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

Product information
Product Name: sec-Butyl Mercaptan
Material: 1021484, 1021479, 1021493, 1021475, 1021476, 1021478, 1021480, 1021477

Use: Odorant, Chemical intermediate

Company: Chevron Phillips Chemical Company LP
Specialty Chemicals
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 liquids, Category 2
Skin sensitization, Category 1

Labeling
## SAFETY DATA SHEET

**sec-Butyl Mercaptan**

**Version 3.1**

**Revision Date 2018-08-28**

### Symbol(s)
- Flame
- Exclamation Mark

### Signal Word
- Danger

### Hazard Statements
- **H225**: Highly flammable liquid and vapor.
- **H317**: May cause an allergic skin reaction.

### Precautionary Statements

#### Prevention:
- **P210**: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- **P233**: Keep container tightly closed.
- **P240**: Ground/bond container and receiving equipment.
- **P241**: Use explosion-proof electrical/ventilating/lighting/equipment.
- **P242**: Use only non-sparking tools.
- **P243**: Take precautionary measures against static discharge.
- **P261**: Avoid breathing dust/fume/gas/mist/vapors/spray.
- **P272**: Contaminated work clothing should not be allowed out of the workplace.
- **P280**: Wear protective gloves/eye protection/face protection.

#### Response:
- **P333 + P313**: If skin irritation or rash occurs: Get medical advice/attention.
- **P363**: Wash contaminated clothing before reuse.
- **P370 + P378**: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

#### Storage:
- **P403 + P235**: Store in a well-ventilated place. Keep cool.

#### Disposal:
- **P501**: Dispose of contents/container to an approved waste disposal plant.

### Carcinogenicity:

**IARC**
- No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**NTP**
- No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

### SECTION 3: Composition/Information on ingredients

#### Synonyms:
- secondary Butyl mercaptan
- 1-methyl-1-propanethiol
- Gas Odorant

#### Molecular Formula:
- C4H10S

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-butyl Mercaptan</td>
<td>513-53-1</td>
<td>99</td>
</tr>
<tr>
<td>n-Butyl Mercaptan</td>
<td>109-79-5</td>
<td>1</td>
</tr>
</tbody>
</table>

**SDS Number:** 100000013999

2/14
SECTION 4: First aid measures

General advice: Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled: If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of skin contact: If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact: Flush eyes with water as a precaution. 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.

SECTION 5: Firefighting measures

Flash point: -23 °C (-9 °F) estimated

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 firefighting: 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 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.

Hazardous decomposition products: Carbon oxides. Sulfur oxides.

SDS Number:100000013999 3/14
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.

Methods for cleaning up: Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7: Handling and storage

Handling

Advice on safe handling: Avoid formation of aerosol. 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. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

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: 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: Odorant, Chemical intermediate

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters
sec-Butyl Mercaptan

SAFETY DATA SHEET

Version 3.1

Revision Date 2018-08-28

Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Basis</th>
<th>Value</th>
<th>Control parameters</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Butyl Mercaptan</td>
<td>ACGIH</td>
<td>TWA</td>
<td>0.5 ppm, URT irr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OSHA Z-1</td>
<td>TWA</td>
<td>10 ppm, 35 mg/m³</td>
<td>(b).</td>
</tr>
<tr>
<td></td>
<td>OSHA Z-1-A</td>
<td>TWA</td>
<td>0.5 ppm, 1.5 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

(6) The value in mg/m³ is approximate.

URT irr Upper Respiratory Tract irritation

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>n-Butyl Mercaptan</td>
<td>109-79-5</td>
<td>Immediately Dangerous to Life or Health Concentration Value 500 parts per million</td>
<td>1995-03-01</td>
</tr>
</tbody>
</table>

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: Air-Purifying Respirator for Organic Vapors. 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. Tightly fitting safety goggles.

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: Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.

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: Liquid
- Physical state: Liquid
- Color: Clear
- Odor: Pungent

**Safety data**
- Flash point: -23 °C (-9 °F) estimated
- Lower explosion limit: No data available
- Upper explosion limit: No data available
- Oxidizing properties: no
- Autoignition temperature: No data available
- Thermal decomposition: No data available
- Molecular formula: C₄H₁₀S
- Molecular weight: 90.2 g/mol
- pH: Not applicable
- Pour point: No data available
- Boiling point/boiling range: 84.98 °C (184.96 °F)
- Vapor pressure: 2.75 PSI at 38 °C (100 °F)
- Relative density: 0.835 at 15.6 °C (60.1 °F)
- Water solubility: Partly soluble
- Partition coefficient: n-octanol/water: No data available
- Viscosity, dynamic: 0.463 cP
- Relative vapor density: 1 (Air = 1.0)
- Evaporation rate: 1
- Percent volatile: > 99 %
## SECTION 10: Stability and reactivity

**Reactivity**
Stable under recommended storage conditions.

**Chemical stability**
This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Possibility of hazardous reactions**

**Hazardous reactions**
Hazardous reactions: Hazardous polymerization does not occur. Further information: No decomposition if stored and applied as directed. Hazardous reactions: Vapors may form explosive mixture with air.

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

**Thermal decomposition**
No data available

**Hazardous decomposition products**
Carbon oxides  
Sulfur oxides

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

## SECTION 11: Toxicological information

**Acute oral toxicity**

<table>
<thead>
<tr>
<th>Compound</th>
<th>LD50</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-butyl Mercaptan</td>
<td>5,176 mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td>n-Butyl Mercaptan</td>
<td>1,500 mg/kg</td>
<td>Rat</td>
</tr>
</tbody>
</table>

**Acute inhalation toxicity**

<table>
<thead>
<tr>
<th>Compound</th>
<th>LC50</th>
<th>Exposure time</th>
<th>Species</th>
<th>Sex</th>
<th>Test atmosphere</th>
<th>Information given</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec-butyl Mercaptan</td>
<td>98.3 mg/l</td>
<td>4 h</td>
<td>Rat</td>
<td>male and female</td>
<td>vapor</td>
<td>based on data obtained from similar substances.</td>
</tr>
<tr>
<td>n-Butyl Mercaptan</td>
<td>22.3 mg/l</td>
<td>4 h</td>
<td>Rat</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Test atmosphere: dust/mist

Acute dermal toxicity
sec-butyl Mercaptan : LD50: > 2,000 mg/kg
   Species: Rat

sec-Butyl Mercaptan
Skin irritation : May irritate skin.

sec-Butyl Mercaptan
Eye irritation : Vapors may cause irritation to the eyes, respiratory system and the skin.

sec-Butyl Mercaptan
Sensitization : Causes sensitization. largely based on animal evidence. Information given is based on data obtained from similar substances.

Repeated dose toxicity
sec-butyl Mercaptan : Species: Rat, male and female
   Sex: male and female
   Application Route: Inhalation
   Exposure time: 13 wks
   Number of exposures: 6 hrs/d, 5 d/wk
   NOEL: 0.367 mg/l 99.6 ppm
   Lowest observable effect level: 1.488 mg/l 403.4 ppm
   Method: OECD Guideline 413
   Target Organs: Blood, Liver, Kidney, Upper respiratory tract

n-Butyl Mercaptan
Species: Rat
   Application Route: Inhalation
   Dose: 0, 9, 70, 150 ppm
   Exposure time: 13 wk
   Number of exposures: 6 h/d, 5 d/wk
   NOEL: 9 ppm
   Lowest observable effect level: 70 ppm

Reproductive toxicity
sec-butyl Mercaptan : Species: Rat
   Sex: male and female
   Application Route: oral gavage
   Dose: 10, 50, 200 mg/kg bw/d
   Number of exposures: Daily
   Test period: 42-50 days
   Method: OECD Guideline 422
   NOAEL Parent: 200 mg/kg
   NOAEL F1: 50 mg/kg
   Information given is based on data obtained from similar substances.

Developmental Toxicity
sec-butyl Mercaptan : Species: Rat
   Application Route: Inhalation
   Dose: 11, 99, 195 ppm
sec-Butyl Mercaptan

Exposure time: GD 6-16
Number of exposures: 6 hrs/d
Method: OECD Guideline 414
NOAEL Teratogenicity: > = 195 ppm
NOAEL Maternal: > = 195 ppm
Information given is based on data obtained from similar substances.

Species: Mouse
Application Route: Inhalation
Dose: 11, 99, 195 ppm
Exposure time: GD 6-16
Number of exposures: 6 hrs/d
Method: OECD Guideline 414
NOAEL Teratogenicity: > = 195 ppm
NOAEL Maternal: > = 195 ppm
Information given is based on data obtained from similar substances.

n-Butyl Mercaptan
Species: Rat
Application Route: Inhalation
Dose: 0, 10, 68, 152 ppm
Number of exposures: 6 h/d
Test period: GD 6-19
NOAEL Teratogenicity: > 152 ppm
NOAEL Maternal: > 152 ppm

Species: Mouse
Application Route: Inhalation
Dose: 0, 10, 68, 152 ppm
Number of exposures: 6 h/d
Test period: GD 6-16
NOAEL Maternal: 10 ppm

sec-Butyl Mercaptan
Aspiration toxicity : May be harmful if swallowed and enters airways.

sec-Butyl Mercaptan
Further information : Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish
sec-butyl Mercaptan : LC50: 8.5 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
static test Analytical monitoring: yes
Method: OECD Test Guideline 203

n-Butyl Mercaptan
LC50: 2.4 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
Information given is based on data obtained from similar substances.
## Toxicsity to daphnia and other aquatic invertebrates

**sec-butyl Mercaptan**
- EC$_{50}$: 0.56 mg/l
- Exposure time: 48 h
- Species: *Daphnia magna* (Water flea)
- Immobilization Method: OECD Test Guideline 202
- Information refers to the main ingredient.

**n-Butyl Mercaptan**
- EC$_{50}$: 0.38 mg/l
- Exposure time: 48 h
- Species: *Daphnia magna* (Water flea)
- Information given is based on data obtained from similar substances.

## Toxicsity to algae

**sec-butyl Mercaptan**
- EC$_{50}$: 3.4 mg/l
- Exposure time: 72 h
- Species: *Pseudokirchneriella subcapitata* (green algae)
- Growth inhibition Method: OECD Test Guideline 201

**n-Butyl Mercaptan**
- EC$_{50}$: 3.0 mg/l
- Exposure time: 96 h
- Species: *Selenastrum capricornutum* (algae)
- Information given is based on data obtained from similar substances.

## M-Factor

<table>
<thead>
<tr>
<th>Substance</th>
<th>M-Factor (Acute Aquat. Tox.)</th>
<th>M-Factor (Chron. Aquat. Tox.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>butane-2-thiol</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

## Biodegradability

**sec-butyl Mercaptan**
- Aerobic
- Result: Not readily biodegradable.
- 6 %
- Testing period: 63 d
- Method: OECD Test Guideline 301F
- Information given is based on data obtained from similar substances.

## Additional ecological information

**Ecotoxicology Assessment**
- Short-term (acute) aquatic hazard: Very toxic to aquatic life.
- Long-term (chronic) aquatic hazard: Very 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 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)**
UN2347, BUTYL MERCAPTAN, 3, II

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**
UN2347, BUTYL MERCAPTAN, 3, II, (-23 °C), MARINE POLLUTANT, (SEC-BUTYL MERCAPTAN)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**
UN2347, BUTYL MERCAPTAN, 3, II

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**
UN2347, BUTYL MERCAPTAN, 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (SEC-BUTYL MERCAPTAN)

**RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))**
UN2347, BUTYL MERCAPTAN, 3, II, ENVIRONMENTALLY HAZARDOUS, (SEC-BUTYL MERCAPTAN)

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**
UN2347, BUTYL MERCAPTAN, 3, II, ENVIRONMENTALLY HAZARDOUS, (SEC-BUTYL MERCAPTAN)
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)
Respiratory or skin sensitization

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

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

SARA 302 Threshold Planning Quantity: This material does not contain any components with a section 302 EHS TPQ.

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

SARA 313 Components: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).
sec-Butyl Mercaptan

US State Regulations

Pennsylvania Right To Know
  sec-butyl Mercaptan - 513-53-1
  n-Butyl Mercaptan - 109-79-5

California Prop. 65 Components
  This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

Europe REACH
  Not in compliance with the inventory

United States of America (USA) TSCA
  On the inventory, or in compliance with the inventory

Canada NDSL
  This product contains one or several components listed in the Canadian NDSL.

Australia AICS
  On the inventory, or in compliance with the inventory

New Zealand NZIoC
  On the inventory, or in compliance with the inventory

Japan ENCS
  On the inventory, or 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: 3
  Reactivity Hazard: 0

Further information

Legacy SDS Number
  427800

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.

<table>
<thead>
<tr>
<th>Key or legend to abbreviations and acronyms used in the safety data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
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