



Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

1-Butene (C₄H₈)

Product Number(s): 0001037080, 0001021733, 0001024965, 0001021732, 0001037081, 0001028349

Synonyms: Ethylethylene; Alpha-butene; Butene-1 (C₄); Alpha-Butylene; 1-Butylene; AlphaPlus™ NAO 4

Product CAS No.: 106-98-9

Company Identification:

Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Product Information:

MSDS Requests: 1 - (800) 852-5530
Technical Information: 1 - (800) 852-5531
Responsible Party: Product Safety Group
Email:msds@cpchem.com

Chevron Phillips Chemicals International N.V.
Brusselsesteenweg 355
B-3090 Overijse
Belgium

24-Hour Emergency Telephone Numbers:

HEALTH:Chevron Phillips Emergency Information Center 866.442.9628 (North America) and 1.832.813.4984 (International)

TRANSPORTATION: North America: CHEMTREC 800.424.9300 or 703.527.3887
ASIA: +1.703.527.3887
EUROPE: BIG .32.14.584545 (phone) or .32.14.583516 (telefax)
SOUTH AMERICA SOS-Cotec Inside Brazil: 0800.111.767
Outside Brazil: 55.19.3467.1600

SECTION 2 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Colorless gas or liquid.

NFPA RATINGS: Health: 1 Flammability: 4 Reactivity: 0

EU Classification:

Signal Word:

Danger

Risk Phrases:

R12: Extremely flammable.

Additional Hazards:

CONTACT WITH LIQUEFIED GAS CAN CAUSE FROSTBITE
 NO ODORANT ADDED; DETECTION OF LEAK VIA SENSE OF SMELL MAY NOT BE POSSIBLE
 CONTENTS UNDER PRESSURE
 LIQUID CAN CAUSE EYE AND SKIN INJURY
 REDUCES OXYGEN AVAILABLE FOR BREATHING

Safety Phrases:

- S33: Take precautionary measures against static discharges.
- S9: Keep container in a well-ventilated place.
- S51: Use only in well-ventilated areas.
- S16: Keep away from sources of ignition - No smoking.

IMMEDIATE HEALTH EFFECTS:

Eye: Because the liquid product evaporates quickly, it can have a severe chilling effect on eyes and can cause local freezing of tissues (frostbite). Symptoms may include pain, tearing, reddening, swelling and impaired vision. Not expected to cause prolonged or significant eye irritation.

Skin: Because the liquid product evaporates quickly, it can have a severe chilling effect on skin and can cause local freezing of tissues (frostbite). Symptoms may include pain, itching, discoloration, swelling, and blistering. Not expected to be harmful to internal organs if absorbed through the skin.

Ingestion: Not expected to be harmful if swallowed. Material is a gas and cannot usually be swallowed.

Inhalation: This material can act as a simple asphyxiant by displacement of air. Symptoms of asphyxiation may include rapid breathing, incoordination, rapid fatigue, excessive salivation, disorientation, headache, nausea, and vomiting. Convulsions, loss of consciousness, coma, and/or death may occur if exposure to high concentrations continues.

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	AMOUNT	EINECS / ELINCS	SYM	R-PHRASES
1-Butene	106-98-9	> 99.5 % weight	203-449-2	F+	R12
n-Butane	106-97-8	< 1 % weight	203-448-7	F+	R12
1,3 Butadiene	106-99-0	60 - 85 ppm	203-450-8	F+, T	R45, R46, R12

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling / Peak	Notation
1,3 Butadiene	ACGIH	2 ppm	NA	NA	NA
1,3 Butadiene	German MAK	34 mg/m3	NA	4	NA
1,3 Butadiene	OSHA PEL	1 ppm	5 ppm	NA	NA
n-Butane	ACGIH	1000 ppm	NA	NA	C1 - C4 Hydrocarbons
n-Butane	German MAK	2400 mg/m3	NA	NA	Peak II

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with running water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get immediate medical attention.

Skin: To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse. Get medical attention if any symptoms develop. Skin contact with the liquid may result in frostbite and burns. Soak contact area in tepid water to alleviate the immediate effects and get medical attention.

Ingestion: If swallowed, do not induce vomiting. Give the person a glass of water or milk to drink and get immediate medical attention. Never give anything by mouth to an unconscious person.

Inhalation: For emergencies, wear a NIOSH approved air-supplying respirator. Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Flammable gas.

NFPA RATINGS: Health: 1 Flammability: 4 Reactivity: 0

FLAMMABLE PROPERTIES:

Flashpoint: -80°C (-112°F)

Autoignition: 723°F (383.9°C)

Flammability (Explosive) Limits (% by volume in air): Lower: 1.6 Upper: 9.3

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames. Allow gas to burn if flow cannot be shut off safely. Apply water from a safe distance to cool container, surrounding equipment and structures. Container areas exposed to direct flame contact should be cooled with large quantities of water (500 gallons water per minute flame impingement exposure) to prevent weakening of container structure.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: DO NOT EXTINGUISH. STOP FLOW OF FUEL AND ALLOW FIRE TO BURN OUT. If flames are accidentally extinguished, explosive reignition may occur. Eliminate ignition sources. Keep people away. Isolate fire area and deny unnecessary entry. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discoloration of the container. For unignited vapor cloud, use water spray to knock down and control dispersion of vapors. Use water spray to cool fire-exposed containers and fire-affected zone until fire is out and danger of reignition has passed. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of released gas. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator. For large releases, warn public of downwind explosion hazard.

Spill Management: Stop the source of the release if you can do it without risk. Observe precautions in Exposure Controls/Personal Protection section. All equipment used when handling the product must be grounded. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Do not direct water at spill or source of leak. Prevent spreading of vapors through sewers, ventilation systems and confined areas. Isolate area until gas has dispersed.

Reporting: U.S.A. regulations may require reporting spills of this material that could reach any surface waters. Report spills to local authorities and/or the National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL . REFER TO PRODUCT LABEL OR MANUFACTURERS TECHNICAL BULLETINS FOR THE PROPER USE AND HANDLING OF THIS MATERIAL .

Precautionary Measures: This material presents a fire hazard. Gas can catch fire and burn with explosive force. Invisible gas spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Petroleum gases are heavier than air and may travel along the ground or into drains to possible distant ignition sources that may cause an explosive flashback. Do not breathe vapor or fumes from when working with this material. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

Unusual Handling Hazards: Auto-refrigeration: Drains can become plugged and valves may become inoperable because of the formation of ice due to expanding vapors or vaporizing liquids. Drains and valves may be thawed by

applying an environmentally acceptable low freezing liquid to the outside surfaces. Liquid should be recovered for reuse or proper disposal.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations, which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids, National Fire Protection Association (NFPA 77), Recommended Practice on Static Electricity' (liquids, powders and dusts), and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents' (liquids).

General Storage Information: DO NOT USE OR STORE near heat, sparks or open flames. USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use. When working with this material, the minimal oxygen content should be 19.5% by volume under normal atmospheric pressure.

Container Warnings: Exposure to heat or prolonged exposure to sun may cause container to burst. Do not puncture, incinerate, or store above 120 F.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:

If user operations generate airborne material, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure.

PERSONAL PROTECTIVE EQUIPMENT:

Eye/Face Protection: Wear eye protection such as safety glasses, chemical goggles, or faceshields if engineering controls or work practices are not adequate to prevent eye contact.

Skin Protection: Wear protective clothing if engineering controls or work practices are not adequate to prevent skin contact. Selection of protective clothing may include gloves, apron, boots, and complete facial protection depending on operations conducted. Suggested materials for protective gloves include: Polyvinyl Alcohol (PVA)(Note: PVA deteriorates in water. Avoid contact with water.), or Nitrile, or Viton

Respiratory Protection: If user operations generate harmful levels of airborne material that is not adequately controlled by ventilation, wear a NIOSH approved respirator that provides adequate protection. Use the following elements for air-purifying respirators: Air-Purifying Respirator for Organic Vapors

Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling / Peak	Notation
1,3 Butadiene	ACGIH	2 ppm	NA	NA	NA
1,3 Butadiene	German MAK	34 mg/m3	NA	4	NA
1,3 Butadiene	OSHA PEL	1 ppm	5 ppm	NA	NA
n-Butane	ACGIH	1000 ppm	NA	NA	C1 - C4 Hydrocarbons
n-Butane	German MAK	2400 mg/m3	NA	NA	Peak II

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Colorless gas or liquid.
Autoignition: 723°F (383.9°C)
Boiling Point: -6.26°C (20.73°F)
Density: 5.01 @ 60 F
Evaporation Rate: NDA
Flammability (Explosive) Limits (% by volume in air): Lower: 1.6 Upper: 9.3
Flashpoint: -80°C (-112°F)
Freezing Point: -185°C (-301°F)
Molecular Formula: C4H8
Molecular Weight: NDA
Melting Point: -185°C (-301°F)
Octanol / Water Partition Coefficient: log-Kow: NDA
pH: NA
Pour Point: NDA
Solubility (in water): Soluble in hydrocarbon solvents; insoluble in water.
Specific Gravity: 0.601 @ 15.6 C (60.1°F)
Vapor Pressure: 1895 mmHg @ 20 C (68°F)
Vapor Density (AIR=1): 1.93
Viscosity: NDA
Percent Volatile: 100 % volume

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Conditions to Avoid: heat, sparks, fire, and oxidizing agents.

Incompatibility With Other Materials: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: Carbon Oxides.

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS:

Acute Oral Toxicity: LD50 / rat / unknown

Acute Dermal Toxicity: LD50 / rabbit / unknown

Acute Inhalation Toxicity: 1-Butene: LC50 / not known

Eye Irritation: Contact with liquefied gas can cause severe damage (frostbite) due to rapid evaporative cooling.

Skin Irritation: Contact with liquefied gas can cause severe damage (frostbite) due to rapid evaporative cooling.

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains N-BUTANE:

Repeated Dose Toxicity: 90 days / inhalation / rat / 1017 or 4489ppm 6 hrs/day, 5 days/wk / NOAEL = 4489ppm

Genetic Toxicity: Ames test - Negative

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY:

This material is not expected to be harmful to aquatic organisms.

ENVIRONMENTAL FATE:

This material is expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition). Consult the appropriate domestic or international mode- specific and quantity- specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the MSDS and the bill of lading.

Shipping Descriptions per regulatory authority.**US DOT**

UN1012, BUTYLENE, 2.1

ICAO / IATA

UN1012, BUTYLENE, 2.1

IMO / IMDG

UN1012, BUTYLENE, 2.1, (-80°C)

RID / ADR

UN1012, BUTYLENE, 2.1, ADR

SECTION 15 REGULATORY INFORMATION
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SARA 311/312 CATEGORIES:

- | | |
|---------------------------------------|-----|
| 1. Immediate (Acute) Health Effects: | YES |
| 2. Delayed (Chronic) Health Effects: | NO |
| 3. Fire Hazard: | YES |
| 4. Sudden Release of Pressure Hazard: | YES |
| 5. Reactivity Hazard: | NO |

REGULATORY LISTS SEARCHED:

01 = CA Prop 65	17 = FDA 178	33 = -
02 = LA RTK	18 = FDA 179	34 = -
03 = MA RTK	19 = FDA 180	35 = -
04 = MN Hazardous Substance	20 = FDA 181	36 = -
05 = NJ RTK	21 = FDA 182	37 = SARA Section 302
06 = PA RTK	22 = FDA 184	38 = SARA Section 313
07 = -	23 = FDA 186	39 = TSCA 12 (b)
08 = -	24 = FDA 189	40 = TSCA Section 4

09 = CWA Section 311
10 = DOT Marine Pollutant
11 = FDA 172
12 = FDA 173
13 = FDA 174
14 = FDA 175
15 = FDA 176
16 = FDA 177

25 = IARC Group 1
26 = IARC Group 2A
27 = IARC Group 2B
28 = IARC Group 3
29 = IARC Group 4
30 = NTP Carcinogen
31 = OSHA Carcinogen
32 = OSHA Highly Hazardous

41 = TSCA Section 5(a)
42 = TSCA Section 8(a) CAIR
43 = TSCA Section 8(a) PAIR
44 = TSCA Section 8(d)
45 = WHIMS - IDL
46 = Germany D TAL
47 = Germany WKG
48 = DEA List 1
49 = DEA List 2

No components of this material were found on the regulatory lists above.

1-Butene	3, 5, 6
n-Butane	3, 4, 5, 6, 45
1,3 Butadiene	3

WARNING: Contains component(s) which are known to the state of California, under Proposition 65, to cause cancer.

WARNING: Contains component(s) which are known to the state of California, under Proposition 65, to cause birth defects or other reproductive harm.

WHMIS CLASSIFICATION:

Class A: Compressed Gas

Class B, Division 1: Flammable Gases

CHEMICAL INVENTORY LISTINGS:

AUSTRALIA	YES (AUS)
CANADA	YES (DSL)
CHINA	YES (IECSC)
EUROPEAN UNION	YES (EINECS)
JAPAN	YES (ENCS)
KOREA	YES (ECL)
PHILIPPINES	YES (PICCS)
UNITED STATES	YES (TSCA)

EU LABELING:

Signal Word:

Danger

Symbols:

F+ - Extremely Flammable

Risk and Safety Phrases:

R12: Extremely flammable.

S33: Take precautionary measures against static discharges.

S9: Keep container in a well-ventilated place.

S51: Use only in well-ventilated areas.

S16: Keep away from sources of ignition - No smoking.

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 1 Flammability: 4 Reactivity: 0 Special: NA

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *-Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA).

REVISION STATEMENT: The following sections have been updated: 3,8,15

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	- Threshold Limit Value	TWA	- Time Weighted Average
STEL	- Short-term Exposure Limit	PEL	- Permissible Exposure Limit
ACGIH	- American Conference of Government Industrial Hygienists	OSHA	- Occupational Safety & Health Administration
NIOSH	- National Institute for Occupational Safety & Health	NFPA	- National Fire Protection Agency
WHMIS	- Workplace Hazardous Materials Information System	IARC	- Intl. Agency for Research on Cancer
EINECS	- European Inventory of existing Commercial Chemical Substances	RCRA	- Resource Conservation Recovery Act
SARA	- Superfund Amendments and Reauthorization Act.	TSCA	- Toxic Substance Control Act
EC50	- Effective Concentration	LC50	- Lethal Concentration
LD50	- Lethal Dose	CAS	- Chemical Abstract Service
NDA	- No Data Available	NA	- Not Applicable
<=	- Less Than or Equal To	>=	- Greater Than or Equal To
CNS	- Central Nervous System	MAK	- Germany Maximum Concentration Values

This data sheet is prepared according to the latest adaptation of the EEC Guideline 67/548.

This data sheet is prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200).

This data sheet is prepared according to the ANSI MSDS Standard (Z400.1).

This data sheet was prepared by EHS Product Stewardship Group, Chevron Phillips Chemical Company LP, 10001 Six Pines Drive, The Woodlands, TX 77380.

This data sheet is prepared according to the Globally Harmonized System (GHS).

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.