



Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Tertiary Butyl Mercaptan

Product Use: Chemical Intermediate, Odorant

Product Number(s): 0001086416, 0001021471, 0001021472, 0001021473, 0001021474, 0001086415, 0001024806, 0001024807, 0001027458, 0001028495, 0001029711, 0001036143, 0001064730, 0001069500, 0001070007, 0001017329, 0001017940, 0001021468, 0001021469, 0001021470

Synonyms: t-Butyl Mercaptan; tert-Butanethiol; 2-Methyl Propane-2-Thiol; TC4SH; tert-Butyl Mercaptan; TBM

Product CAS No.: 75-66-1

Company Identification:

Chevron Phillips Chemical Company LP
Specialty Chemicals
10001 Six Pines Drive
The Woodlands TX 77380

Product Information:

MSDS Requests: (800) 852 - 5530
Technical Information: (832) 813 - 4862
Responsible Party: Product Safety Group
Email:msds@cpchem.com

Chevron Phillips Chemicals International N.V.
Brusselsesteenweg 355
B-3090 Overijse
Belgium

24-Hour Emergency Telephone Numbers HEALTH:Chevron Phillips Emergency Information Center
866.442.9628 (North America) and 1.832.813.4984 (International)

TRANSPORTATION: North America: CHEMTREC 800.424.9300 or 703.527.3887
ASIA: +1.703.527.3887
EUROPE: BIG .32.14.584545 (phone) or .32.14.583516 (telefax)
SOUTH AMERICA SOS-Cotec Inside Brazil: 0800.111.767
Outside Brazil: 55.19.3467.1600

SECTION 2 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Clear liquid, repulsive odor.

NFPA RATINGS: Health: 1 Flammability: 3 Reactivity: 0

GHS Classification and Labeling:

Flammable liquid: Category 2.

Acute aquatic toxicant: Category 2.

Skin Sensitizer: Category 1.

Eye irritation: Category 2B.

Skin irritation: Category 3.

Signal Word: Danger



GHS Symbol:

Physical Hazards: Highly flammable liquid and vapor.

Environmental Hazards: Toxic to aquatic life.

Health Hazards: May cause allergic skin reaction. May be harmful if swallowed and enters airways. Causes eye irritation. Causes mild skin irritation.

Precautionary Hazard - Prevention: Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use explosion-proof electrical/ventilating/lighting/equipment. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Avoid release to the environment.

Precautionary Hazard - Response: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. In case of fire: Use manufacturer/supplier or the competent authority to specify appropriate media for extinction.

Precautionary Hazard - Storage: Store in a well-ventilated place. Keep cool.

Precautionary Hazard - Disposal: Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

EU Classification:

Signal Word:

Danger

Risk Phrases:

R65: Harmful: may cause lung damage if swallowed.

R51: Toxic to aquatic organisms.

R43: May cause sensitization by skin contact.

R67: Vapors may cause drowsiness and dizziness.

R11: Highly flammable.

R36/38: Irritating to eyes and skin.

Safety Phrases:

S2: Keep out of the reach of children.

S62: If swallowed do not induce vomiting: seek medical advice immediately and show this container or label.

S16: Keep away from sources of ignition - No smoking.

S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S24/25: Avoid contact with skin and eyes.

S9: Keep container in a well-ventilated place.

S51: Use only in well-ventilated areas.

S36/37: Wear suitable protective clothing and gloves.

IMMEDIATE HEALTH EFFECTS:

Eye: Contact with the eyes causes irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision. Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin causes irritation. Contact with the skin may cause an allergic skin reaction. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if

absorbed through the skin.

Ingestion: This material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.

Inhalation: Breathing this material at elevated concentrations causes central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death. This material has a strong objectionable odor that may cause nausea, dizziness, or headache.

DELAYED OR OTHER HEALTH EFFECTS:

Reproduction and Birth Defects: This material is not expected to cause birth defects or other harm to the developing fetus based on animal data.

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	AMOUNT	EINECS / ELINCS	SYM	R-PHRASES
tert-Butyl Mercaptan	75-66-1	> 99.0 % weight	200-890-2	F Xn	R65, R43, R51, R11
Proprietary Materials		< 1 % weight	NA	NA	NA

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling / Peak	Notation
tert-Butyl Mercaptan	ACGIH	Not Established	NA	NA	n-Butyl Mercaptan: 0.5 ppm
tert-Butyl Mercaptan	CPCHEM	.5 ppm	NA	NA	As n-Butyl Mercaptan

SECTION 4 FIRST AID MEASURES

Eye: Flush eyes with running water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get immediate medical attention.

Skin: To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse. Get medical attention if any symptoms develop.

Ingestion: If swallowed, do not induce vomiting. Give the person a glass of water or milk to drink and get immediate medical attention. Never give anything by mouth to an unconscious person.

Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FIRE CLASSIFICATION:

Japanese Fire Code: Group 2 OSHA Classification (29 CFR 1910.1200): Flammable liquid.

NFPA RATINGS: Health: 1 Flammability: 3 Reactivity: 0

FLAMMABLE PROPERTIES:

Flashpoint: -26°C (-14.8°F) Estimated

Autoignition: NDA

Flammability (Explosive) Limits (% by volume in air): Lower: NDA Upper: NDA

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form: Sulfur Oxides, Carbon Oxides

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator. Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible sorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

Reporting: U.S.A. regulations may require reporting spills of this material that could reach any surface waters. Report spills to local authorities and/or the National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL . REFER TO PRODUCT LABEL OR MANUFACTURERS TECHNICAL BULLETINS FOR THE PROPER USE AND HANDLING OF THIS MATERIAL .

Precautionary Measures: This material presents a fire hazard. Liquid quickly evaporates and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 15°F. Do not get in eyes.

General Handling Information: Avoid work practices that may release volatile components in the atmosphere. Local air pollution regulations should be consulted to determine if the release of volatile components is regulated or restricted in the area in which this material is used. Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations, which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids, National Fire Protection Association (NFPA 77), Recommended Practice on Static Electricity' (liquids, powders and dusts), and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning,

and Stray Currents' (liquids).

General Storage Information: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner, or disposed of properly. **DO NOT USE OR STORE** near heat, sparks or open flames. **USE AND STORE ONLY IN WELL VENTILATED AREA.** Keep container closed when not in use.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), 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.

ENGINEERING CONTROLS:

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits. Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT:

Eye/Face Protection: Wear eye protection such as safety glasses, chemical goggles, or faceshields if engineering controls or work practices are not adequate to prevent eye contact.

Skin Protection: Wear impervious protective clothing to prevent skin contact. Selection of protective clothing may include gloves, apron, boots, and complete facial protection depending on operations conducted. Users should determine acceptable performance characteristics of protective clothing. Consider physical requirements and other substances present when selecting protective clothing. Suggested materials for protective gloves include: 4H (PE/EVAL), or Responder

Respiratory Protection: If exposure is anticipated to be greater than applicable exposure limits, wear a NIOSH approved respirator that provides adequate protection from measured concentrations of this material, 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. Air-purifying respirators are not recommended due to potential olfactory fatigue.

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling / Peak	Notation
tert-Butyl Mercaptan	ACGIH	Not Established	NA	NA	n-Butyl Mercaptan: 0.5 ppm
tert-Butyl Mercaptan	CPCHEM	.5 ppm	NA	NA	As n-Butyl Mercaptan

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Clear liquid, repulsive odor.
Autoignition: NDA
Boiling Point: 63°C (145.4°F) - 65°C (149°F)
Evaporation Rate: 1
Flammability (Explosive) Limits (% by volume in air): Lower: NDA Upper: NDA
Flashpoint: -26°C (-14.8°F) Estimated
Molecular Formula: C₄H₁₀S
Molecular Weight: NDA
Melting Point: NDA
Octanol / Water Partition Coefficient: log-Kow: NDA
pH: NA
Pour Point : NDA
Solubility (in water): Negligible
Specific Gravity: 0.806 @ 16 °C (60.8°F)
Vapor Pressure: 5.9 psia @ 38 °C (100.4°F)
Vapor Density (AIR=1): >3
Viscosity: 0.638 cP @ 20 °C (68°F)
Percent Volatile: 100 % volume

SECTION 10 STABILITY AND REACTIVITY

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

Conditions to Avoid: No Data Available

Incompatibility With Other Materials: No data available

Hazardous Decomposition Products: Sulfur Oxides. Carbon Oxides.

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS:

Acute Oral Toxicity: tert-Butyl Mercaptan: / rat / 8.4 g/kg

Acute Dermal Toxicity: tert-Butyl Mercaptan: / rabbit / 20.8 g/kg

Acute Inhalation Toxicity: tert-Butyl Mercaptan: LC50 / rat / 26,432 ppm / 4 hour(s)

Eye Irritation: tert-Butyl Mercaptan: This material is irritating to the eyes.

Skin Irritation: tert-Butyl Mercaptan: This material is irritating to the skin.

Sensitization: Dermal / sensitizer / based on test results for the components

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains TERTIARY BUTYL MERCAPTAN:

Repeated Dose Toxicity: 13 weeks / Inhalation / rat / Doses 0, 9, 97 or 196ppm / 6 h/day, 5 days/week / LOAEL = 9ppm (proximal tubular nephrosis was observed in male rats only)

Reproductive and Developmental Toxicity: GD 6-16 / inhalation / mice / Doses: 0, 11, 99 or 195ppm (atmospheric concentration) / 6hr/day / NOAEL = 195ppm (no teratology effects were observed); GD 6-19 / inhalation / rat / Doses: 0, 11, 99 or 195ppm (atmospheric concentration) / 6hr/day / NOAEL = 9ppm (no teratology effects were observed)

Genetic Toxicity: Ames test - negative; Sister Chromatid Exchange Assay - negative; Mouse lymphoma forward mutational assay - positive; Mouse micronucleus assay - negative

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY:

This material is expected to be toxic to aquatic organisms.

tert-Butyl Mercaptan - 48 hour(s) / EC50 / water flea (*Daphnia magna*) / 6.7 mg/l

tert-Butyl Mercaptan - 96 hour(s) / LC50 / Rainbow trout (*Salmo gairdneri*) / 34 mg/l

tert-Butyl Mercaptan - 72 hour(s) / EC50 / green algae (*Selenastrum capricornutum*) / 24 mg/l

ENVIRONMENTAL FATE:

The environmental fate of this material is not available.

SECTION 13 DISPOSAL CONSIDERATIONS

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.

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 MSDS and the bill of lading.

Shipping Descriptions per regulatory authority.

US DOT

UN2347, BUTYL MERCAPTANS, 3, II

ICAO / IATA

UN2347, BUTYL MERCAPTANS, 3, II

IMO / IMDG

UN2347, BUTYL MERCAPTANS, 3, II, (-26°C)

RID / ADR

UN2347, BUTYL MERCAPTANS, 3, II, ADR

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES:

- | | |
|---------------------------------------|-----|
| 1. Immediate (Acute) Health Effects: | YES |
| 2. Delayed (Chronic) Health Effects: | NO |
| 3. Fire Hazard: | YES |
| 4. Sudden Release of Pressure Hazard: | NO |
| 5. Reactivity Hazard: | NO |

REGULATORY LISTS SEARCHED:

01= CA Prop 65	17 = FDA 178	33 = RCRA Waste Appendix VIII
02 = LA RTK	18 = FDA 179	34 = RCRA Waste D-List
03 = MA RTK	19 = FDA 180	35 = RCRA Waste P-List
04 =MN Hazardous Substance	20 = FDA 181	36 = RCRA Waste U-List
05 =NJ RTK	21 = FDA 182	37 = SARA Section 302
06 = PA RTK	22 = FDA 184	38 = SARA Section 313
07 = CAA Section 112 HAPs	23 = FDA 186	39 = TSCA 12 (b)
08 = CWA Section 307	24 = FDA 189	40 = TSCA Section 4
09 = CWA Section 311	25 = IARC Group 1	41 = TSCA Section 5(a)
10 =DOT Marine Pollutant	26 = IARC Group 2A	42 = TSCA Section 8(a) CAIR
11 = FDA 172	27 = IARC Group 2B	43 = TSCA Section 8(a) PAIR
12 = FDA 173	28 = IARC Group 3	44 = TSCA Section 8(d)
13 = FDA 174	29 = IARC Group 4	45 = WHIMS - IDL
14 = FDA 175	30 = NTP Carcinogen	46 = Germany D TAL
15 = FDA 176	31 = OSHA Carcinogen	47 = Germany WKG
16 = FDA 177	32 = OSHA Highly Hazardous	48 = DEA List 1
		49 = DEA List 2

The following components of this material are found on the regulatory lists indicated.

tert-Butyl Mercaptan	3, 5, 6, 46
tertiary Butyl Mercaptan	5, 6

WHMIS CLASSIFICATION:

Class B, Division 2: Flammable Liquids
Class D, Division 2, Subdivision B: Toxic Material
Skin Sensitization
Skin or Eye Irritation

CHEMICAL INVENTORY LISTINGS:

AUSTRALIA	YES (AUS)
CANADA	YES (DSL)
CHINA	YES (IECSC)
EUROPEAN UNION	YES (EINECS)
JAPAN	YES (ENCS)
KOREA	YES (ECL)
PHILIPPINES	YES (PICCS)
UNITED STATES	YES (TSCA)

EU LABELING:**Signal Word:**

Danger

Symbols:

Xn - Harmful F - Flammable

Risk and Safety Phrases:

R65: Harmful: may cause lung damage if swallowed.
R51: Toxic to aquatic organisms.
R43: May cause sensitization by skin contact.
R67: Vapors may cause drowsiness and dizziness.

R11: Highly flammable.
 R36/38: Irritating to eyes and skin.
 S2: Keep out of the reach of children.
 S62: If swallowed do not induce vomiting: seek medical advice immediately and show this container or label.
 S16: Keep away from sources of ignition - No smoking.
 S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 S24/25: Avoid contact with skin and eyes.
 S9: Keep container in a well-ventilated place.
 S51: Use only in well-ventilated areas.
 S36/37: Wear suitable protective clothing and gloves.

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 1 Flammability: 3 Reactivity: 0 Special: NA

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA).

REVISION STATEMENT: The following sections have been updated:15

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	- Threshold Limit Value	TWA	- Time Weighted Average
STEL	- Short-term Exposure Limit	PEL	- Permissible Exposure Limit
ACGIH	- American Conference of Government Industrial Hygienists	OSHA	- Occupational Safety & Health Administration
NIOSH	- National Institute for Occupational Safety & Health	NFPA	- National Fire Protection Agency
WHMIS	- Workplace Hazardous Materials Information System	IARC	- Intl. Agency for Research on Cancer
EINECS	- European Inventory of existing Commercial Chemical Substances	RCRA	- Resource Conservation Recovery Act
SARA	- Superfund Amendments and Reauthorization Act.	TSCA	- Toxic Substance Control Act
EC50	- Effective Concentration	LC50	- Lethal Concentration
LD50	- Lethal Dose	CAS	- Chemical Abstract Service
NDA	- No Data Available	NA	- Not Applicable
<=	- Less Than or Equal To	>=	- Greater Than or Equal To
CNS	- Central Nervous System	MAK	- Germany Maximum Concentration Values

This data sheet is prepared according to the latest adaptation of the EEC Guideline 67/548.
This data sheet is prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200).
This data sheet is prepared according to the ANSI MSDS Standard (Z400.1).
This data sheet was prepared by EHS Product Stewardship Group, Chevron Phillips Chemical Company LP, 10001 Six Pines Drive, The Woodlands, TX 77380.
This data sheet is prepared according to the Globally Harmonized System (GHS).

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.