

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: 1,3-Butadiene	Trade Name: 1,3-Butadiene
Product Use: Many.	
Chemical Name: Butadiene (1,3-Butadiene)	Synonym: Biethylene, bivinyl, butadiene, buta-1,3-diene, alpha-gamma-butadiene, divinyl, erythrene pyrrolylene, viny lethyle.
Chemical Formula: C ₄ H ₆	Chemical Family: Diene
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Composition and Information on Ingredients

INGREDIENTS	% (VOL)	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	TLV-TWA (ACGIH)
Butadiene (1,3-butadiene)	100	106-99-0	ORAL (LD50): Acute: 5480 mg/kg [Rat].	258 g/m3	2 ppm

3. Hazards Identification

Emergency Overview

DANGER! Flammable liquid and gas under pressure. Cancer suspect agent. Can form explosive mixture with air. May cause frostbite. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers.

ROUTES OF EXPOSURE: Eye contact. Inhalation. Ingestion. Swallowing.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION: May cause irritation to the respiratory tract, with nausea, vomiting, blurred vision, headache, fatigue, and unconsciousness. Lack of oxygen can kill.

SKIN CONTACT: May cause irritation with redness and possible swelling. Exposure to the liquid may cause frostbite.

SKIN ABSORPTION: No harm expected.

SWALLOWING:

An unlikely route of exposure. This product is a gas at normal temperature and pressure. Frostbite of the mouth and lips could occur.

EYE CONTACT:

May cause irritation with redness and excess tearing. Exposure to the liquid may cause freezing.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

CARCINOGENIC EFFECTS: Classified POSSIBLE. Classified A2 (Suspected for human.) by ACGIH, 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP, SUSPECTED by Group 2.

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.

May cause damage to the following organs: kidneys, liver, upper respiratory tract, skin, eyes.

OTHER EFFECTS OF OVEREXPOSURE:

None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs. Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease. Because of its irritating properties, this material may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

This material has been shown to cause cancer in experimental animals (NTP). This indicates that 1,3-butadiene is an animal carcinogen. This material has also been shown, in several independent studies to cause mutations in bacteria. CARCINOGENIC ASSESSMENT (NTP ANNUAL REPORT, IARC MONOGRAPHS, OTHER): ACGIH has classified 1,3-butadiene as an "industrial substance suspect of carcinogenic potential for man". NTP has classified 1,3-butadiene as showing clear evidence of carcinogenicity.

CARCINOGENICITY:

Classified POSSIBLE. Classified A2 (Suspected for human.) by ACGIH, 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP, SUSPECTED by Group 2.

4. First Aid Measures

INHALATION:

Remove to fresh air. Give artificial respiration if not breathing. Oxygen may be given when necessary. Call a physician.

SKIN CONTACT:

For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41 C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician. Discard clothing and shoes.

SWALLOWING:

This product is a gas at normal temperature and pressure.

EYE CONTACT:

For contact with the liquid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLAMMABLE :	Yes.	IF YES, UNDER WHAT CONDITIONS?	Forms explosive mixtures with air and oxidizing agents.
FLASH POINT (test method)	CLOSED CUP: -76°C (-104.8°F). (Tag)	AUTOIGNITION TEMPERATURE	420°C (788°F)

**FLAMMABLE LIMITS
IN AIR, % by volume:****LOWER:** 2**UPPER:** 12**EXTINGUISHING MEDIA:**CO₂, dry chemical, water spray or fog.**SPECIAL FIRE FIGHTING PROCEDURES:**

DANGER! Flammable, high-pressure gas. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool, then move them away from fire area if without risk. Continue cooling water spray while moving cylinders. Do not extinguish any flames emitted from cylinders; allow them to burn out. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with the fire code.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Flammable gas. Forms explosive mixtures with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Vapours form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with approved device. No part of a container should be subjected to temperature higher than 52 C. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

HAZARDOUS COMBUSTION PRODUCTS:These products are carbon oxides (CO, CO₂).**SENSITIVITY TO IMPACT:**

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable, high-pressure gas. Forms explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce gas with fog or fine water spray. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Flammable gas may spread from leak. Before entering area, especially confined areas, check atmosphere with an appropriate device.

WASTE DISPOSAL METHOD:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard and product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Electrical equipment must be non-sparking or explosion-proof. Leak check system with soapy water; never use a flame. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Flammable liquid and gas under pressure. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. **May form explosive mixtures with air.** Ground all equipment. Store and use with adequate ventilation at all times. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier, be sure valve is closed, then install valve outlet plug tightly. Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST: An explosion-proof local exhaust system is acceptable. See SPECIAL.

MECHANICAL (general): Inadequate.
See SPECIAL.

SPECIAL: Use only in a closed system.

OTHER: See SPECIAL.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use NIOSH/MSHA approved gas mask with chin style organic vapour canister for concentrations up to 100X the TLV. For higher concentrations, use full-face piece pressure demand air-line respirator or a pressure demand self contained breathing apparatus. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standard Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Wear work gloves when handling cylinders. Use polyvinyl chloride gloves for skin protection.

EYE PROTECTION: Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3 "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE: Gas.	FREEZING POINT: -108.92°C (-164.1°F)	pH: Not applicable.
BOILING POINT -4.411°C (24.1°F)	VAPOUR PRESSURE 248.8 kPa (@ 20°C)	MOLECULAR WEIGHT: 54.092 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1) 0.621 (Water = 1)	SOLUBILITY IN WATER, Not applicable.	
SPECIFIC GRAVITY: VAPOUR (air = 1) 1.9153	EVAPORATION RATE (Butyl Acetate=1): >1 compared to (Butyl Acetate=1)	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 0.0059 g/ml @ 21 C	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: Not available.

APPEARANCE & ODOUR: Colourless. Odour: Aromatic. (Slight.)

10. Stability and Reactivity

STABILITY:	Unstable.
CONDITIONS OF CHEMICAL INSTABILITY:	Elevated temperatures. Exposure to air may form spontaneously flammable or explosive peroxides. Contact with rusty iron.
INCOMPATIBILITY (materials to avoid):	Oxidizing agents, acids, halogens, sulfur dioxide, phenol, protopaldehyde.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide.
HAZARDOUS POLYMERIZATION:	Yes.
CONDITIONS OF REACTIVITY:	Due to the polymerization properties of this product, it should be returned to Praxair within sixty (60) days. Avoid elevated temperatures.

11. Toxicological Information

See section 3.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD:

Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME:

Butadienes, stabilized

HAZARD CLASS:
CLASS 2.1:
Flammable gas.
IDENTIFICATION #:

UN1010

PRODUCT REPORTABLE QUANTITY (PRQ):

Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.

SHIPPING LABEL(s):

Flammable gas

PLACARD (when required):

Flammable gas

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations.

DSL (Canada)

This material is on the DSL list.

WHMIS (Canada)
CLASS A: Compressed gas.
CLASS B-1: Flammable gas.
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASS F: Dangerously Reactive Material
International Regulations
EINECS

Not available.

DSCL (EEC)

R45- May cause cancer.

International Lists

No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:
HMIS RATINGS:

HEALTH 0 *

FLAMMABILITY 4

PHYSICAL HAZARD 2

*An Asterisk used in conjunction with HMIS health hazards ratings designates a carcinogenic or reproductive hazard.

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED:	CGA-510
PIN-INDEXED YOKE:	None.
ULTRA-HIGH-INTEGRITY CONNECTION:	None.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1	Safe Handling and Storage of Compressed Gas
P-1	Safe Handling of Compressed Gases in Containers
P-14	Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmosphere
SB-2	Oxygen-Deficient Atmospheres
V-1	Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7	Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
---	Handbook of Compressed Gases, Fifth Edition

PREPARATION INFORMATION:

DATE:	Oct 15, 2016
DEPARTMENT:	Safety and Environmental Services
TELEPHONE:	905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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