## SECTION 1: Identification of the substance/mixture and of the company/undertaking

**Product information**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Crude Butadiene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>1120922, 1037102, 1015401</td>
</tr>
</tbody>
</table>

**Use**

- Chemical intermediate

**Company**

- Chevron Phillips Chemical Company LP
  - 10001 Six Pines Drive
  - The Woodlands, TX 77380

**Emergency telephone:**

**Health:**
- 866.442.9628 (North America)
- 1.832.813.4984 (International)

**Transport:**
- CHEMTREC 800.424.9300 or 703.527.3887(int'l)
- Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
- EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
- Mexico CHEMTREC 01-800-681-9531 (24 hours)
- South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
- Argentina: +(54)-1159839431

**Responsible Department:**
- Product Safety and Toxicology Group

**E-mail address:**
- SDS@CPChem.com

**Website:**
- www.CPChem.com

## SECTION 2: Hazards identification

**Classification of the substance or mixture**

This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

**Classification**

- Flammable gases, Category 1
- Gases under pressure, Liquefied gas
- Acute toxicity, Category 4, Oral
- Skin irritation, Category 2
- Eye irritation, Category 2A
- Germ cell mutagenicity, Category 1B
- Carcinogenicity, Category 1A
- Specific target organ systemic toxicity - single exposure, Category 3, Central nervous system

**SDS Number:** 100000014664
Crude Butadiene

Version 2.0
Revision Date 2018-02-09

SAFETY DATA SHEET

Labeling

Symbol(s): 

Signal Word: Danger

Hazard Statements: 
H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.
H302: Harmful if swallowed.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H336: May cause drowsiness or dizziness.
H340: May cause genetic defects.
H350: May cause cancer.

Precautionary Statements:

Prevention: 
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response: 
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.

Storage: 
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Disposal:
Crude Butadiene

P501 Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity:

**IARC**
- Group 1: Carcinogenic to humans
  - 1,3-Butadiene 106-99-0
  - Benzene 71-43-2
- Group 2B: Possibly carcinogenic to humans
  - Isoprene 78-79-5

**NTP**
- Known to be human carcinogen
  - 1,3-Butadiene 106-99-0
  - Benzene 71-43-2
- Reasonably anticipated to be a human carcinogen
  - Isoprene 78-79-5

**SECTION 3: Composition/information on ingredients**

**Synonyms**
- 1,3-Butadiene
- Butadiene, 1,3-
- Butadiene Feedstock
- Crude C4

**Molecular formula**
- UVCB

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gases (petroleum), light steam-cracked, butadiene conc.</td>
<td>68955-28-2</td>
<td>100</td>
</tr>
<tr>
<td>1,3-Butadiene</td>
<td>106-99-0</td>
<td>10 - 80</td>
</tr>
<tr>
<td>n-Butane</td>
<td>106-97-8</td>
<td>0 - 60</td>
</tr>
<tr>
<td>Isobutane</td>
<td>75-28-5</td>
<td>0 - 30</td>
</tr>
<tr>
<td>Isobutylene</td>
<td>115-11-7</td>
<td>0 - 15</td>
</tr>
<tr>
<td>1-Butene</td>
<td>106-98-9</td>
<td>0 - 15</td>
</tr>
<tr>
<td>cis-2-Butene</td>
<td>590-18-1</td>
<td>0 - 10</td>
</tr>
<tr>
<td>trans-2-Butene</td>
<td>624-64-6</td>
<td>0 - 10</td>
</tr>
<tr>
<td>Isopentane</td>
<td>78-78-4</td>
<td>0 - 5</td>
</tr>
<tr>
<td>n-Pentane</td>
<td>109-66-0</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Cyclopentadiene</td>
<td>542-92-7</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Isoprene</td>
<td>78-79-5</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Cyclopentane</td>
<td>287-92-3</td>
<td>0 - 5</td>
</tr>
<tr>
<td>2-methyl-2-butene</td>
<td>513-35-9</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

**SECTION 4: First aid measures**

**General advice**: Move out of dangerous area. Show this material safety data sheet to the doctor in attendance.

**If inhaled**: Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.
**Crude Butadiene**

In case of skin contact: If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact: Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed: Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital. Induce vomiting immediately and call a physician. Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

**SECTION 5: Firefighting measures**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>-76 °C (-105 °F)</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Suitable extinguishing media</td>
<td>Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.</td>
</tr>
<tr>
<td>Unsuitable extinguishing media</td>
<td>High volume water jet.</td>
</tr>
<tr>
<td>Specific hazards during fire fighting</td>
<td>Do not allow run-off from fire fighting to enter drains or water courses.</td>
</tr>
<tr>
<td>Special protective equipment for fire-fighters</td>
<td>Wear self-contained breathing apparatus for firefighting if necessary.</td>
</tr>
<tr>
<td>Further information</td>
<td>Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.</td>
</tr>
<tr>
<td>Fire and explosion protection</td>
<td>Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Carbon oxides.</td>
</tr>
</tbody>
</table>

**SECTION 6: Accidental release measures**

| Personal precautions               | Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to |

SDS Number: 100000014664
form explosive concentrations. Vapors can accumulate in low areas.

Environmental precautions: Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

SECTION 7: Handling and storage

Handling

Advice on safe handling: Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion: Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers: Prevent unauthorized access. No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Basis</th>
<th>Value</th>
<th>Control parameters</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3-Butadiene</td>
<td>ACGIH</td>
<td>TWA 2 ppm</td>
<td></td>
<td>cancer, A2</td>
</tr>
<tr>
<td></td>
<td>OSHA Z-1</td>
<td>TWA 1 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OSHA Z-1</td>
<td>STEL 5 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OSHA CARC</td>
<td>PEL 1 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OSHA 29 CFR 1910.1051(c)</td>
<td>TWA 1 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isobutane</td>
<td>ACGIH</td>
<td>STEL 1,000 ppm</td>
<td></td>
<td>CNS impair, EX</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>STEL 1,000 ppm</td>
<td></td>
<td>CNS impair, EX</td>
</tr>
<tr>
<td>n-Butane</td>
<td>OSHA Z-1-A</td>
<td>TWA 800 ppm, 1,900 mg/m3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isobutylene</td>
<td>ACGIH</td>
<td>STEL 1,000 ppm</td>
<td></td>
<td>CNS impair, EX</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>STEL 1,000 ppm</td>
<td></td>
<td>CNS impair, EX</td>
</tr>
<tr>
<td>1-Butene</td>
<td>ACGIH</td>
<td>TWA 250 ppm</td>
<td>Uni wr, body weight eff, A4</td>
<td></td>
</tr>
<tr>
<td>cis-2-Butene</td>
<td>ACGIH</td>
<td>TWA 250 ppm</td>
<td>body weight eff</td>
<td></td>
</tr>
<tr>
<td>trans-2-Butene</td>
<td>ACGIH</td>
<td>TWA 250 ppm</td>
<td>body weight eff</td>
<td></td>
</tr>
<tr>
<td>Isopentane</td>
<td>ACGIH</td>
<td>TWA 1,000 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Pentane</td>
<td>OSHA Z-1</td>
<td>TWA 1,000 ppm, 2,950 mg/m3</td>
<td></td>
<td>(b)</td>
</tr>
</tbody>
</table>

SDS Number: 100000014664 5/18
Crude Butadiene

Version 2.0

Revision Date 2018-02-09

OSHA Z-1-A TWA 600 ppm, 1,800 mg/m³
OSHA Z-1-A STEL 750 ppm, 2,250 mg/m³
ACGIH TWA 1,000 ppm.

Cyclopentadiene

ACGIH TWA 75 ppm, URT irr, eye irr,
OSHA Z-1 TWA 75 ppm, 200 mg/m³
ACGIH TWA 75 ppm, 200 mg/m³

Isoprene

US WEEL TWA 2 ppm.

Cyclopentane

ACGIH TWA 600 ppm, CNS impair, URT irr, eye irr, skin irr,
OSHA Z-1 TWA 600 ppm, 1,720 mg/m³

Benzene

ACGIH TWA 75 ppm, leukemia, BEI A1, Skin, eye irr,
OSHA Z-1 TWA 75 ppm, 200 mg/m³ (a),
OSHA Z-1 CEIL 5 ppm, (a).

OSHA Z-1 Peak 50 ppm, (a).

OSHA 29 CFR 1910.1028(c) TWA 1 ppm,
OSHA 29 CFR 1910.1028(c) STEL 5 ppm,
OSHA CARC PEL 1 ppm

Adopted values or notations enclosed are those for which changes are proposed in the NCV.
(a) This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the benzene standard at 1910.1028.
(b) The value in mg/m³ is approximate.

ACGIH TWA 75 ppm,
BENCAI A1 Confirmed human carcinogen
A2 Suspected human carcinogen
A4 Not classifiable as a human carcinogen
BEI Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
body weight effects Cancer
CNS impair Central Nervous System impairment
EX Explosion hazard: the substance is a flammable asphyxiant or excursions above the TLV ® could approach 10% of the lower explosive limit.
eye irr Eye irritation
leukemia Leukemia
Skin Danger of cutaneous absorption
skin irr Skin irritation
URT irr Upper Respiratory Tract irritation

Hazardous components without workplace control parameters

Immediately Dangerous to Life or Health Concentrations (IDLH)

<table>
<thead>
<tr>
<th>Substance name</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3-Butadiene</td>
<td>106-99-0</td>
<td>Immediately Dangerous to Life or Health Concentration Value 2000 parts per million</td>
<td>1995-03-01</td>
</tr>
<tr>
<td>n-Pentane</td>
<td>109-66-0</td>
<td>Immediately Dangerous to Life or Health Concentration Value 1500 parts per million</td>
<td>1995-03-01</td>
</tr>
<tr>
<td>Cyclopentadiene</td>
<td>542-92-7</td>
<td>Immediately Dangerous to Life or Health Concentration Value 750 parts per million</td>
<td>1995-03-01</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>Immediately Dangerous to Life or Health Concentration Value 500 parts per million</td>
<td>1995-03-01</td>
</tr>
</tbody>
</table>

Biological exposure indices

US

<table>
<thead>
<tr>
<th>Substance name</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Sampling time</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3-Butadiene</td>
<td>106-99-0</td>
<td>1,2 Dihydroxy-4-(N-acetylcysteinyl)-butane: 2.5 mg/l (Urine)</td>
<td>End of shift (As soon as possible after exposure ceases)</td>
<td>2010-03-01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixture of N-1 and N-2(hydroxybutenyl)valine: 2.5 picomoles per gram Hemoglobin (Hemoglobin (Hb) adducts in blood)</td>
<td>Not critical</td>
<td>2010-03-01</td>
</tr>
</tbody>
</table>

SDS Number:100000014664 6/18
Engineering measures

Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection

Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection

The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection

Eye wash bottle with pure water. Safety glasses.

Skin and body protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.

Hygiene measures

When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form: Liquefied gas
Physical state: Gaseous
Color: Colorless
Odor: Odorless
# SAFETY DATA SHEET

## Crude Butadiene

| Version 2.0 | Revision Date 2018-02-09 |

### Safety data

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>-76 °C (-105 °F)</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>2 %(V)</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>12 %(V)</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>UVCB</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Pour point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>-11 - 28 °C (12 - 82 °F)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>64.00 PSI at 37.8 °C (100.0 °F)</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.63 at 16 °C (61 °F)</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Negligible</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>1.9 (Air = 1.0)</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Percent volatile</td>
<td>&gt; 99 %</td>
</tr>
</tbody>
</table>

### SECTION 10: Stability and reactivity

**Reactivity**: No decomposition if stored and applied as directed.

**Chemical stability**: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. No decomposition if stored and applied as directed.

**Possibility of hazardous reactions**

**Conditions to avoid**: Heat, flames and sparks.

SDS Number: 100000014664     8/18
### SECTION 11: Toxicological information

**Crude Butadiene**

**Acute oral toxicity**
- LD50 Oral: unknown
- Negligible or unlikely exposure pathways

**Acute inhalation toxicity**
- LC50: > 50000 ppm
- Species: Rat
- Test atmosphere: gas
- Information given is based on data obtained from similar substances.
- Exposure to very high levels may trigger heartbeat irregularities (cardiac arrhythmia), and possible cardiac sensitization.

**Acute dermal toxicity**
- LD50 Dermal: > 5,000 mg/kg
- Species: Rabbit
- Method: Acute toxicity estimate
- Negligible or unlikely exposure pathways

**Skin irritation**
- May cause skin irritation in susceptible persons. Contact with liquid or refrigerated gas can cause cold burns and frostbite.

**Eye irritation**
- Contact with eyes may cause irritation. Contact with liquid or refrigerated gas can cause cold burns and frostbite.

**Sensitization**
- Did not cause sensitization on laboratory animals.
- Information refers to the main ingredient.

**Repeated dose toxicity**
- This information is not available.

**Carcinogenicity**
- Species: Mouse
- Sex: male and female
- Dose: 6.25, 20, 62.5, 200, 625 ppm
- Exposure time: 6hr/day. 5day/wk for up to 2 y
- Test substance: yes
- Print Date: OECD Test Guideline 453
- Remarks: Clear evidence of multiple organ carcinogenicity.
<table>
<thead>
<tr>
<th>Compound</th>
<th>Species</th>
<th>Sex</th>
<th>Dose</th>
<th>Exposure time</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Butadiene</td>
<td>Rat</td>
<td>male and female</td>
<td>1000, 8000 ppm</td>
<td>6 hr/day, 5 day/wk for 2 years</td>
<td>Test substance: yes Remarks: weak oncogen</td>
</tr>
<tr>
<td>Isobutylene</td>
<td>Rat</td>
<td>male</td>
<td>500, 2000, 8000 ppm</td>
<td>105 wks</td>
<td>Increased incidence of thyroid tumors</td>
</tr>
<tr>
<td></td>
<td>Rat</td>
<td>female</td>
<td>500, 2000, 8000 ppm</td>
<td>105 wks</td>
<td>No increase incidence of tumors</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td>male</td>
<td>500, 2000, 8000 ppm</td>
<td>105 wks</td>
<td>No increase incidence of tumors</td>
</tr>
<tr>
<td></td>
<td>Mouse</td>
<td>female</td>
<td>500, 2000, 8000 ppm</td>
<td>105 wks</td>
<td>No increase incidence of tumors</td>
</tr>
<tr>
<td>1-Butene</td>
<td>Rat</td>
<td>male</td>
<td>0, 500, 2000, 8000 ppm</td>
<td>2 years</td>
<td>Increased incidence of thyroid tumors Remarks: increased incidence of thyroid tumors Information given is based on data obtained from similar substances.</td>
</tr>
</tbody>
</table>
Crude Butadiene

Species: Rat
Sex: female
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: no increase incidence of tumors, Information given is based on data obtained from similar substances.

Species: Mouse
Sex: male
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: no increase incidence of tumors, Information given is based on data obtained from similar substances.

Species: Mouse
Sex: female
Dose: 0, 500, 2000, 8000 ppm
Exposure time: 2 years
Number of exposures: 6 hr/d, 5 d/wk
Remarks: no increase incidence of tumors, Information given is based on data obtained from similar substances.

cis-2-Butene
Species: Rat
Dose: up to 8000 ppm
Exposure time: 105 weeks
Remarks: increased incidence of thyroid tumors

Isoprene
Species: Rat
Dose: 0. 70, 220, 700, 220, 7000 ppm
Exposure time: 26 wks
Number of exposures: 6 h/d, 5 d/wk
Remarks: interstitial cell hyperplasia of testis at 7000 ppm

Species: Mouse
Dose: 0. 70, 220, 700, 220, 7000 ppm
Exposure time: 26 wks
Number of exposures: 6 h/d, 5 d/wk
Remarks: malignant neoplastic lesions in the liver, lung, fore stomach and Harderian gland at 700 ppm

Benzene
Species: Rat
Sex: female
Dose: 0, 25, 50, 250 mg/kg
Exposure time: 103 wks
Number of exposures: daily, 5 days/week
Test substance: yes
Remarks: zymbal gland carcinomas, squamous cell papillomas
Species: Rat  
Sex: male  
Dose: 0, 50, 100, 200 mg/kg  
Exposure time: 103 wks  
Number of exposures: daily, 5 days/week  
Test substance: yes  
Remarks: zymbal gland carcinomas, squamous cell papillomas

Species: Mouse  
Sex: male and female  
Dose: 25, 50, 100 mg/kg  
Exposure time: 103 wks  
Number of exposures: daily, 5 days/week  
Test substance: yes  
Remarks: Clear evidence of multiple organ carcinogenicity.

Crude Butadiene  
Reproductive toxicity : This information is not available.

Crude Butadiene  
Developmental Toxicity : This information is not available.

Crude Butadiene  
Aspiration toxicity  
Toxicology Assessment : No aspiration toxicity classification.

Crude Butadiene  
CMR effects  
Carcinogenicity:  
Not available  
Mutagenicity:  
In vivo tests showed mutagenic effects  
Teratogenicity:  
Not available  
Reproductive toxicity:  
Not available

Crude Butadiene  
Further information : Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Concentrations substantially above the TLV value may cause narcotic effects. Solvents may degrease the skin.

SECTION 12: Ecological information

Ecotoxicity effects
Toxicity to fish : No data available

Toxicity to daphnia and other aquatic invertebrates : No data available
Toxicity to algae: No data available

Elimination information (persistence and degradability)
Bioaccumulation: Bioaccumulation is unlikely.
Biodegradability: This material is volatile and is expected to partition to air. Expected to be biodegradable.

Ecotoxicology Assessment

Acute aquatic toxicity
Isopentane: Toxic to aquatic life.
n-Pentane: Toxic to aquatic life.
Isoprene: Toxic to aquatic life.
Cyclopentane: Harmful to aquatic life.
2-methyl-2-butene: Toxic to aquatic life.
Benzene: Toxic to aquatic life.

Chronic aquatic toxicity
Isopentane: Toxic to aquatic life with long lasting effects.
n-Pentane: Toxic to aquatic life with long lasting effects.
Isoprene: Toxic to aquatic life with long lasting effects.
Cyclopentane: Harmful to aquatic life with long lasting effects.
2-methyl-2-butene: Toxic to aquatic life with long lasting effects.
Benzene: Harmful to aquatic life with long lasting effects.

Results of PBT assessment: This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).

Additional ecological information: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.
Crude Butadiene

Product: The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.

Contaminated packaging: Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (1,3-BUTADIENE, BUTANES), 2.1, RQ (1,3-BUTADIENE, BENZENE)

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (1,3-BUTADIENE, BUTANES), 2.1, (−76 °C)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (1,3-BUTADIENE, BUTANES), 2.1

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (1,3-BUTADIENE, BUTANES), 2.1, (B/D)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (1,3-BUTADIENE, BUTANES), 2.1 (13)

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN1965, HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (1,3-BUTADIENE, BUTANES), 2.1

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
SECTION 15: Regulatory information

National legislation

SARA 311/312 Hazards: Flammable (gases, aerosols, liquids, or solids)
- Gases under pressure
- Acute toxicity (any route of exposure)
- Skin corrosion or irritation
- Serious eye damage or eye irritation
- Germ cell mutagenicity
- Carcinogenicity
- Specific target organ toxicity (single or repeated exposure)

CERCLA Reportable Quantity: 13 lbs
1,3-Butadiene

SARA 302 Reportable Quantity: This material does not contain any components with a SARA 302 RQ.

SARA 302 Threshold Planning Quantity: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 304 Reportable Quantity: This material does not contain any components with a section 304 EHS RQ.

SARA 313 Ingredients: The following components are subject to reporting levels established by SARA Title III, Section 313:
- 1,3-Butadiene - 106-99-0
- Benzene - 71-43-2
- Isoprene - 78-79-5

Clean Air Act

Ozone-Depletion Potential: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):
- 1,3-Butadiene - 106-99-0
- Benzene - 71-43-2

The following chemical(s) are listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F):
- 1,3-Butadiene - 106-99-0
- n-Butane - 106-97-8
- Isobutane - 75-28-5

SDS Number: 100000014664 15/18
Crude Butadiene

Isobutylene - 115-11-7
1-Butene - 106-98-9
cis-2-Butene - 590-18-1
trans-2-Butene - 624-64-6
1,3-Pentadiene - 504-60-9
Isopentane - 78-78-4
n-Pentane - 109-66-0
Isoprene - 78-79-5
cis-2-Pentene - 627-20-3
trans-2-Pentene - 646-04-8
3-Methyl-1-Butene - 563-45-1
2-methyl-1-butene - 563-46-2

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

: 1,3-Butadiene - 106-99-0
   Isobutylene - 115-11-7
   1-Butene - 106-98-9
   Isopentane - 78-78-4
   n-Pentane - 109-66-0
   Isoprene - 78-79-5
   Benzene - 71-43-2

US State Regulations

Pennsylvania Right To Know

: 1,3-Butadiene - 106-99-0
   n-Butane - 106-97-8
   Isobutylene - 115-11-7
   1-Butene - 106-98-9
   cis-2-Butene - 590-18-1
   trans-2-Butene - 624-64-6
   Isopentane - 78-78-4
   n-Pentane - 109-66-0
   Cyclopentadiene - 542-92-7
   Isoprene - 78-79-5
   Cyclopentane - 287-92-3
   2-methyl-2-butene - 513-35-9
   Benzene - 71-43-2
   Isobutane - 75-28-5

California Prop. 65 Ingredients

: WARNING! This product contains a chemical known in the State of California to cause cancer.

WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.
Crude Butadiene

Version 2.0

Revision Date 2018-02-09

Europe REACH : Not in compliance with the inventory
United States of America (USA) : On the inventory, or in compliance with the inventory
TSCA
Canada DSL : On the inventory, or in compliance with the inventory
Australia AICS : On the inventory, or in compliance with the inventory
New Zealand NZIoC : Not in compliance with the inventory
Japan ENCS : Not in compliance with the inventory
Korea KECI : On the inventory, or in compliance with the inventory
Philippines PICCS : Not in compliance with the inventory
China IECSC : Not in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 4
Reactivity Hazard: 2

Further information
Legacy SDS Number : 1773

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Government Industrial Hygienists</td>
</tr>
<tr>
<td>AICS</td>
<td>Australia, Inventory of Chemical Substances</td>
</tr>
<tr>
<td>DSL</td>
<td>Canada, Domestic Substances List</td>
</tr>
<tr>
<td>NDSL</td>
<td>Canada, Non-Domestic Substances List</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstract Service</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration 50%</td>
</tr>
<tr>
<td>EGEST</td>
<td>EOSCA Generic Exposure Scenario Tool</td>
</tr>
<tr>
<td>EOSCA</td>
<td>European Oilfield Specialty Chemicals Association</td>
</tr>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Chemical Substances</td>
</tr>
<tr>
<td>LD50</td>
<td>Lethal Dose 50%</td>
</tr>
<tr>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Agency</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety &amp; Health</td>
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<tr>
<td>NTP</td>
<td>National Toxicology Program</td>
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<tr>
<td>NZIoC</td>
<td>New Zealand Inventory of Chemicals</td>
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<tr>
<td>NOAEL</td>
<td>No Observable Adverse Effect Level</td>
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<tr>
<td>NOEC</td>
<td>No Observed Effect Concentration</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety &amp; Health Administration</td>
</tr>
<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
</tr>
<tr>
<td>PICCS</td>
<td>Philippines Inventory of Commercial Chemical Substances</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>MAK</td>
<td>Germany Maximum Concentration Values</td>
</tr>
<tr>
<td>GHS</td>
<td>Globally Harmonized System</td>
</tr>
<tr>
<td>PRNT</td>
<td>Presumed Not Toxic</td>
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<tr>
<td>&gt;=</td>
<td>Greater Than or Equal To</td>
</tr>
<tr>
<td>STEL</td>
<td>Short-term Exposure Limit</td>
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<tr>
<td>IC50</td>
<td>Inhibition Concentration 50%</td>
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<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act</td>
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<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
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<td>TLV</td>
<td>Threshold Limit Value</td>
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<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
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<td>Time Weighted Average</td>
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<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
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<td>TSCA</td>
<td>Toxic Substance Control Act</td>
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<td>KECI</td>
<td>Korea, Existing Chemical Inventory</td>
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<td>UVCB</td>
<td>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</td>
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<td>Less Than or Equal To</td>
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<tr>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
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<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
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