### MATERIAL SAFETY DATA SHEET (MSDS) BUTADIENE

**PRODUCT IDENTIFICATION**
- **D.O.T. SHIPPING NAME**: Butadiene, Stabilized
- **SYNONYM (S)**: 1-3 Butadiene, Vinylethylene, Biethylene, Erythrene, Bivynl, Divynl B
- **D.O.T. I.D. NUMBER**: UN-1010
- **D.O.T. HAZARD CLASS**: 2.1 Flammable Gas
- **D.O.T. LABEL (S)**: Flammable Gas
- **C.A.S. NUMBER**: 106-99-0
- **CHEMICAL FORMULA**: C₄H₆ or H₂C:CHCH₂CH₂ or CH₂:CHCH:CH₂

**PHYSICAL DATA**
- **MOLECULAR WEIGHT**: 54.092
- **FREEZING POINT**: -108.9°C, -164.0°F
- **BOILING POINT**: -3.9°C, 25°F
- **VAPOR PRESSURE**: 25 PSIA @ 50°F, 8.4 PSIA @ 0°F
- **SPECIFIC VOLUME**: 6.9ft³/lb @ 1atm, 70°F
- **SPECIFIC GRAVITY**:
  - 0.63 @ 60°F
  - 1.88 @ 1 atm, 15.5°C
  - Of Vapor (Air=1)
- **EVAPORATION RATE**: Not Available
- **n-Bu Acetate=1**
- **VISCOITY OF LIQUID**: 0.4 cst @ 0°F
- **RELATIVE DENSITY, (air=1)**: 1.9153 @ 1 atm, 60°F
- **SOLUBILITY IN WATER**: 0.07% @ 100°F
- **DESCRIPTION**: At room temperature and atmospheric pressure 1,3-butadiene is a colorless, flammable gas, with a mildly aromatic odor. It is shipped as a liquefied gas under its own vapor pressure.

**FIRE AND EXPLOSION HAZARD DATA**
- **FLAMMABLE LIMITS IN AIR**: 2.0 – 12.0% by volume
- **AUTO-IGNITION TEMPERATURE**: 435°C, 815.0°F
- **FLASHPOINT**: <0°F METHOD: ASTM D56

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FIRE FIGHTING PROCEDURES

The only safe way to extinguish an 1,3-butadiene fire is to stop the flow of gas. If the flow cannot be stopped, let the fire burn out while cooling the cylinder and the surroundings using a water spray. Personnel may have to wear approach type protective suits and positive pressure self-contained breathing apparatus. Firefighters' turnout gear may be inadequate. Small secondary fires may be brought under control by using carbon dioxide or a dry chemical fire extinguisher and stopping the flow. Cover liquid spills with foam. If a leak or spill has not ignited, use water spray to disperse the vapors. Do not extinguish flames at leak because possibility of uncontrolled explosive reignition exists.

UNUSUAL HAZARDS

Unstable, material will vigorously polymerize, decompose, condense or will become self-reactive under conditions of shocks of pressure or temperature. Static discharge, material can accumulate static charges which can cause an incendiary electrical discharge. Auto-refrigeration, drains can become plugged and valves may be come in operable because of the formation of ice due to expanding vapors or vaporizing liquids.

1. Cylinders exposed to fire may rupture with violent force. Extinguish surrounding fire and keep cylinders cool by applying water from a maximum possible distance with a water spray.
2. Flammable gases may spread from a spill after the fire is extinguished and be subject to re-ignition.
3. Butadiene may form explosive peroxides on exposure to air in storage.
4. See Section 6, Reactivity Data.

HEALTH HAZARD DATA

- PERMISSIBLE EXPOSURE LIMITS

  OSHA TWA 1 ppm (2.2 mg/m³)
  ASGIH TWA 2 ppm (4.4 mg/m³)*
  ACGIH STEL 5 ppm (11 mg/m³)*

  ACGIH considers 1,3 – butadiene to be a suspected carcinogen and has recommended a TWA of 2 ppm (4.4 mg/m³).

  NIOSH recommends 1,3- butadiene be regarded as potential occupational carcinogen and as a possible reproductive hazard. They have not recommended any permissible exposure limits.

- ACCUTE EFFECTS OF OVEREXPOSURE

  Exposure to rapidly expanding gas or vaporizing liquids may cause irritation of the eyes, nose and throat, drowsiness, and lightheadedness. It has anesthetic action and exposure to very high concentrations may cause unconsciousness and death. If spilled on the skin, it might cause frostbite and irritation.

- CHRONIC EFFECTS OF OVEREXPOSURE

  Possible carcinogen, leukemia, lymph sarcoma, and reproductive hazard.
FIRST AID INFORMATION

▪ INHALATION  
  Move victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

▪ CONTACT  
  Prompt medical attention.

REACTIVITY DATE

▪ STABILITY  
  ( ) Stable.  (X) Unstable.

▪ POLYMERIZATION  
  Must be stabilized to prevent polymerization; avoid exposure to air to prevent unstable polymer or explosive peroxide formation.

▪ INCOMERIZATION  
  Air, oxidizing agents, acetylide forming metals, ether, caustics, amines, alkanolamines, halogenated compounds, alcohols, glycols, glycol, moisture, ether, phenols, alkylene oxides, ammonia, halogens, acid anhydrides.

▪ HAZARDOUS DECOMPOSITION/OXIDATION PRODUCTS  
  Explosive Peroxides. Material is unstable.

SPILL OR LEAKAGE PROCEDURE

Shut off all ignition sources and ventilate the area. For controlling large flow, personnel may have to wear approach-type protective suits and positive pressure self-contained breathing apparatus. If in public area, keep public away and advise authorities. Warn occupants and shipping in surrounding and downwind areas of fire and explosion hazard and request all to stay clear. For a water spill, allow to evaporate from surface. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

PRECAUTIONS

▪ STORAGE RECOMMENDATIONS  
  Cylinders should be stored and used in dry, cool, well-ventilated areas away from sources of heat or ignition. Do not store with oxidizers. Protect material from direct sunlight. Use proper bonding and/or grounding procedures. Do not pressurize, cut, heat, or weld containers.

  ▪ STORAGE TEMPERATURE  
    Ambient.

  ▪ LOADING/UNLOADING TEMPERATURE  
    Ambient

  ▪ LOADING/UNLOADING VISCOSITY  
    0.4 cst

  ▪ STORAGE/TRANSPORT PRESSURE  
    1 atmosphere or above

  ▪ PERSONAL PROTECTIVE EQUIPMENT  
    1. Eye protection – For open systems, gas proof goggles should be worn. For vaporizing liquid and expanding vapor wear safety glasses with side shields.
    2. Respiratory protection – Approved respiratory equipment must be worn when airborne concentrations exceed safe levels.
    3. Skin protection – long sleeves and insulating gloves.

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▪ BEFORE USING THE GAS

1. Secure the cylinder to prevent it from failing or being Knocked over.
2. Install check valves or traps to prevent suckback to the cylinder.
3. Ground all lines and equipment.
4. Leak check the lines and equipment.
5. Have an emergency plan covering steps to be taken in the event of an accidental release.

▪ SARA TITLE III

Under the provisions of Sections 311/312, this product is classified into the following hazard categories:
1. Delayed Health.
2. Fire.
4. Reactive.
This information may be subject to the provisions of the Community Right-to-know Reporting Requirements (40 CFR 370) if threshold quantity criteria are met. This product contains the following Section 313 Reportable Ingredients.
Component 1,3 – Butadiene
CAS Number 106-9-0
Maximum % 99.5

▪ DISCLAIMER

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