

# MATERIAL SAFETY DATA SHEET

Issue Date: February 16, 2006

Revision Date: October 9, 2008

Revision Number: 3

## Butadiene

**Contact Phone Number: (713) 840-7474**
**CHEMTREC (800) 424-9300**

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<b>Material Name:</b>	Butadiene	<b>Chemical Name:</b>	1,3-butadiene
<b>Manufacturer:</b>	Texas Petrochemicals 5151 San Felipe, # 800 Houston, TX 77056	<b>Synonyms:</b>	vinyl ethylene, divinyl

### 2. HAZARDS IDENTIFICATION

<b>Emergency Overview</b>	<b>DANGER</b> Extremely flammable. May form explosive mixtures with air. May cause flash fire or explosion. Vapors may cause flash fire or explosion. Will be easily ignited by heat, spark or flames. Harmful if inhaled. Harmful if absorbed through the skin. Irritating to eyes, respiratory system and skin. Cancer hazard. <b>MAY CAUSE CANCER.</b> Irritating to skin. May cause central nervous system depression. Can cause adverse reproductive effects. May cause heritable genetic damage. Prolonged exposure may cause chronic effects.
<b>OSHA Regulatory Status</b>	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
<b>Potential Health Effects</b>	
<b>Routes of Exposure</b>	Inhalation. Skin contact. Eye contact.
<b>Eyes</b>	Direct contact with cold gas may cause eye damage from frostbite. Contact may irritate or burn eyes. Eye contact may result in corneal injury. Do not get this material in contact with eyes.
<b>Skin</b>	Contact with evaporating liquid may cause frostbite or freezing of skin. Harmful in contact with skin. Irritating to skin. Avoid contact with the skin.
<b>Inhalation</b>	Harmful if inhaled. Irritating to respiratory system. May cause central nervous system depression. May cause headaches and dizziness. May cause cancer by inhalation. Prolonged inhalation may be harmful. Do not breathe dust/fume/gas/mist/vapors/spray.
<b>Ingestion</b>	This material is a gas under normal atmospheric conditions and ingestion is unlikely. Contact with liquefied gas might cause frostbites, in some cases with tissue damage. Ingestion may cause nausea, headache and dizziness.
<b>Target Organs</b>	Central nervous system. Eyes. Respiratory system.

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**Chronic Effects** Conjunctiva. Sterility. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. Pregnant women or women of child-bearing age should not be exposed to this product. Can cause adverse reproductive effects.

**Signs and Symptoms** Irritation of nose and throat. Irritation of eyes and mucous membranes. Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Conjunctivitis. Birth defects. Sterility.

**Potential Environmental Effects** Ecological injuries are not known or expected under normal use.

### 3. COMPOSITION INFORMATION/INGREDIENTS

Component	CAS #	Percent
1,3-Butadiene	106-99-0	> 99.5

### 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** Frostbite: Do not remove clothes, but flush with copious amounts of lukewarm water. Call an ambulance and continue to flush during transportation to hospital. For minor skin contact, avoid spreading material on unaffected skin. Immediately flush skin with plenty of water. Get medical attention if any discomfort continues.

**Inhalation** Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

**Ingestion** Have victim rinse mouth thoroughly with water. Do not induce vomiting without advice from poison control center. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If material is ingested, immediately contact a poison control center.

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**Notes to Physician** In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

**General Advice** In case of shortness of breath, give oxygen. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Keep victim under observation. Keep victim warm. If exposed or concerned: get medical attention/advice.

### 5. FIRE FIGHTING MEASURES

<b>Flash Point</b> -105 °F (-76.1 °C) Tag Closed Cup	<b>Auto-Ignition Temperature</b> 788 °F (420 °C)
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#### Flammability Limits in Air

**Lower (% by volume): 2% Upper (% by volume): 12%**

**Flammable Properties** Flammable by OSHA criteria. Containers may explode when heated. Vapor or gas may spread to distant ignition sources and flash back. Runoff to sewer may cause fire or explosion hazard.

**Extinguishing Media**

**Suitable Extinguishing Media** Water. Water spray. Dry powder. Carbon dioxide (CO<sub>2</sub>)

**Unsuitable Extinguishing Media** Do not use a solid water stream as it may scatter and spread fire.

**Protection of firefighters**

**Specific Hazards Arising from the Chemical**

Vapors are heavier than air and may travel along the floor and in the bottom of containers. Vapors may be ignited by a spark, a hot surface or an ember. Pressurized container may explode when exposed to heat or flame. Irritating and toxic gases or fumes may be released during a fire. May polymerize resulting in fire and explosion.

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### Protective Equipment and Precautions for Firefighters

In case of fire and/or explosion do not breathe fumes. 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 1/2 mile (800 meters) in all directions; also consider initial evacuation for 1/2 mile (800 meters) 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. Use water spray to cool unopened containers. Cool containers with flooding quantities of water until well after fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

### Specific Methods

In the event of fire and/or explosion do not breathe fumes. In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers.

### Hazardous Combustion Products

Carbon monoxide and carbon dioxide.

## 6. ACCIDENTAL RELEASE MEASURES

### Personal Precautions

Keep unnecessary personnel away. Stay upwind. Keep out of low areas. Keep people away from and upwind of spill/leak. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Ventilate closed spaces before entering. Ensure adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

### Methods for Containment

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use water spray to reduce vapors or divert vapor cloud drift. Prevent entry into waterways, sewers, basements or confined areas.

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### Methods for Cleaning Up

Wipe up with absorbent material (e.g. cloth, fleece).

**Large Spills:** Dike far ahead of liquid spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

**Small Spills:** Clean contaminated surface thoroughly. After removal flush contaminated area thoroughly with water. This material and its container may be considered a hazardous waste when disposed of.

### Other information

Clean up in accordance with all applicable regulations.

## 7. HANDLING AND STORAGE

### Handling

Avoid exposure - obtain special instructions before use. Do not empty into drains. Keep away from sources of ignition - No smoking. Do not smoke. Wear personal protective equipment. May be ignited by open flame. Vapors may form explosive mixtures with air. Use only in area provided with appropriate exhaust ventilation. Avoid contact with skin. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get this material in contact with eyes. Avoid prolonged exposure. Do not handle or store near an open flame, heat or other sources of ignition. All equipment used when handling the product must be grounded. Wash thoroughly after handling. Avoid contact with clothing.

### Storage

Avoid exposure - obtain special instructions before use. The pressure in sealed containers can increase under the influence of heat. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in cool place. Keep in a well-ventilated place. Keep container tightly closed. Keep in an area equipped with sprinklers. Keep this material away from food, drink and animal feed. Keep out of the reach of children. Use care in handling/storage.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components	Type	Value
<b>ACGIH</b>		
1,3-Butadiene (106-99-0)	TWA	2 ppm

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**US – OSHA**

1,3-Butadiene (106-99-0)

STEL 5 ppm

TWA 1ppm (2.2 mg/m3)

**Engineering Controls**

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

**Personal Protective Equipment**
**Eye / Face Protection**

Avoid exposure - obtain special instructions before use. Do not get this material in contact with eyes. Wear chemical goggles. Face-shield.

**Skin Protection**

Avoid contact with the skin. Wear chemical protective equipment that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Wear appropriate chemical resistant clothing. Protective gloves. Avoid exposure - obtain special instructions before use.

**Respiratory Protection**

Avoid exposure - obtain special instructions before use. Wear positive pressure self-contained breathing apparatus (SCBA). A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use.

**General Hygiene Considerations**

When using do not smoke. Do not get this material in contact with eyes. Avoid contact with skin. Avoid contact with clothing. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL/CHEMICAL PROPERTIES**

<b>Appearance</b>	Clear Liquid	<b>Color</b>	Colorless
<b>Odor</b>	Mild, Aromatic	<b>Odor Threshold</b>	Not Available
<b>Physical State</b>	Gas	<b>Form</b>	Compressed liquefied gas
<b>pH</b>	Not Applicable	<b>Melting Point</b>	-164 °F (-108.9 °C)
<b>Freezing Point</b>	Not available	<b>Boiling Point</b>	24.1 °F (-4.41 °C)
<b>Evaporation Rate</b>	Gas (10-25 °C)	<b>Vapor Pressure</b>	34.5 psia (60 °F)
<b>Vapor Density</b>	1.87 (Air=1)	<b>Specific Gravity</b>	0.62 (Water=1) (60 °F)
<b>Solubility (water)</b>	Slight	<b>Partition Coefficient (n-octanol/water)</b>	1.99 (Log P <sub>ow</sub> )

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<b>Auto-Ignition Temperature</b>	788 °F (420 °C)	<b>Decomposition Temperature</b>	Not Available
<b>Percent Volatile</b>	100 %	<b>Molecular Weight</b>	54.1

### 10. CHEMICAL STABILITY REACTIVITY

<b>Chemical Stability</b>	Risk of explosion. Risk of ignition. May form explosive peroxides. Will polymerize upon exposure to air.
<b>Conditions to avoid</b>	Heat, flames and sparks.
<b>Incompatible Materials</b>	Peroxides, Chlorine, Phenol, Copper
<b>Hazardous Decomposition Products</b>	Carbon monoxide. Carbon oxides.
<b>Possibility of Hazardous Reactions</b>	Will occur. Will polymerize upon exposure to air.

### 11. TOXICOLOGICAL INFORMATION

Toxicological Data	Test Results
Components	Test Results
1,3-Butadiene (106-99-0)	Acute Inhalation LC50 Mouse: 270 mg/l 2 Hours Acute Inhalation LC50 Rat: 285 mg/l 4 Hours Acute Oral LD50 Mouse: 3210 mg/kg Acute Oral LD50 Rat: 5480 mg/kg
<b>Sensitization</b>	
<b>Acute Effects</b>	Harmful if inhaled or absorbed through skin. Causes respiratory tract irritation. Vapors may cause drowsiness and dizziness. Contact with evaporating liquid may cause freeze injury.
<b>Local Effects</b>	Irritating to skin. Contact may irritate or burn eyes. Contact with compressed gas can cause damage (frostbite) due to rapid evaporative cooling.
<b>Chronic Effects</b>	Hazardous by OSHA criteria. Prolonged inhalation may be harmful. Repeated absorption may cause disorder of central nervous system, liver, kidneys and blood. Prolonged exposure may cause chronic effects.
<b>Carcinogenicity</b>	Hazardous by OSHA criteria. Cancer hazard. Risk of cancer cannot be excluded with prolonged exposure.
<b>IARC Monographs on Occupational Exposures to Chemical Agents: Overall evaluation</b>	
1,3-Butadiene (106-99-0)	1 Human carcinogen

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**US ACGIH Threshold Limit Values: A2 carcinogen**

1,3-Butadiene (106-99-0) Group A2 Suspected human carcinogen

**US NTP Report on Carcinogens: Known carcinogen**

1,3-Butadiene (106-99-0) Known carcinogen

**US OSHA Specifically Regulated Substances: Cancer hazard**

1,3-Butadiene (106-99-0) Cancer hazard

**Epidemiology** Not available.

**Mutagenicity** Not available.

**Neurological Effects** Hazardous by OSHA criteria.

**Reproductive Effects** Hazardous by OSHA criteria. Avoid exposure to women during early pregnancy. Possible reproductive hazard. Can cause adverse reproductive effects - such as birth defects, miscarriages, and infertility.

**Teratogenicity** Not available.

**Further Information** Reproductive toxicity. Symptoms may be delayed.

### 12. ECOLOGICAL INFORMATION

**Ecotoxicity** This material is not expected to be harmful to aquatic life.

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

**Persistence and Degradability** Volatile substances are degraded in the atmosphere within a few days.

**Bioaccumulation/ Accumulation** Potential to bioaccumulate is low.

**Partition Coefficient** 1.99 (Log P<sub>OW</sub>)

**Mobility in Environmental Media** The gas will disperse in the air. May evaporate quickly

### 13. DISPOSAL CONSIDERATIONS

**Waste Codes** D001: Waste Flammable material with a flash point <140 F

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### Disposal Instructions

Dispose of this material and its container at hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities. Do not incinerate sealed containers. Do not dispose of waste into sewer. Do not allow this material to drain into sewers/water supplies. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose in accordance with all applicable regulations.

### 14. TRANSPORTATION INFORMATION

	DOT	IATA	IMDG
<b>Basic Shipping Requirements</b>			
<b>UN Number</b>	UN1010	UN1010	UN1010
<b>Proper Shipping Name</b>	Butadienes, stabilized	Butadienes, stabilized	Butadienes, stabilized
<b>Hazard Class</b>	2.1	2.1	2.1
<b>Subsidiary Hazard Class</b>	6.1	6.1	6.1
<b>Additional Information</b>			
<b>Special Provisions</b>	T50		
<b>Packaging Exceptions</b>	306	306	306
<b>Packaging Non-Bulk</b>	304	304	
<b>Packaging Bulk</b>	314, 315	314, 315	
<b>ERG Number</b>	116		
<b>Labels Required</b>		2.1	2.1



### 15. REGULATORY INFORMATION

#### US Federal Regulations

##### OSHA

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29CFR1910.1200.

##### TSCA

All components are on the U.S. EPA TSCA Inventory List.

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<b>CERCLA (Superfund) RQ</b>	1,3-Butadiene 10 lbs
<b>Superfund Amendments and Reauthorization Act of 1986 (SARA)</b>	
<b>Section 313</b>	<b>De-Minimis Concentration</b>
	1,3-Butadiene (106-99-0) 0.1%
	<b>Listed Substance</b>
	1,3-Butadiene (106-99-0) Listed
<b>Hazard Categories</b>	Immediate Hazard – Yes
	Delayed Hazard – Yes
	Fire Hazard – Yes
	Pressure Hazard – No
	Reactivity Hazard – No
<b>Section 302 Extremely Hazardous Substance</b>	No
<b>Section 311 Hazardous Chemical</b>	Yes

### Chemical Inventory Status

Country	Inventory Name	On Inventory*
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 New and Existing Chemicals (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

\* A 'Yes' indicates that all components of this product comply with the inventory requirements administered by the governing country(s).

### State Regulations

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

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US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance	
1,3-Butadiene (106-99-0)	Listed
US - California Proposition 65 - CRT: Listed date/Carcinogenic substance	
1,3-Butadiene (106-99-0)	Listed: April 1, 1988 Carcinogenic
US - California Proposition 65 - CRT: Listed date/Developmental toxin	
1,3-Butadiene (106-99-0)	Listed: April 16, 2004 Developmental toxin
US - California Proposition 65 - CRT: Listed date/Female reproductive toxin	
1,3-Butadiene (106-99-0)	Listed: April 16, 2004 Female reproductive toxin
US - California Proposition 65 - CRT: Listed date/Male reproductive toxin	
1,3-Butadiene (106-99-0)	Listed: April 16, 2004 Male reproductive toxin
US - New Jersey Community RTK (EHS Survey): Reportable threshold	
1,3-Butadiene (106-99-0)	500 lbs
US - Pennsylvania RTK - Hazardous Substances	
1,3-Butadiene (106-99-0)	Listed
US - Pennsylvania RTK - Hazardous Substances	
1,3-Butadiene (106-99-0)	Special Hazard

### 16. OTHER INFORMATION

HMIS <sup>®</sup>	HMIS <sup>®</sup> is a registered trade and service mark of the NPCA. Health: 2* Flammability: 4 Physical hazard: 2
NFPA	Health: 2 Flammability: 4 Instability: 2

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.