

PRODUCT NAME: 1,3-BUTADIENE

1. Product and Company Identification

BOC India Limited,
Oxygen House
P-43 Taratala Road
Kolkata 700 0888

BOC India Limited
Unit:

TELEPHONE NUMBER: (033) 24014708-20

Customer Service Center: 1800 345 6789

PRODUCT NAME: 1,3-BUTADIENE

CHEMICAL NAME: 1,3-Butadiene

COMMON NAMES/SYNONYMS: Biethylene, Butadiene, and Vinyl Ethylene

2. Composition, Information on Ingredients

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL	TLV	
1,3-Butadiene FORMULA: C ₄ H ₆ CAS: 106-99-0	100.0	1 ppm 0.5 ppm (action level) 5 ppm – STEL	2 ppm	

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

3. Hazards Identification

EMERGENCY OVERVIEW

Irritant to eyes and skin. Highly flammable. Dangerous fire and explosion hazard. Avoid heat, sparks, and flames. Contact with liquid may cause frostbite and tissue freezing. Inhalation of moderate concentrations may cause dizziness, drowsiness, blurring of vision, and nausea. Repeated exposure over time to 1,3-butadiene may increase risks of developing cancer and cause reproductive toxicity or birth defects. Contents under pressure. Use and store below 52 ° C.

PRODUCT NAME: 1,3-BUTADIENE**ROUTE OF ENTRY:**

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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HEALTH EFFECTS:

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen Yes	Reproductive Hazard Yes	Mutagen Yes
Synergistic Effects None Reported		

Carcinogenicity: - OSHA: Yes

EYE EFFECTS: Vapors may be irritating to the eyes. Contact with liquid may cause frostbite or tissue freezing.

SKIN EFFECTS: Butadiene is irritating to mucous membranes and the skin. Contact with liquid may cause tissue freezing or frostbite on dermal contact. Frostbite effects appear as a change in color of the skin to gray or white, possibly followed by blistering. May cause skin rash.

INGESTION EFFECTS: Since product is a gas at room temperature, ingestion is unlikely. Contact with liquid product may cause freezing of tissue and should be treated as frostbite. Consult a physician for treatment.

INHALATION EFFECTS: In moderate concentrations, butadiene may cause dizziness, drowsiness, blurring of vision and nausea. At very high concentrations, it has an anesthetic and narcotic effect causing respiratory paralysis, unconsciousness, and death. Butadiene also poses an explosion hazard at narcotic concentrations.

1,3-Butadiene is listed by the International Agency for Research on Cancer (IARC) as a Group 2A agent (probably carcinogenic to humans) - limited evidence exists in humans and sufficient evidence exists in experimental animals with regard to carcinogenicity. 1,3-butadiene is regulated as an occupational carcinogen by OSHA and classified as a known human carcinogen by NTP.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: May aggravate pre-existing eye and skin conditions.

4. First Aid Measures

EYES: Never introduce oil or ointment into the eyes without medical advice! For contact with liquid, DO NOT WASH THE EYES WITH HOT OR EVEN TEPID WATER! Open eyelids wide to allow liquid to evaporate. For contact with gas, flush eyes with lukewarm water for 15 minutes. If pain or irritation persists, refer the victim to an ophthalmologist for treatment and follow up.

SKIN: Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. If irritation persists, or contact with liquid occurs, seek medical attention.

INGESTION: Unlikely as product is a gas at room temperature.

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INHALATION: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF- CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

5. Fire Fighting Measures

Conditions of Flammability: Flammable gas		
Flash point: -76 °C	Method: Closed Cup	Autoignition Temperature: 420 °C
LEL(%): 2	UEL(%): 11.5	
Hazardous combustion products: Not Available		
Sensitivity to mechanical shock: Not Available		
Sensitivity to static discharge: Not Available		

FIRE AND EXPLOSION HAZARDS: Flammable gas. 1,3-Butadiene is heavier than air and may travel a considerable distance to an ignition source and flash back. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

EXTINGUISHING MEDIA: Water spray or fog, carbon dioxide, dry chemical.

FIRE FIGHTING INSTRUCTIONS: If possible, stop the flow of gas. Inerting the atmosphere to reduce oxygen levels may extinguish flame, allowing capping of leaking container. Do not attempt this unless specifically trained. Reduce the rate of flow and inject an inert gas, if possible, before completely stopping the flow to prevent flashback. Do not extinguish the fire until the supply is shut off as otherwise an explosive re- ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Use non-sparking tools to close container valves.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above liquid level with remote monitors. Limit the number of personnel in proximity of fire and evacuate surrounding areas in all directions. Use flooding quantities of water spray or fog.

Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Continue to cool fire-exposed cylinders until well after flames are extinguished.

6. Accidental Release Measures

Immediately extinguish all ignition sources and evacuate all personnel from affected area. No smoking, flares, sparks, or flames in hazard area. Use appropriate protective equipment (See Section 8). Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate enclosed areas. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Electrical classification: Class 1 Group B.

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Earth-ground and bond all lines and equipment associated with the gas system. All electrical equipment should be non-sparking or explosion proof. Butadiene is noncorrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52 °C.

Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. There should be no sources of ignition in the areas of storage or use. Post "NO SMOKING OR OPEN FLAME" signs in storage or use areas. Outside or detached storage is preferred.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection

ENGINEERING CONTROLS:

Use enclosures and local exhaust ventilation as necessary to limit exposure below the acceptable exposure limits. Exhaust gas should be vented to a gas treatment system. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

EYE/FACE PROTECTION:

Safety goggles or glasses.

SKIN PROTECTION:

Appropriate protective and chemical-resistant gloves, clothing and splash protection, or fully encapsulating vapor protective clothing to prevent exposure. For materials of construction, consult protective clothing manufacturer's specific data. (Viton[®], Saranex[®], and Barricade[®] are generally effective for exposures greater than 8 hours).

RESPIRATORY PROTECTION:

For emergency release and conditions with exposures above the applicable exposure limits use a positive pressure NIOSH approved air-supplying respirator system (SCBA or airline/escape bottle) using a full face- mask and a minimum Grade D air.

OTHER/GENERAL PROTECTION:

Safety shoes, safety shower, eyewash "fountain".

PRODUCT NAME: 1,3-BUTADIENE**9. Physical and Chemical Properties**

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 21°C	: 36	psia
Vapor density (Air = 1)	: 1.94	
Evaporation point	: Not Available	
Boiling point	: -4.4	°C
Freezing point	: -108.9	°C
PH	: Not Available	
Specific gravity	: 0.06211 @ 20 ° C/4 ° C	
Oil/water partition coefficient	: 1.99 (log Kow)	
Solubility (H ₂ O)	: 735 mg/l @ 20 ° C	
Odor threshold	: 1.1-1.6 ppm (recognition)	
Odor and appearance	: Aromatic odor; A colorless gas.	

10. Stability and Reactivity

STABILITY: Stable. Product contains inhibitors to help prevent hazardous polymerization and formation of explosive peroxides in air.

INCOMPATIBLE MATERIALS/CONDITIONS: Oxidizers. Avoid heat, sparks, and flame.

HAZARDOUS DECOMPOSITION PRODUCTS: No data

HAZARDOUS POLYMERIZATION: May occur. 1,3-Butadiene is shipped with an inhibitor to prevent polymerization.

11. Toxicological Information

INHALATION: High concentrations of 1,3-butadiene may act as an anesthetic causing narcosis, respiratory paralysis, unconsciousness, and death. No effects were reported in mice exposed for 6-12 minutes at 100,000 ppm. LC50 values are 270 g/m³/2 H (171,800 ppm/1 H) for mice and 285 g/m³/4 H (265,000 ppm/1 H) for rats.

SKIN AND EYE: Slight eye and upper respiratory irritation have been reported following exposure to 8,000 ppm for 8 hours. Children which played with butadiene clay or mineral mixtures have developed dermatitis or rashes several days after contact.

OTHER: Mice exposed to 1,3-butadiene have exhibited ovarian and testicular atrophy and abnormal sperm. Decreases in fetal weight and crown-to-rump length in Sprague Dawley rats have been reported following exposure to 8000 ppm butadiene on gestational days 6 to 15 6 H/day). Increases in major defects occurred at concentrations of 1000 and 8000 ppm (Sprague-Dawley rats, gestational days 6-15, 6 H/day).

The main health effects following long-term exposure to 1,3-butadiene are lymphoma, leukemia, and potential reproductive toxicity. Epidemiological evidence indicates an increased risk of leukemia in workers exposed to 1,3-butadiene.

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An increase in both common and uncommon tumor types were seen in both sexes of Sprague-Dawley rats exposed for 2 years at concentrations of 1000 and 8000 ppm (6 H/day, 5 days/week). Most of the increased tumor incidence related to endocrine systems. In NTP inhalation studies in B6C3F1 mice, 1,3-butadiene was clearly carcinogenic in both sexes of mice causing tumors in a variety of organs. It has been suggested that mice may be more susceptible to the carcinogenic effects of 1,3-butadiene.

1,3-Butadiene is listed by the International Agency for Research on Cancer (IARC) as a Group 2A agent (probably carcinogenic to humans) - limited evidence exists in humans and sufficient evidence exists in experimental animals with regard to carcinogenicity. The ACGIH "Threshold Limit Values and Biological Exposure Indices for 1998-1989" lists 1,3-butadiene in Appendix A2 as a "Suspected Human Carcinogen". OSHA has regulated 1,3-butadiene as a potential occupational carcinogen. NTP classifies 1,3-butadiene as a "known" human carcinogen.

12. Ecological Information

Does not contain Class I or Class II ozone depleting substances. See Section 3 for ecotoxicity information. A calculated BCF of 7 (estimate) indicates a low potential for bioconcentration in aquatic organisms. 1,3- Butadiene is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds. The CERCLA reportable quantity (RQ) is 10 pounds.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	India	
PROPER SHIPPING NAME:	Butadienes, stabilized	
HAZARD CLASS:	2.1	
IDENTIFICATION NUMBER:	UN 1010	
SHIPPING LABEL:	FLAMMABLE GAS	

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

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