



## Crude Butadiene

Version 5.0

Revision Date 2022-11-04

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

#### Product information

Product Name : Crude Butadiene  
 Material : 1120922, 1037102, 1015401

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  
 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  
 EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
 Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)  
 Belgium: 070 245 245 (24 hours/day, 7 days/week)  
 Bulgaria: +359 2 9154 233  
 Croatia: +3851 2348 342 (24 hours/day, 7 days/week)  
 Cyprus: 1401  
 Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402  
 Denmark: Danish Poison Center (Gifftlinjen): +45 8212 1212  
 Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
 Finland: 0800 147 111 09 471 977 (24 hours/day)  
 France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)  
 Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
 Greece: (0030) 2107793777 (24 hours/day, 7 days/week)  
 Hungary: +36-80-201-199 (24 hours/day, 7 days/week)  
 Iceland: 543 2222 (24 hours/day, 7 days/week)  
 Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
 Italy: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
 Latvia: State Fire and Rescue Service, phone number: 112; Toxicology and Sepsis Clinic  
 Poisoning and Drug Information Center, Hipokrāta 2, Riga, Latvia, LV-1038, phone number +371  
 67042473. (24 hours.)  
 Liechtenstein: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

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Lithuania: +370 (85) 2362052  
 Luxembourg: (+352) 8002 5500 (24 hours/day, 7 days/week)  
 Malta: +356 2395 2000  
 The Netherlands: NVIC: +31 (0)88 755 8000  
 Norway: 22 59 13 00 (24 hours/day, 7 days/week)  
 Poland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)  
 Portugal: CIAV phone number: +351 800 250 250  
 Romania: +40213183606  
 Slovakia: +421 2 5477 4166  
 Slovenia: Phone number: 112  
 Spain: National Emergency Telephone Number of Spanish Poison Centre: +34 91 562 04 20 (24 hours/day, 7 days/week)  
 Sweden: 112 – ask for Poisons Information

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  
 Skin irritation, Category 2  
 Eye irritation, Category 2A  
 Germ cell mutagenicity, Category 1B  
 Carcinogenicity, Category 1A  
 Specific target organ toxicity - single exposure, Category 3,  
 Central nervous system  
 Specific target organ toxicity - repeated exposure, Category 1,  
 Blood  
 Simple Asphyxiant

**Labeling**

Symbol(s) : 

Signal Word : Danger

Hazard Statements : H220: Extremely flammable gas.  
 H280: Contains gas under pressure; may explode if heated.  
 H315: Causes skin irritation.  
 H319: Causes serious eye irritation.  
 H336: May cause drowsiness or dizziness.  
 H340: May cause genetic defects.  
 H350: May cause cancer.  
 H372: Causes damage to organs (Blood) through prolonged or repeated exposure.  
 May displace oxygen and cause rapid suffocation.

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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.  
 P260 Do not breathe 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:**  
 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:**  
 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

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

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

Molecular formula : UVCB  
CAS-No. : 68955-28-2

Component	CAS-No.	Weight %
Gases (petroleum), light steam-cracked, butadiene conc.	68955-28-2	100
1,3-Butadiene	106-99-0	10 - 80
n-Butane	106-97-8	0 - 60
Isobutane	75-28-5	0 - 42
Isobutylene	115-11-7	0 - 15
1-Butene	106-98-9	0 - 15
cis-2-Butene	590-18-1	0 - 10
trans-2-Butene	624-64-6	0 - 10
1,3-Pentadiene	504-60-9	0 - 5
Isopentane	78-78-4	0 - 5
n-Pentane	109-66-0	0 - 5
Cyclopentadiene	542-92-7	0 - 5
Isoprene	78-79-5	0 - 5
Cyclopentane	287-92-3	0 - 5
2-methyl-2-butene	513-35-9	0 - 5
Propane	74-98-6	0 - 3
Propylene	115-07-1	0 - 3
Propadiene	463-49-0	0 - 3
Benzene	71-43-2	0 - 5

**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.

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 : 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.

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**SECTION 5: Firefighting measures**

Flash point	:	-76°C (-105°F)
Autoignition temperature	:	No data available
Suitable extinguishing media	:	Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.
Further information	:	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.
Fire and explosion protection	:	Do not spray on a naked flame or any 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.
Hazardous decomposition products	:	Carbon oxides.

**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 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
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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 a naked flame or any 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.

Use : Chemical intermediate

**SECTION 8: Exposure controls/personal protection****Ingredients with workplace control parameters****US**

Components	Basis	Value	Control parameters	Note
1,3-Butadiene	ACGIH	TWA	2 ppm,	A2,
	OSHA Z-1	TWA	1 ppm,	
	OSHA Z-1	STEL	5 ppm,	
	OSHA CARC	PEL	1 ppm,	
	OSHA 29 CFR 1910.1051(c)	TWA	1 ppm,	
	OSHA CARC	STEL	5 ppm,	
n-Butane	OSHA Z-1-A	TWA	800 ppm, 1,900 mg/m3	
	ACGIH	STEL	1,000 ppm,	CNS impair, EX,
Isobutane	ACGIH	STEL	1,000 ppm,	CNS impair, EX,
Isobutylene	ACGIH	TWA	250 ppm,	A4,
1-Butene	ACGIH	TWA	250 ppm,	
cis-2-Butene	ACGIH	TWA	250 ppm,	
trans-2-Butene	ACGIH	TWA	250 ppm,	
Isopentane	ACGIH	TWA	1,000 ppm,	
n-Pentane	OSHA Z-1	TWA	1,000 ppm, 2,950 mg/m3	
	OSHA Z-1-A	TWA	600 ppm, 1,800 mg/m3	
	OSHA Z-1-A	STEL	750 ppm, 2,250 mg/m3	
Cyclopentadiene	ACGIH	TWA	1,000 ppm,	
	ACGIH	TWA	0.5 ppm,	
	OSHA Z-1	TWA	75 ppm, 200 mg/m3	
	OSHA Z-1-A	TWA	75 ppm, 200 mg/m3	
	ACGIH	STEL	1 ppm,	
Isoprene	ACGIH	TWA	0.5 ppm,	URT irr, LRT irr, eye irr,
	US WEEL	TWA	2 ppm,	
Cyclopentane	ACGIH	TWA	600 ppm,	
	OSHA Z-1-A	TWA	600 ppm, 1,720 mg/m3	
Benzene	ACGIH	TWA	0.5 ppm,	A1, Skin,
	ACGIH	STEL	2.5 ppm,	A1, Skin,
	OSHA Z-1-A	TWA	1 ppm,	
	OSHA Z-1-A	CEIL	5 ppm,	
	OSHA Z-2	Peak	50 ppm,	
	OSHA 29 CFR 1910.1028(c)	TWA	1 ppm,	
	OSHA 29 CFR 1910.1028(c)	STEL	5 ppm,	
	OSHA CARC	PEL	1 ppm,	
	OSHA CARC	STEL	5 ppm,	

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2,2-Dimethylpropane	ACGIH	TWA	1,000 ppm,	
Propane	OSHA Z-1	TWA	1,000 ppm, 1,800 mg/m3	
	OSHA Z-1-A	TWA	1,000 ppm, 1,800 mg/m3	
Propylene	ACGIH	TWA	500 ppm,	A4,

- A1 Confirmed human carcinogen  
A2 Suspected human carcinogen  
A4 Not classifiable as a human carcinogen  
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  
LRT irr Lower Respiratory Tract irritation  
Skin Danger of cutaneous absorption  
URT irr Upper Respiratory Tract irritation

**Immediately Dangerous to Life or Health Concentrations (IDLH)**

Substance name	CAS-No.	Control parameters	Update
1,3-Butadiene	106-99-0	Immediately Dangerous to Life or Health Concentration Value 2000 parts per million	2017-02-03
n-Butane	106-97-8	Immediately Dangerous to Life or Health Concentration Value 1600 parts per million	2017-02-03
n-Pentane	109-66-0	Immediately Dangerous to Life or Health Concentration Value 1500 parts per million	1995-03-01
Cyclopentadiene	542-92-7	Immediately Dangerous to Life or Health Concentration Value 750 parts per million	1995-03-01
Benzene	71-43-2	Immediately Dangerous to Life or Health Concentration Value 500 parts per million	1995-03-01
1,3-Butadiene	106-99-0	Immediately Dangerous to Life or Health Concentration Value 2000 parts per million	2017-02-03
n-Butane	106-97-8	Immediately Dangerous to Life or Health Concentration Value 1600 parts per million	2017-02-03
n-Pentane	109-66-0	Immediately Dangerous to Life or Health Concentration Value 1500 parts per million	1995-03-01
Cyclopentadiene	542-92-7	Immediately Dangerous to Life or Health Concentration Value 750 parts per million	1995-03-01
Benzene	71-43-2	Immediately Dangerous to Life or Health Concentration Value 500 parts per million	1995-03-01
Propane	74-98-6	Immediately Dangerous to Life or Health Concentration Value 2100 parts per million	1995-03-01

**Biological exposure indices****US**

Substance name	CAS-No.	Control parameters	Sampling time	Update
1,3-Butadiene	106-99-0	1,2 Dihydroxy-4-(N-acetylcysteinyl)- butane: 2.5 mg/l Background (Urine) Semi-quantitative ( )	End of shift (As soon as possible after exposure ceases)	2010-03-01
		Mixture of N-1 and N- 2(hydroxybutenyl)valine: 2.5 picomoles per gram Hemoglobin Semi-quantitative (Hemoglobin (Hb) adducts in blood)	Not critical	2010-03-01
Benzene	71-43-2	S-Phenylmercapturic acid: 25 µg/g creatinine Background (Urine)	End of shift (As soon as possible after exposure ceases)	2010-03-01

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t,t-Muconic acid: 500 µg/g  
creatinine Background (Urine)End of shift (As  
soon as possible  
after exposure  
ceases)

2010-03-01

**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 : If ventilation or other engineering controls are not adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure, a supplied-air NIOSH approved respirator may be appropriate. If exposure to harmful levels of airborne material may occur, a NIOSH approved respirator that provides protection may be appropriate, such as: A positive pressure, air-supplying respirator may be appropriate if there is potential for uncontrolled release, aerosolization, 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**

- Flash point : -76°C (-105°F)



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

**SECTION 10: Stability and reactivity**

<b>Reactivity</b>	: Stable under recommended storage conditions.
<b>Chemical stability</b>	: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
<b>Possibility of hazardous reactions</b>	
<b>Hazardous reactions</b>	: Hazardous reactions: Hazardous polymerization may occur., See 'Conditions to Avoid' and/or "Materials to Avoid" in this section.

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Hazardous reactions: Vapors may form explosive mixture with air.

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

**Hazardous decomposition products** : Carbon oxides

**Other data** : No decomposition if stored and applied as directed.

**SECTION 11: Toxicological information**

**Crude Butadiene  
Acute oral toxicity** : Negligible or unlikely exposure pathways

**Crude Butadiene  
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.

**Crude Butadiene  
Acute dermal toxicity** : Negligible or unlikely exposure pathways

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

**Crude Butadiene  
Eye irritation** : Contact with eyes may cause irritation. Contact with liquid or refrigerated gas can cause cold burns and frostbite.  
May cause irreversible eye damage.

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

**Crude Butadiene  
Repeated dose toxicity** : This information is not available.

**Genotoxicity in vitro**

1,3-Butadiene : Test Type: Ames test  
Metabolic activation: with and without metabolic activation  
Result: Positive results were obtained in some in vitro tests.

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	Test Type: Chromosome aberration test in vitro Test system: Chinese hamster cells Method: OECD Guideline 473 Result: positive
n-Butane	Test Type: Ames test Result: negative
Isobutane	Test Type: Ames test Result: negative
Isobutylene	Test Type: Ames test Result: negative
	Test Type: Reverse mutation assay Result: negative
	Test Type: Mouse lymphoma assay Result: negative
	Test Type: Micronucleus test Result: negative
1-Butene	Test Type: Ames test Metabolic activation: with and without metabolic activation Result: negative
cis-2-Butene	Test Type: Reverse mutation assay Metabolic activation: with and without metabolic activation Result: negative
	Test Type: Cell transformation assay Metabolic activation: with and without metabolic activation Result: negative
	Test Type: in vitro test Result: negative
1,3-Pentadiene	Test Type: Ames test Method: OECD Test Guideline 471 Result: negative
Isopentane	Test Type: Ames test Concentration: 1, 2, 5, 8, 10% Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 471 Result: negative

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Test Type: Ames test  
 Concentration: 1, 2, 5, 8, 10, 25, 50%  
 Metabolic activation: with and without metabolic activation  
 Method: OECD Test Guideline 471  
 Result: negative  
 Remarks: Information given is based on data obtained from similar substances.

Test Type: Chromosome aberration test in vitro  
 Metabolic activation: with and without metabolic activation  
 Method: Mutagenicity (in vitro mammalian cytogenetic test)  
 Result: negative  
 Remarks: Information given is based on data obtained from similar substances.

Test Type: In vitro mammalian cell gene mutation test  
 Metabolic activation: with and without metabolic activation  
 Method: OECD Test Guideline 476  
 Result: negative  
 Remarks: Information given is based on data obtained from similar substances.

n-Pentane

Test Type: Ames test  
 Metabolic activation: with and without metabolic activation  
 Result: negative

Test Type: Chromosome aberration test in vitro  
 Metabolic activation: with and without metabolic activation  
 Result: Ambiguous

Isoprene

Test Type: Ames test  
 Result: negative

Test Type: Sister Chromatid Exchange Assay  
 Result: positive

Cyclopentane

Test Type: Modified Ames test  
 Concentration: 1250 microgram/plate  
 Metabolic activation: with and without metabolic activation  
 Result: negative

Test Type: Mouse lymphoma assay  
 Concentration: 200 microgram/milliliter  
 Metabolic activation: with and without metabolic activation  
 Result: negative

2-methyl-2-butene

Test Type: Ames test  
 Metabolic activation: with and without metabolic activation  
 Method: OECD Test Guideline 471  
 Result: negative

Method: OECD Test Guideline 480  
 Result: negative

Propane

Test Type: Ames test  
 Result: negative

Propylene

Test Type: Ames test  
 Metabolic activation: with and without metabolic activation  
 Method: OECD Test Guideline 471

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Result: negative

Test Type: Mammalian cell gene mutation assay  
 Metabolic activation: with and without metabolic activation  
 Method: OECD Test Guideline 476  
 Result: Ambiguous

Benzene

Test Type: Ames test  
 Result: negative

Test Type: Cytogenetic assay  
 Result: positive

Test Type: Mouse lymphoma assay  
 Result: positive

Test Type: Sister Chromatid Exchange Assay  
 Result: negative

**Genotoxicity in vivo**

1,3-Butadiene

: Test Type: Mouse micronucleus assay  
 Species: mice  
 Route of Application: inhalation (gas)  
 Exposure time: 6 h per day for 5 days  
 Dose: 50, 200, 500, 1300 ppm  
 Method: OECD Test Guideline 474  
 Result: positive

Test Type: Dominant lethal assay  
 Species: mice  
 Method: OECD Test Guideline 478  
 Result: Positive results were obtained in some in vivo tests.

Isobutylene

Test Type: Mouse micronucleus assay  
 Result: negative

1-Butene

Test Type: Micronucleus test  
 Species: Mouse  
 Dose: 1000, 3260, 10000 ppm  
 Method: Mutagenicity (micronucleus test)  
 Result: negative

cis-2-Butene

Test Type: Mouse micronucleus assay  
 Cell type: Bone marrow  
 Dose: 10,000 ppm  
 Result: negative

Test Type: Mouse micronucleus assay  
 Cell type: Bone marrow  
 Dose: 22, 000 ppm  
 Result: negative

1,3-Pentadiene

Species: Mouse  
 Exposure time: 6h/d, 2 days  
 Dose: 30-300 ppm  
 Method: Mutagenicity (micronucleus test)  
 Result: negative

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Isopentane  
 Test Type: In vivo micronucleus test  
 Species: Rat  
 Cell type: Bone marrow  
 Route of Application: inhalation (vapor)  
 Exposure time: 13 wk  
 Dose: 5000, 10,000, 20,000 mg/m<sup>3</sup>  
 Method: Directive 67/548/EEC, Annex V, B.12.  
 Remarks: Information given is based on data obtained from similar substances.

n-Pentane  
 Test Type: Micronucleus test  
 Species: Rat  
 Cell type: Bone marrow  
 Result: negative

Isoprene  
 Result: negative

Test Type: Micronucleus test  
 Result: positive

Cyclopentane  
 Test Type: Micronucleus test  
 Species: Mouse  
 Route of Application: inhalation (vapor)  
 Dose: 10,000 ppm  
 Result: negative

2-methyl-2-butene  
 Test Type: Mouse micronucleus assay  
 Species: Rat  
 Cell type: Bone marrow  
 Route of Application: Inhalation  
 Exposure time: 6 h/d 2d  
 Method: OECD Test Guideline 474  
 Result: positive

Propylene  
 Test Type: Micronucleus test  
 Species: Rat  
 Route of Application: inhalation (gas)  
 Method: OECD Test Guideline 474  
 Result: negative

Benzene  
 Test Type: Mouse micronucleus assay  
 Result: positive

**Carcinogenicity**

1,3-Butadiene : 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.

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	<p>Species: Rat Sex: male and female Dose: 1000, 8000 ppm Exposure time: 6 hr/day, 5 day/wk for 2 years Test substance: yes Remarks: weak oncogen</p>
Isobutylene	<p>Species: Rat Sex: male Dose: 500, 2000, 8000 ppm Exposure time: 105 wks Number of exposures: 6 hrs/d, 5 d/wk Remarks: increased incidence of thyroid tumors</p> <p>Species: Rat Sex: female Dose: 500, 2000, 8000 ppm Exposure time: 105 wks Number of exposures: 6 hrs/d, 5 d/wk Remarks: no increase incidence of tumors</p> <p>Species: Mouse Sex: male Dose: 500, 2000, 8000 ppm Exposure time: 105 wks Number of exposures: 6 hrs/d, 5 d/wk Remarks: no increase incidence of tumors</p> <p>Species: Mouse Sex: female Dose: 500, 2000, 8000 ppm Exposure time: 105 wks Number of exposures: 6 hrs/d, 5 d/wk Remarks: no increase incidence of tumors</p>
1-Butene	<p>Species: Rat Sex: male Dose: 0, 500, 2000, 8000 ppm Exposure time: 2 years Number of exposures: 6 hr/d, 5 d/wk Remarks: increased incidence of thyroid tumors, Information given is based on data obtained from similar substances.</p>

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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

Propylene

Species: Rat  
 Dose: 0, 5000, 10000 ppm  
 Exposure time: 103 wks  
 Number of exposures: 6 h/d, 5 d/wk  
 Remarks: No evidence of carcinogenicity

Species: Mouse  
 Dose: 0, 5000, 10000 ppm  
 Exposure time: 103 wks  
 Number of exposures: 6 h/d, 5 d/wk  
 Remarks: No evidence of carcinogenicity

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



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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:  
May cause cancer.  
Mutagenicity:  
May cause genetic defects.  
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

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

**Toxicity to algae** : No data available

**Biodegradability** : This material is volatile and is expected to partition to air. Expected to be biodegradable

**Elimination information (persistence and degradability)**

**Bioaccumulation** : Bioaccumulation is unlikely.

**Mobility** : No data available

**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., Toxic to aquatic life with long lasting effects.

**Ecotoxicology Assessment**

**Short-term (acute) aquatic hazard** : Toxic to aquatic life.

**Long-term (chronic) aquatic hazard** : Toxic 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.

**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

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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)**

UN1010, BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, 2.1, RQ (1,3-BUTADIENE, BENZENE)

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**

UN1010, BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, 2.1, (-76 °C c.c.)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**

UN1010, BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, 2.1

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**

UN1010, BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, 2.1, (B/D)

**RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))**

239,UN1010,BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, 2.1

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**

UN1010, BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, 2.1

<b>Other information</b>	<b>:</b>	<b>IGC CODE: MIXED C4 CARGOES, S.T. 2G/2PG</b>
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Maritime transport in bulk according to IMO instruments

**SECTION 15: Regulatory information****National legislation**

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

**EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO - KNOW**

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- CERCLA Reportable Quantity : 12 lbs  
1,3-Butadiene  
100 lbs  
Benzene
- SARA 302 Reportable Quantity : Calculated RQ exceeds reasonably attainable upper limit.  
Hydrogen Sulfide
- SARA 302 Threshold Planning Quantity : This material does not contain any components with a section 302 EHS TPQ.
- SARA 304 Reportable Quantity : Calculated RQ exceeds reasonably attainable upper limit.  
Hydrogen Sulfide 7783-06-4 100 lbs
- SARA 313 Components : The following components are subject to reporting levels established by SARA Title III, Section 313:  
: 1,3-Butadiene - 106-99-0  
Isoprene - 78-79-5  
Benzene - 71-43-2  
Propylene - 115-07-1

**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 112 (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  
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

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3-Methyl-1-Butene - 563-45-1  
 2-methyl-1-butene - 563-46-2  
 2,2-Dimethylpropane - 463-82-1  
 Propane - 74-98-6  
 Propylene - 115-07-1  
 Propadiene - 463-49-0  
 Vinyl acetylene - 689-97-4  
 Ethyl acetylene - 107-00-6

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCM I 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  
 Propylene - 115-07-1

**US State Regulations****Pennsylvania Right To Know**

: Gases (petroleum), light steam-cracked, butadiene conc. - 68955-28-2  
 1,3-Butadiene - 106-99-0  
 n-Butane - 106-97-8  
 Isobutane - 75-28-5  
 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  
 Cyclopentadiene - 542-92-7  
 Isoprene - 78-79-5  
 Cyclopentane - 287-92-3  
 1,4-Pentadiene - 591-93-5  
 cis-2-Pentene - 627-20-3  
 trans-2-Pentene - 646-04-8  
 2-methyl-2-butene - 513-35-9  
 Benzene - 71-43-2  
 3-Methyl-1-Butene - 563-45-1  
 2-methyl-1-butene - 563-46-2  
 2,2-Dimethylpropane - 463-82-1  
 Propane - 74-98-6  
 Propylene - 115-07-1  
 Propadiene - 463-49-0  
 Vinyl acetylene - 689-97-4  
 Acetaldehyde - 75-07-0

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## Dimethyl Disulfide - 624-92-0

California Prop. 65 Components : WARNING: This product can expose you to chemicals including [listed below], which is [are] known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov/food](http://www.P65Warnings.ca.gov/food).

1,3-Butadiene	106-99-0
Isoprene	78-79-5
Benzene	71-43-2
Acetaldehyde	75-07-0
Ethylbenzene	100-41-4
Naphthalene	91-20-3
tert-butyl-4-methoxyphenol	25013-16-5
Cumene	98-82-8

WARNING: This product can expose you to chemicals including [listed below], which is [are] known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

1,3-Butadiene	106-99-0
Benzene	71-43-2
Methanol	67-56-1
Carbon disulfide	75-15-0

**Notification status**

Europe REACH	: Not in compliance with the inventory
Switzerland CH INV	: On the inventory, or in compliance with the inventory
United States of America (USA) TSCA	: On or in compliance with the active portion of the TSCA inventory
Canada DSL	: All components of this product are on the Canadian DSL
Other AIIIC	: 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	: A substance(s) in this product was not registered, notified to be registered, or exempted from registration by CPChem according to K-REACH regulations. Importation or manufacture of this product is still permitted provided the Korean Importer of Record has themselves notified the substance or the exported amount does not exceed the minimum threshold quantity of the non-registered substance(s).
Philippines PICCS	: Not in compliance with the inventory
Taiwan TCSI	: Not in compliance with the inventory
China IECSC	: Not in compliance with the inventory

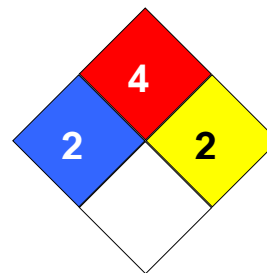
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**SECTION 16: Other information**

**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			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and	TSCA	Toxic Substance Control Act

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	New Chemical Substances		
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		