

PRODUCT NAME: CIS-2-BUTENE

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: CIS-2-BUTENE
CHEMICAL NAME: Cis-2-Butene
COMMON NAMES/SYNONYMS: (Z)-2-Butene

2. Composition, Information on Ingredients

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL	TLV	
cis-2-Butene FORMULA: C ₄ H ₈ CAS: 590-18-1	100	None Established	Simple Asphyxiant	

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

3. Hazards Identification

EMERGENCY OVERVIEW

Colorless gas with slight odor. Extremely flammable. Dangerous fire and explosion hazard. Avoid heat, sparks, and flames. This product does not contain oxygen and may cause asphyxia if released in a confined area. Simple hydrocarbons may cause irritation and central nervous system depression at high concentrations. Contents under pressure. Use and store below 52 ° C.

PRODUCT NAME: CIS-2-BUTENE**ROUTE OF ENTRY:**

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

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

Carcinogenicity: -- OSHA: No

EYE EFFECTS: None required.

SKIN EFFECTS: Adverse effects not anticipated.

INGESTION EFFECTS: Ingestion is unlikely.

INHALATION EFFECTS: Product is relatively nontoxic. Simple hydrocarbons may irritate the eyes, mucous membranes and respiratory system at high concentrations.

Inhalation of high concentrations may cause dizziness, disorientation, incoordination, narcosis, nausea or narcotic effects. This product may displace oxygen if released in a confined space. Maintain oxygen levels above 19.5% at sea level to prevent asphyxiation.

Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

POTENTIAL ENVIRONMENTAL EFFECTS: Not expected to be toxic to fish and wildlife.

4. First Aid Measures

EYES: None required.

SKIN: None required.

INGESTION: Not normally required. Seek immediate medical attention.

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 assisted (artificial) respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

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5. Fire Fighting Measures

Conditions of Flammability: Flammable liquid and vapor		
Flash point: -73.3°C	Method: Closed Cup	Autoignition Temperature: 325°C
LEL(%): 1.7	UEL(%): 9.0	
Hazardous combustion products: Carbon monoxide, Carbon dioxide		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

FIRE AND EXPLOSION HAZARDS: Flammable gas. Rapid flame propagation and flashback possible. Cis-2-Butene is heavier than air and may travel a considerable distance to an ignition source. Keep away from open flame and other sources of ignition. Do not allow smoking in storage areas or when handling. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

EXTINGUISHING MEDIA: Water, 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.

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. No smoking, flares, flames or sparks in hazard area. Evacuate all personnel from affected area. Use appropriate protective equipment (See Section 8). Increase ventilation to prevent build up of a flammable/explosive atmosphere. 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

Earth bond and ground all lines and equipment associated with the product system. All equipment should be non-sparking and explosion proof.

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

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movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. 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. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

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 125°F (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. Post "NO SMOKING" signs in use and storage areas. There should be no sources of ignition in areas where this product is being used or stored. 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 local exhaust and general ventilation systems to prevent build up of flammable concentrations. Small quantities can be handled in forced ventilation hoods. 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: Protective gloves as appropriate for the job.

RESPIRATORY PROTECTION: For emergency release use a positive pressure NIOSH approved air-supplying respirator systems (SCBA or airline/escape bottle) using at a minimum Grade D air.

OTHER/GENERAL PROTECTION: Safety shoes.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 21°C	: 38.7	psia
Vapor density at STP (Air = 1)	: 2.0	
Evaporation point	: Not Available	
Boiling point	: 3.7	°C
Freezing point	: Not Available	
Ph	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H ₂ O)	: Insoluble	
Odor threshold	: Not Available	
Odor and appearance	: A colorless gas with a slight olefinic odor.	

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10. Stability and Reactivity

STABILITY: Stable

INCOMPATIBLE MATERIALS/CONDITIONS: Incompatible with oxidizers. Avoid heat, sparks, and flame.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide

HAZARDOUS POLYMERIZATION: Will not occur.

11. Toxicological Information

SKIN AND EYE: Adverse effects are not expected.

INHALATION: Product is a simple asphyxiant. Maintain atmospheric oxygen at or above 19.5%.

OTHER: Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

12. Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not toxic. Will not bioconcentrate.

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:	Petroleum Gases, liquefied	
HAZARD CLASS:	2.1	
IDENTIFICATION NUMBER:	UN 1075	
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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