

SAFETY DATA SHEET



Revision Date 19-Dec-2017

SDS Number 888100008857

Revision Number 1.02

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

Product Name Natural Gas - Rockies

Synonyms None

Recommended Use Fuel
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
Chronic Aquatic Toxicity	Category 2

Label elements

Danger

May cause genetic defects
May cause cancer
Toxic to aquatic life with long lasting effects



Appearance Gas

Physical State @20°C Gas

Odor No information available

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

Causes mild skin irritation. Toxic to aquatic life.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Percent
Methane	74-82-8	58-88
Ethane	74-84-0	3.5-19
Propane	74-98-6	1-12.3
Carbon Dioxide	124-38-9	1-6.1
Butane	106-97-8	1-4
Nitrogen	7727-37-9	1-3
Isobutane	75-28-5	1-3
Cyclohexane	110-82-7	0.1-2
n-Heptane	142-82-5	0.2-1.3
Isopentane	78-78-4	0.3-1.2
Pentane	109-66-0	0.2-1

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

Small Fire	Any extinguisher suitable for Class B fires, dry chemical, CO ₂ , foam (AFFF/ATC), or water spray can be used.
Large Fire	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.
Unsuitable extinguishing media	DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
Specific hazards arising from the chemical	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.
Hazardous combustion products	Smoke, CO, and other products of incomplete combustion.
Explosion data	
Sensitivity to Mechanical Impact	None.
Sensitivity to Static Discharge	Yes.
Special protective equipment for fire-fighters	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.
Further information	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.
NFPA	Health hazards 1 Flammability 4 Stability 0 Physical and chemical properties -

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.
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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.
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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL
Methane 74-82-8	: See Appendix F: Minimal Oxygen Content	-
Ethane 74-84-0	: See Appendix F: Minimal Oxygen Content	-
Propane 74-98-6	: See Appendix F: Minimal Oxygen Content	TWA: 1000 ppm TWA: 1800 mg/m ³ (vacated) TWA: 1000 ppm (vacated) TWA: 1800 mg/m ³
Carbon Dioxide 124-38-9	STEL: 30000 ppm TWA: 5000 ppm	TWA: 5000 ppm TWA: 9000 mg/m ³ (vacated) TWA: 10000 ppm (vacated) TWA: 18000 mg/m ³ (vacated) STEL: 30000 ppm (vacated) STEL: 54000 mg/m ³
Butane 106-97-8	STEL: 1000 ppm	(vacated) TWA: 800 ppm (vacated) TWA: 1900 mg/m ³
Nitrogen 7727-37-9	: See Appendix F: Minimal Oxygen Content	-
Isobutane 75-28-5	STEL: 1000 ppm	-
Cyclohexane 110-82-7	TWA: 100 ppm	TWA: 300 ppm TWA: 1050 mg/m ³ (vacated) TWA: 300 ppm (vacated) TWA: 1050 mg/m ³
n-Heptane 142-82-5	STEL: 500 ppm TWA: 400 ppm	TWA: 500 ppm TWA: 2000 mg/m ³ (vacated) TWA: 400 ppm (vacated) TWA: 1600 mg/m ³ (vacated) STEL: 500 ppm

		(vacated) STEL: 2000 mg/m ³
Isopentane 78-78-4	TWA: 1000 ppm	-
Pentane 109-66-0	TWA: 1000 ppm	TWA: 1000 ppm TWA: 2950 mg/m ³ (vacated) TWA: 600 ppm (vacated) TWA: 1800 mg/m ³ (vacated) STEL: 750 ppm (vacated) STEL: 2250 mg/m ³

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

Physical State @20°C	Gas
Appearance	Gas
Odor	No data available
Color	No data available
Odor threshold	No data available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	Not applicable	
Melting point / freezing point	No data available	
Boiling range	No data available	
Flash point	No data available	
Evaporation rate	No data available	
Flammability (solid, gas)	Not applicable	
Flammability Limit in Air %		
Upper flammability limit:	No data available	
Lower flammability limit:	No data available	
Vapor pressure	No data available	
Vapor density	No data available	

Relative density	No data available
Water solubility	No data available
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 _{st} (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

Reactivity	This product is non-reactive under normal conditions.
Chemical stability	Stable under recommended storage conditions.
Possibility of hazardous reactions	None under normal processing.
Conditions to avoid	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.
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Numerical measures of toxicity

Acute toxicity

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

ATEmix (dermal)	56,636.00 mg/kg
ATEmix (inhalation-gas)	1,058,227.82 mg/l
ATEmix (inhalation-dust/mist)	5,088.00 mg/l

Chemical Name	Oral LD50	LD50/dermal/rat - NO UNITS (Wizards mg/kg)	Inhalation LC50
Ethane 74-84-0	-	-	= 658 mg/L (Rat) 4 h
Propane	-	-	= 658 mg/L (Rat) 4 h

74-98-6			
Butane 106-97-8	-	-	= 658 g/m ³ (Rat) 4 h
Isobutane 75-28-5	-	-	= 658 mg/L (Rat) 4 h
Cyclohexane 110-82-7	= 12705 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	= 13.9 mg/L (Rat) 4 h
n-Heptane 142-82-5	-	= 3000 mg/kg (Rabbit)	= 103 g/m ³ (Rat) 4 h
Isopentane 78-78-4	-	-	= 280000 mg/m ³ (Rat) 4 h
Pentane 109-66-0	> 2000 mg/kg (Rat)	= 3000 mg/kg (Rabbit)	= 364 g/m ³ (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/m³); 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 dose 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.

Cyclohexane

Cyclohexane may be fatal if it is swallowed and enters the airways. Cyclohexane has low acute oral, dermal, and inhalation toxicity. Acute (short-term) overexposure can irritate and burn the eyes, irritate the nose and throat, and cause coughing, wheezing, headache, dizziness, nausea, vomiting, lightheadedness, drowsiness, and unconsciousness at high concentrations. Chronic inhalation exposure caused maternal toxicity and developmental effects in rats. At high enough levels, repeated or prolonged contact with skin may cause dermatitis.

Pentane

Pentane may be fatal if it is swallowed and enters the airway. If inhaled, short-term (acute) overexposure can cause drowsiness, disorientation, other narcotic effects, and possibly death. Acute exposure to n-pentane by inhalation and ingestion results in low toxicity in animal studies. Exposure can cause irritation to eyes, skin (including dermatitis), and nose. Sensitization has not been reported. Exposure to high enough levels may also affect the central nervous system (CNS).

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.
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, Skin, Central nervous system, Central Vascular System (CVS).
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 Toxic to aquatic life with long lasting effects.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Cyclohexane 110-82-7	500: 72 h <i>Desmodesmus subspicatus</i> mg/L EC50	3.96 - 5.18: 96 h <i>Pimephales promelas</i> mg/L LC50 flow-through 23.03 - 42.07: 96 h <i>Pimephales promelas</i> mg/L LC50 static 24.99 - 44.69: 96 h <i>Lepomis macrochirus</i> mg/L LC50 static 48.87 - 68.76: 96 h <i>Poecilia reticulata</i> mg/L LC50 static	-	400: 24 h <i>Daphnia magna</i> mg/L EC50
n-Heptane 142-82-5	-	375.0: 96 h Cichlid fish mg/L LC50	-	10: 24 h <i>Daphnia magna</i> mg/L EC50
Isopentane 78-78-4	-	-	-	2.3: 48 h <i>Daphnia magna</i> mg/L EC50
Pentane 109-66-0	-	9.99: 96 h <i>Lepomis macrochirus</i> mg/L LC50 9.87: 96 h <i>Oncorhynchus mykiss</i> mg/L LC50 11.59: 96 h <i>Pimephales promelas</i> mg/L LC50	-	9.74: 48 h <i>Daphnia magna</i> mg/L EC50

Persistence and degradability No information available.

Bioaccumulation There is no data for this product.

Component Information

Chemical Name	Partition coefficient
Ethane 74-84-0	≤2.8
Propane 74-98-6	2.3
Butane 106-97-8	2.89
Isobutane 75-28-5	2.88

Cyclohexane 110-82-7	3.44
n-Heptane 142-82-5	4.66
Isopentane 78-78-4	3.2 - 3.3
Pentane 109-66-0	3.39

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 U056

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Cyclohexane 110-82-7	-	-	-	U056

California Hazardous Waste Status This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste Status
Cyclohexane 110-82-7	Toxic Ignitable
n-Heptane 142-82-5	Toxic Ignitable
Isopentane 78-78-4	Ignitable Toxic
Pentane 109-66-0	Toxic Ignitable

14. TRANSPORT INFORMATION

DOT

UN/ID no UN1972
Proper Shipping Name METHANE, REFRIGERATED LIQUID
Hazard Class 2.1
Reportable Quantity (RQ) (Cyclohexane: RQ (kg)= 454.00)
Special Provisions T75, TP5
Description UN1972, METHANE, REFRIGERATED LIQUID (METHANE, CYCLOHEXANE), 2.1, Marine pollutant
Emergency Response Guide Number 115

TDG

Description Forbidden Not regulated
Forbidden

MEX

UN/ID no UN1972

Proper Shipping Name METHANE, REFRIGERATED LIQUID
Hazard Class 2.1
Description UN1972, METHANE, REFRIGERATED LIQUID, 2.1

IATA Forbidden BY PASSENGER AIR Not regulated
UN/ID no UN1972
Description Forbidden

IMDG
UN/ID no UN1972
Proper Shipping Name METHANE, REFRIGERATED LIQUID
Hazard Class 2
EmS No. F-D, S-U
Description UN1972, METHANE, REFRIGERATED LIQUID, 2, Marine pollutant

15. REGULATORY INFORMATION

International Inventories

TSCA Listed
DSL/NDSL Listed
ENCS Not Listed
IECSC Listed
KECL Listed
PICCS Listed
AICS 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

Acute health hazard No
Chronic Health Hazard Yes
Fire hazard No
Sudden release of pressure hazard No
Reactive Hazard 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
Cyclohexane 110-82-7	1000 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
Methane 74-82-8	X	X	X
Ethane 74-84-0	X	X	X
Propane 74-98-6	X	X	X
Carbon Dioxide 124-38-9	X	X	X
Butane 106-97-8	X	X	X
Isobutane 75-28-5	X	X	X
Nitrogen 7727-37-9	X	X	X
Cyclohexane 110-82-7	X	X	X
n-Heptane 142-82-5	X	X	X
Isopentane 78-78-4	X	X	X
Pentane 109-66-0	X	X	X

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

Revision Date 19-Dec-2017

Revision Note No information available.

Disclaimer

Tesoro Companies, Inc. (Tesoro) provides the information on this Safety Data Sheet (SDS) in order to meet its obligations under 29 CFR 1910.1200, and does not hereby make any guarantee of product specifications or suitability for any particular purpose. Tesoro does not assume any liability arising out of the use of Tesoro's product or the use of information provided on this SDS. The end user of the product has the responsibility for evaluating the adequacy of the data under the conditions of use, determining the safety, toxicity and suitability of the product under these conditions, and obtaining additional or clarifying information where uncertainty exists. No guarantee expressed or implied is made as to the effects of such use, the results to be obtained, or the safety and toxicity of the product in any specific application. Furthermore, the information herein is not represented as absolutely complete, since it is not practicable to provide all relevant information in the format of this document, since additional information may be necessary under exceptional conditions of use, and since Tesoro prepared this SDS based on information available on the date of its publication.

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End of Safety Data Sheet