750 ppm
Hexane - straight chain other isomers	500 ppm N/E	N/E N/E	50 ppm 500 ppm	N/E 1,000 ppm
Methane	N/E	N/E	N/E	N/E
Nitrogen	N/E	N/E	N/E	N/E

9. PHYSICAL AND CHEMICAL PROPERTIES

State Gas
 Color Colorless
 Odor Odorless
 Melting Point EF N/A
 Boiling Point EF -258
 Vapor Pressure N/A
 Vapor Density (Air = 1) 0.6 (estimate)

10. STABILITY AND REACTIVITY

REACTIVITY

Stable

INCOMPATIBILITIES

Incompatible with halogens or interhalogens. Reacts violently with oxidizers; e.g. bromine pentafluoride, chlorine, fluorine, liquid oxygen, chlorine dioxide, barium peroxide.

HAZARDOUS DECOMPOSITION PRODUCTS

Incomplete combustion can produce carbon monoxide.

CONDITIONS TO AVOID

Very dangerous fire and explosion hazard when exposed to heat or flame. Mixtures with chlorine have produced explosions.

11. TOXICOLOGICAL INFORMATION

For Butane

RTECS EJ4200000

Inhalation LC₅₀ (rat) 658 gm/m³/4 hr

Inhalation LC₅₀ (mouse) 680 gm/m³/2 hr

Hazardous Substances Data Bank

Respiratory exposure of mice to 27% (270,000 ppm) for 2 hrs. caused death in 40% of the animals and 31% caused 60% mortality. In dogs, lethality was observed at concentrations of 200,000-250,000 ppm; anesthesia and relaxation preceded death... There was only a small margin of safety between the anesthetic and lethal concentration. (Snyder, E, "Browning's Toxicology and Metabolism of Industrial Solvents," 2nd Ed. Vol 1, 1987, p. 270)

Butane appears to be mildly to moderately irritating to the rabbit skin. (*Ibid.*, p. 271)

The mutagenic potential of n-butane was evaluated *in vitro* at several concentrations using Ames *Salmonella* microsome assay. n-Butane was not mutagenic. (Kirwin, CJ, *et al.*, *J. Soc. Cosmet. Chem.*, 31, 367-70 (1980))

For Ethane

Hazardous Substances Data Bank

Ethane is considered to be physiologically and toxicologically inert. At high concentrations, ethane acts primarily as a simple asphyxiant by displacing oxygen from the blood and air. (Snyder, E, "Browning's Toxicology and Metabolism of Industrial Solvents," 2nd Ed. Vol 1, 1987, p. 260)

Guinea pigs exposed to 2.2 to 5.5% for two hours show slight signs of irregular respiration, readily reversible on cessation of the exposure. (Patty, "Industrial Hygiene and Toxicology," 3rd Ed., Vol 2A, 2B, 2C, p. 3181 (1981-82))

When mixed with oxygen at 15 to 19%, ethane is a weak cardiac sensitizer. (*Ibid.*)

For Hexane

RTECS MN9275000

Oral LD₅₀ (rat) 28,710 mg/kg
Inhalation TC_{Lo} (human) 190 ppm/8 weeks

Hazardous Substances Data Bank

Nervous system degeneration (distal dying-back axonopathy) is caused by hexane in man. (Schaumburg, HH and Spencer PS, *Ann. NY Acad. Sci.*, **329**, p. 14-29 (1979)).

Acute exposure to hexane causes central nervous system depression. Chronic exposure to an average air concentration of 450-650 ppm for as little as 2 months may result in peripheral neuropathy, characterized by muscular weakness, loss of sensation, and impaired gait. (Baselt, "Biolog. Monitor. Meth. Indust. Chemic., 2nd Ed., p 172 (1988))

Hexane may be the most highly toxic member of the alkanes... When ingested, it causes nausea, bronchial and general intestinal irritation, and CNS effects and presents an acute aspiration hazard. About 50 g may be fatal to humans.... An exposure of 880 ppm for 15 min can cause eye and upper respiratory tract irritation in humans.... Exposure to 5,000 ppm for 10 minutes causes marked vertigo. (Patty, "Industrial Hygiene and Toxicology," 3rd Ed., Vol 2A, 2B, 2C, p. 3186 (1981-82))

Hexane is three times as acutely toxic to mice as is pentane; concentrations of 30,000 ppm produced CNS depression within 30-60 minutes and convulsions and death resulted from 35,000 - 40,000 ppm. (ACGIH. Documentation of TLVs , 5th Ed., p. 305 (1986))

Hexane was found to be negative when tested for mutagenicity using the Salmonella/microsome preincubation assay. (Mortelmans, K, *et al.*, *Environ. Mutagen.*, **8**, p 1-119 (1986))

Oral LD₅₀ (juvenile rat) 24 ml/kg
Oral LD₅₀ (adult rat) 45 ml/kg
Inhalation LC₅₀ (rat) 48,000 ppm/< 4 hr.

For Propane

Hazardous Substances Data Bank

Acute exposures of humans to 250, 500, or 1,000 ppm for periods of 1 minute to 8 hours did not produce any untoward physiological effects as determined by serial EKG's and continuous monitoring of modified V5 by telemetry during exposure. (Steward, RD, *et al.*, *Environ. Health Perspect.*, **26**, 275-85 (1978))

The effects of propane were studied in guinea pigs exposed to 24,000-29,000 ppm and 47,000-55,000 ppm for periods of 5, 30, 60, and 120 minutes; at the lower concentration, irregular breathing was observed and at the higher concentration, tremors were evident during the first 5 minutes of exposure. Stupor was commonly observed in the animals exposed for longer periods of time (up to 2 hours). All animals recovered from the propane exposure and there were no pathological signs of organ toxicity at necropsy. In these studies, a CNS depressant ...effect for propane was not seen until exposure levels were about 50,000 ppm. (Snyder, E, "Browning's Toxicology and Metabolism of Industrial Solvents," 2nd Ed. Vol 1, 1987, p. 263)

12. ECOLOGICAL INFORMATION

For Hexane

Hazardous Substances Data Bank

No mortalities were observed in young Coho salmon (*Oncorhynchus kisutch*) when subjected to #100 ppm for 96 hours. ("Verschueren. Handbk. Environ. Data Org. Chem.," p. 733 (1983))

13. DISPOSAL CONSIDERATIONS

RCRA Waste Code: D001

These gases may be used as an auxiliary fuel or disposed of by burning in a properly designed flare or incinerator. Observe all applicable federal, state, and local regulations.

14. TRANSPORT INFORMATION

DOT Proper Shipping Name Natural Gas, compressed
DOT Hazard Class 2.1
DOT I.D. Number UN 1971
Packing Group N/A
Label(s) Flammable Gas
Emergency Response Guidebook - Guide No. 17

15. REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200)

 Hazardous Non-Hazardous

CAA LIST OF REGULATED FLAMMABLE SUBSTANCES (40 CFR 68.130)

Chemical Name	TQ (lbs)
Butane	10,000
Ethane	10,000
Methane	10,000
Propane	10,000
Pentane	10,000

CERCLA/SUPERFUND (40 CFR 117, 302)

Chemical Name	RQ (lbs)
Hexane	1 (Statutory)

SARA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355)

Chemical Name	TPQ (lbs)	RQ (lbs)
N/A		

SARA HAZARD CATEGORIES (40 CFR 370)

Acute Chronic Fire Pressure Reactive None

SARA TOXIC SUBSTANCES (40 CFR 372)

Chemical Name	CAS Number	%
N/A		

TOXIC SUBSTANCES CONTROL ACT

The chemicals in this product are listed on the TSCA Inventory. Heptane and pentane are subject to the Preliminary Assessment Information Rule (40 CFR 712.30 (x)) and Health and Safety Data Reporting (40 CFR 716.120(d)). Hexane is subject to a Specific Chemical Substance and Mixture Testing rule (40 CFR 799.2155).

STATE REGULATIONS

- Florida Hazardous Substance List Present (heptane, hexane, nitrogen, pentane)
- Massachusetts Right To Know List Present (butane, ethane, heptane, hexane, methane, nitrogen, propane, pentane)
- Minnesota Hazardous Substance List Present (butane, ethane, heptane, hexane, methane, propane, pentane)
- New Jersey Right To Know List Butane - Substance No. 0273; Special Hazard - Flammable
Ethane - Substance No. 0834; Special Hazard - Flammable
Heptane - Substance No. 1339; Special Hazard - Flammable
Hexane- Substance No. 1340; Special Hazard - Flammable
Methane - Substance No. 1202; Special Hazard - Flammable
Nitrogen - Substance No. 1375
Propane - Substance No. 1594; Special Hazard - Flammable
Pentane - Substance No. 1476; Special Hazard - Flammable
- Pennsylvania Right To Know List Present (butane, ethane, heptane, hexane, methane, nitrogen, propane, pentane)

16. OTHER INFORMATION

This material may contain small amounts of RADON, a naturally occurring radioactive gas, and its particulate decay products, some of which may be retained in process equipment. Because of the short half-life of these decay products, they will decay to background levels within 4 hours after cessation of flow. Maintenance of equipment which may concentrate particulate matter (e.g. filtration systems) should therefore be delayed until

at least 4 hours after gas flow has been stopped. If personnel cannot wait 4 hours to begin maintenance work, appropriate protective equipment, to prevent skin contamination or inhalation of airborne particulate matter, should be worn when working with the process equipment.

ABBREVIATIONS

- C - Ceiling limit
- N/A - Not applicable
- N/D - Not determined
- N/E - Not established
- N/K - Not known
- RQ - Reportable Quantity
- TPQ - Threshold Planning Quantity
- TQ - Threshold Quantity

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