

# SAFETY DATA SHEET



Revision Date 14-Jun-2017

SDS Number 888100008834

Revision Number 1.01

## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

**Product Name** Butane-Propane with H2S

**Synonyms** RS047, Coker Stabilizer Reflux, Depropanizer Feed, HC Debutanizer Overhead Liquid, HC Debutanizer Overhead Release Gas, LEU Feed, Butane/Propane with H2S

**Recommended Use** Refinery Intermediate Stream  
**Uses advised against** All others

**Manufacturer** Tesoro Refining & Marketing Co.  
19100 Ridgewood Parkway  
San Antonio, TX 78259

**Emergency Telephone** Chemtrec: 1-800-424-9300  
Tesoro Call Center: 1-877-783-7676

**E-mail address** ProductStewardship@TSOCORP.com

## 2. HAZARDS IDENTIFICATION

### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1A

### Label elements

#### Danger

May cause genetic defects  
May cause cancer



**Appearance** Gas

**Physical State @20°C** Gas

**Odor** Odorless components mixed with H2S which has rotten egg

**Precautionary Statements - Prevention**

Obtain special instructions before use  
 Do not handle until all safety precautions have been read and understood  
 Wear protective gloves/protective clothing/eye protection/face protection

**Precautionary Statements - Response**

IF exposed or concerned: Get medical advice/attention

**Precautionary Statements - Disposal**

Dispose of contents/container to an approved waste disposal plant

**Hazards not otherwise classified (HNOC)**

Not applicable

**Other Information**

Harmful to aquatic life.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Percent
Propane	74-98-6	30-65
Butane	106-97-8	30-65
Isobutane	75-28-5	5-25
Propene; Propylene	115-07-1	0-<5
Ethane	74-84-0	0-<2
Hydrogen Sulfide	7783-06-4	0->1

### 4. FIRST AID MEASURES

**Description of first aid measures****General advice**

Remove from exposure, lie down. In case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt, seek medical advice. Never give anything by mouth to an unconscious person. Take off all contaminated clothing immediately and thoroughly wash material from skin.

**Inhalation**

Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Administer oxygen if breathing is difficult. Seek immediate medical attention/advice.

**Eye contact**

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Get medical attention immediately if symptoms occur.

**Skin contact**

For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. Immediate medical attention is required.

**Ingestion**

Ingestion is not typically an exposure route of gases or compressed gases. If swallowed, call a poison control center or physician immediately.

**Self-protection of the first aider**

Remove all sources of ignition. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Wear personal protective clothing (see section 8). Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

**Most important symptoms and effects, both acute and delayed****Symptoms**

In high concentration the gas may cause a suffocation. Victim may not be aware of asphyxiation.

### Indication of any immediate medical attention and special treatment needed

**Note to physicians** A patient adversely affected by exposure to this product should not be given adrenaline (epinephrine) or similar heart stimulant since these would increase the risk of cardiac arrhythmias.

## 5. FIRE-FIGHTING MEASURES

<b>Small Fire</b>	Any extinguisher suitable for Class B fires, dry chemical, CO2, foam (AFFF/ATC), or water spray can be used.
<b>Large Fire</b>	Water spray, fog or alcohol-resistant foam. CAUTION: Use of water spray when fighting fire may be inefficient. Cool containers with flooding quantities of water until well after fire is out.
<b>Unsuitable extinguishing media</b>	DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
<b>Specific hazards arising from the chemical</b>	Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.). Vapors may form explosive mixture with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. May accumulate electrostatic charge and ignite or explode.
<b>Hazardous combustion products</b>	Smoke, CO, and other products of incomplete combustion.
<b>Explosion data</b>	
<b>Sensitivity to Mechanical Impact</b>	None.
<b>Sensitivity to Static Discharge</b>	Yes.
<b>Special protective equipment for fire-fighters</b>	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn.
<b>Further information</b>	ALWAYS stay away from tanks engulfed in fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Do not direct water at source of leak or safety devices; icing may occur. Cool containers with flooding quantities of water until well after fire is out. Do not allow run-off from fire-fighting to enter drains or water courses.
<b>NFPA</b>	<b>Health hazards</b> 3 <b>Flammability</b> 4 <b>Stability</b> 0 <b>Physical and chemical properties</b> -

## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

**Personal precautions** Keep people away from and upwind of spill/leak. Stop leak if you can do it without risk. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use grounding and bonding connection when transferring this material to prevent static discharge, fire or explosion. Flammable vapor may accumulate to flammable ranges in confined spaces or containers. Monitor area for flammable or explosive atmosphere.

**Other Information** Refer to protective measures listed in Sections 7 and 8.

### Environmental precautions

**Environmental precautions** See Section 12 for additional Ecological Information.

### Methods and material for containment and cleaning up

**Methods for containment** Prevent further leakage or spillage if safe to do so.

**Methods for cleaning up** Pick up and transfer to properly labeled containers.

**Prevention of secondary hazards** Clean contaminated objects and areas thoroughly observing environmental regulations.

## 7. HANDLING AND STORAGE

### Precautions for safe handling

#### **Advice on safe handling**

Do not breathe gas. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Flammable/toxic gases may accumulate in confined areas (basements, tanks, hopper/tank cars etc.). Pay attention to flashback. Use only with adequate ventilation and in closed systems. Empty containers pose a potential fire and explosion hazard. Do not cut, puncture or weld containers. Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements.

#### **Conditions for safe storage, including any incompatibilities**

#### **Storage Conditions**

Store in a dry place. Store in a closed container. Store in accordance with local regulations. Protect from sunlight. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL
Propane 74-98-6	: See Appendix F: Minimal Oxygen Content	TWA: 1000 ppm TWA: 1800 mg/m <sup>3</sup> (vacated) TWA: 1000 ppm (vacated) TWA: 1800 mg/m <sup>3</sup>
Butane 106-97-8	STEL: 1000 ppm	(vacated) TWA: 800 ppm (vacated) TWA: 1900 mg/m <sup>3</sup>
Isobutane 75-28-5	STEL: 1000 ppm	-
Propene; Propylene 115-07-1	TWA: 500 ppm	-
Ethane 74-84-0	: See Appendix F: Minimal Oxygen Content	-
Hydrogen Sulfide 7783-06-4	STEL: 5 ppm TWA: 1 ppm	(vacated) TWA: 10 ppm (vacated) TWA: 14 mg/m <sup>3</sup> (vacated) STEL: 15 ppm (vacated) STEL: 21 mg/m <sup>3</sup> Ceiling: 20 ppm

NOTE: Limits shown for guidance only. For additional information, OSHA's 1989 air contaminants standard exposure limits provided even though the limits were vacated in 1992. State, local or other agencies or advisory groups may have established more stringent limits. Follow applicable regulations.

### Appropriate engineering controls

#### **Engineering controls**

Showers  
Eyewash stations  
Ventilation systems.

### Individual protection measures, such as personal protective equipment

#### **Eye/face protection**

Use goggles or face-shield where there is a possibility of splashing.

#### **Hand Protection**

Wear suitable gloves.

#### **Skin and body protection**

Wear suitable protective clothing.

**Respiratory protection**

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Use a NIOSH approved respirator when there is a potential for airborne concentrations to exceed occupational exposure limits. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2, NIOSH Respirator Decision Logic, and the respirator manufacturer for additional guidance on respiratory protection selection. A Self-Contained Breathing Apparatus (SCBA) should be used for fire fighting. Use a NIOSH approved positive-pressure supplied air respirator if there is a potential for uncontrolled release, exposure levels are unknown, in oxygen deficient (less than 19.5% oxygen), or any other circumstance where an air-purifying respirator may not provide adequate protection.

**General hygiene considerations**

Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<b>Physical State @20°C</b>	Gas
<b>Appearance</b>	Gas
<b>Odor</b>	Odorless components mixed with H <sub>2</sub> S which has rotten egg
<b>Color</b>	Colorless gas. Cold vapor may generate visible white cloud, but the lack of a visible cloud does not indicate absence of gas.
<b>Odor threshold</b>	Odor threshold as low as 10 part per billion reported for H <sub>2</sub> S.

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	Not applicable	
Melting point / freezing point	-184 °C / -299 °F	
Boiling range	-89 - -88.9 to -0.55 °C	
Flash point	-104 °C / -155 °F	
Evaporation rate	No data available	
Flammability (solid, gas)	Gas	
Flammability Limit in Air %		
Upper flammability limit:	9.5	
Lower flammability limit:	2.1	
Vapor pressure	1169	
Vapor density	1.6	
Relative density	No data available	
Water solubility	Slightly Soluble	
Solubility in other solvents	No data available	
Partition coefficient	No data available	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Kinematic viscosity	No data available	
Dynamic viscosity	No data available	
Explosive properties	No data available	
Oxidizing properties	No data available	
Minimum Ignition Energy (mJ)	No data available	
K <sub>st</sub> (bar.m/s)	No data available	
Softening point	No data available	
VOC Content (%)	No data available	
Density	No data available	
Bulk density	Not applicable	
Conductivity	No data available	

## 10. STABILITY AND REACTIVITY

<b>Reactivity</b>	This product is non-reactive under normal conditions.
<b>Chemical stability</b>	Stable under recommended storage conditions.
<b>Possibility of hazardous reactions</b>	None under normal processing.
<b>Conditions to avoid</b>	Heat, flames and sparks.

**Incompatible materials** Oxidizing or reducing agents. Acids. Alkali.

**Hazardous decomposition products** None under normal use conditions.

## 11. TOXICOLOGICAL INFORMATION

### Information on likely routes of exposure

**Inhalation** Specific test data for the substance or mixture is not available.  
**Eye contact** Specific test data for the substance or mixture is not available.  
**Skin contact** Specific test data for the substance or mixture is not available.  
**Ingestion** Specific test data for the substance or mixture is not available.

### Information on toxicological effects

**Symptoms** No information available.

### Numerical measures of toxicity

#### Acute toxicity

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (inhalation-gas) 29,976.28 mg/l  
ATEmix (inhalation-dust/mist) 5.01 mg/l

Chemical Name	Oral LD50	LD50/dermal/rat - NO UNITS (Wizards mg/kg)	Inhalation LC50
Propane 74-98-6	-	-	= 658 mg/L ( Rat ) 4 h
Butane 106-97-8	-	-	= 658 g/m <sup>3</sup> ( Rat ) 4 h
Isobutane 75-28-5	-	-	= 658 mg/L ( Rat ) 4 h
Propene; Propylene 115-07-1	-	-	> 65000 ppm ( Rat ) 4 h
Ethane 74-84-0	-	-	= 658 mg/L ( Rat ) 4 h
Hydrogen Sulfide 7783-06-4	-	-	= 700 mg/m <sup>3</sup> ( Rat ) 4 h

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

#### Chemical Name

##### Butane

If inhaled, short-term overexposure to hydrocarbon gases may cause rapid suffocation. Inhalation of butane at very high concentrations can cause drowsiness, narcosis, asphyxia, and cardiac arrhythmia; butane affects the central nervous system (CNS). As gases, the primary route of exposure is inhalation; compressed gases may exhibit additional hazards. In animal studies, 2-Butene was the most toxic of the C1-4 hydrocarbon gas (C1-4 HCs) evaluated for its short term (acute) toxicity when inhaled for four hours at 10,000 ppm (23.1 g/m<sup>3</sup>); no fatalities were observed, and no LC50 value was established. Repeated dose toxicity has been observed in combination with testing for reproductive and developmental toxicity; the lowest does at which adverse effects were observed (LOAEL) following repeated dose reported to be 5,000 ppm. Adverse effects included lowered body weight, though some changes in blood chemistry were also reported. C1-4 HCs were not mutagenic in several test systems using bacteria or mammalian cells, nor were they mutagenic in animal studies. No adverse developmental effects were reported for the highest dose tested (NOAEL ≥ 5,000 ppm). Reproductive toxicity was reported for

isobutene (LOAEL = 9,000 ppm) as reduced fertility in females and pregnancy loss; caution should be used in interpreting the results of this study due to the small number of animals tested. The carcinogenicity of individual petroleum streams varies due to factors such as source and processing; IARC and ECHA C&L Inventory reports individually on the carcinogenicity of these substances.

**Hydrogen Sulfide**

Hydrogen Sulfide may be fatal if inhaled. The nervous system and respiratory tract are the main targets of hydrogen sulfide toxicity. Short term (acute) overexposure may cause irritation to the eyes, nose or throat. At high enough levels, effects on the nervous system include headaches, poor concentration, poor memory, unconsciousness, and death. Hydrogen sulfide has a strong odor that is characteristic of rotten eggs; however, the odor is not a reliable warning property as olfactory fatigue occurs at high levels. Respiratory distress or arrest can occur at high concentrations. Direct contact of the liquid with skin can cause frostbite; contact with the eyes can cause redness or severe burns. Cardiovascular effects have also been observed. NIOSH has determined that 100 ppm is immediately dangerous to life and health.

**Health hazard and classification information**

- Skin Corrosion/Irritation Category** No information available.
- Serious eye damage/eye irritation** No information available.  
No information available.
- Germ cell mutagenicity** No information available.
- Carcinogenicity** Classification based on data available for ingredients. Contains a known or suspected carcinogen.

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Propene; Propylene 115-07-1	-	Group 3	-	-

- Reproductive toxicity** No information available.
- Target Organ Systemic Toxicant - Single Exposure** No information available.
- Target Organ Systemic Toxicant - Repeated Exposure** No information available.
- Target organ effects** Respiratory system, Eyes, Central nervous system.
- Aspiration hazard** No information available.

**12. ECOLOGICAL INFORMATION**

**Additional Ecological Information** Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems. U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number to the U.S. Coast Guard National Response Center is (800) 424-8802

**Ecotoxicity**

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Hydrogen Sulfide 7783-06-4	-	0.016: 96 h Pimephales promelas mg/L LC50 flow-through 0.0448: 96 h Lepomis macrochirus	-	0.022: 96 h Gammarus pseudolimnaeus mg/L LC50

		mg/L LC50 flow-through	
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**Persistence and degradability** No information available.

**Bioaccumulation** There is no data for this product.

**Component Information**

Chemical Name	Partition coefficient
Propane 74-98-6	2.3
Butane 106-97-8	2.89
Isobutane 75-28-5	2.88
Propene; Propylene 115-07-1	<=2.8
Ethane 74-84-0	<=2.8
Hydrogen Sulfide 7783-06-4	0.45

**Other adverse effects** No information available.

**13. DISPOSAL CONSIDERATIONS**

**Waste treatment methods**

**Waste from residues/unused products** Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

**Contaminated packaging** Do not reuse empty containers.

**US EPA Waste Number** U135

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Hydrogen Sulfide 7783-06-4	U135	-	-	U135

**14. TRANSPORT INFORMATION**

**DOT** Not regulated

**TDG** Not regulated

**MEX** Not regulated

**IATA** Not regulated  
**UN/ID no** UN1953

**IMDG** Not regulated

**15. REGULATORY INFORMATION**

**International Inventories**

**TSCA** Listed  
**DSL/NDSL** Listed



<b>ENCS</b>	Listed
<b>IECSC</b>	Listed
<b>KECL</b>	Listed
<b>PICCS</b>	Listed
<b>AICS</b>	Listed

**Legend:**

- TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
- DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
- ENCS** - Japan Existing and New Chemical Substances
- IECSC** - China Inventory of Existing Chemical Substances
- KECL** - Korean Existing and Evaluated Chemical Substances
- PICCS** - Philippines Inventory of Chemicals and Chemical Substances
- AICS** - Australian Inventory of Chemical Substances

**US Federal Regulations**

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

**SARA 311/312 Hazard Categories**

<b>Acute health hazard</b>	No
<b>Chronic Health Hazard</b>	Yes
<b>Fire hazard</b>	Yes
<b>Sudden release of pressure hazard</b>	No
<b>Reactive Hazard</b>	No

**CWA (Clean Water Act)**

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Hydrogen Sulfide 7783-06-4	100 lb	-	-	X

**CERCLA**

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply.

**US State Regulations**

**California Proposition 65**

This product does not contain any Proposition 65 chemicals.

**U.S. State Right-to-Know Regulations**

**US State Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Butane 106-97-8	X	X	X
Propane 74-98-6	X	X	X
Isobutane 75-28-5	X	X	X
Propene; Propylene 115-07-1	X	X	X

Ethane 74-84-0	X	X	X
Hydrogen Sulfide 7783-06-4	X	X	X

**16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION**

Revision Date 14-Jun-2017

Revision Note No information available.

**Disclaimer**

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**End of Safety Data Sheet**