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

Product information

Product Name: Crude Hydrogen
Material: 1015516

Company: Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)

Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
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 gases, Category 1
- Gases under pressure, Compressed gas
- Simple Asphyxiant

Labeling

SDS Number: 100000067615
Crude Hydrogen

Symbol(s): 

Signal Word: Danger


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: None established

Molecular formula: UVCB

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Gas</td>
<td>68476-26-6</td>
<td>100</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>1333-74-0</td>
<td>70</td>
</tr>
<tr>
<td>Ethylene</td>
<td>74-85-1</td>
<td>12</td>
</tr>
<tr>
<td>Methane</td>
<td>74-82-8</td>
<td>68</td>
</tr>
<tr>
<td>Ethane</td>
<td>74-84-0</td>
<td>3</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

General advice: Move out of dangerous area. Show this material safety data sheet to the doctor in attendance.

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

In case of skin contact: Wash off with soap and water.
Crude Hydrogen
Version 2.2
Revision Date 2017-12-21

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. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: Firefighting measures

Flash point: No data available

Autoignition temperature: 585 °C (1,085 °F)

Suitable extinguishing media: Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media: High volume water jet.

Special protective equipment for fire-fighters: Wear self-contained breathing apparatus for firefighting if necessary.

Further information: 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: No data available.

SECTION 6: Accidental release measures

Personal precautions: Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Environmental precautions: Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

SECTION 7: Handling and storage

Handling

Advice on safe handling: 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

SDS Number: 100000067615
SAFETY DATA SHEET

Crude Hydrogen
Version 2.2
Revision Date 2017-12-21

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

Prevent unauthorized access. No smoking. Keep container tightly closed in a dry and well-ventilated place. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>US</th>
<th>Ingredients</th>
<th>Basis</th>
<th>Value</th>
<th>Control parameters</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>Ethylene</td>
<td>ACGIH</td>
<td>TWA</td>
<td>200 ppm.</td>
<td>asphyxia, A4,</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: 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. Safety glasses.
**Crude Hydrogen**

**Skin and body protection**: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.

**Hygiene measures**: 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**: Compressed gas
- **Physical state**: Gaseous
- **Color**: Colorless
- **Odor**: Odorless

**Safety data**
- **Flash point**: No data available
- **Lower explosion limit**: 4 %(V)
- **Upper explosion limit**: 75 %(V)
- **Oxidizing properties**: No
- **Autoignition temperature**: 585 °C (1,085 °F)
- **Molecular formula**: UVCB
- **Molecular weight**: Not applicable
- **pH**: Not applicable
- **Freezing point**: No data available
- **Pour point**: Not applicable
- **Boiling point/boiling range**: -253 °C (-423 °F)
- **Vapor pressure**: No data available
- **Density**: 0.0052 LB/FT³ at (760.00 MMHG)
- **Water solubility**: Partly soluble
- **Partition coefficient: n-octanol/water**: No data available
- **Viscosity, dynamic**: 0.013 cP
- **Relative vapor density**: 0.5

**SDS Number**: 100000067615
### 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.

**Possibility of hazardous reactions**

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

**Materials to avoid**: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Hazardous decomposition products**: No data available

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

### SECTION 11: Toxicological information

**Crude Hydrogen**

**Acute oral toxicity**: No data available
- Negligible or unlikely exposure pathways

**Acute inhalation toxicity**: LC50: > 8000 ppm
- Test atmosphere: gas
- Method: Acute toxicity estimate

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

**Skin irritation**: No skin irritation

**Eye irritation**: No eye irritation

**Sensitization**: No adverse effects expected.

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

**Carcinogenicity**
Ethylene
Species: Rat
Dose: 0, 300, 1000, 3000 ppm
Exposure time: 2 yrs
Number of exposures: 6 h/d, 5 d/wk
Remarks: no increase incidence of tumors

Reproductive toxicity
Ethylene
Species: Rat
Application Route: Inhalation
Dose: 0, 200, 1000, 5000 ppm
Number of exposures: 6 h/d
NOAEL Parent: 5000 ppm
NOAEL F1: 5000 ppm
no abnormalities observed

Ethane
Species: Rat
Sex: male and female
Application Route: Inhalation
Dose: 0, 1600, 5000, 16000 ppm
Exposure time: 6 weeks
Number of exposures: 6 hours/day, 7 days/week
Test period: 6 weeks
Test substance: yes
Method: OECD Guideline 422
NOAEL Parent: 16000 ppm
NOAEL F1: 16000 ppm
no abnormalities observed

Developmental Toxicity
Ethylene
Species: Rat
Application Route: Inhalation
Dose: 0, 200, 1000, 5000 ppm
Number of exposures: 6 h/d
NOAEL Teratogenicity: 5000 ppm
NOAEL Maternal: 5000 ppm
No toxicity to reproduction
Animal testing did not show any effects on fertility.

Ethane
This material is not expected to bioaccumulate.
This substance is not considered to be persistent, bioaccumulating and toxic (PBT).
This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Crude Hydrogen
Further information: No data available.
Biodegradability : Not applicable

Ecotoxicology Assessment
Results of PBT assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Additional ecological information : No data available

### 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 : Do not dispose of waste into sewer. 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)**
UN2034, HYDROGEN AND METHANE MIXTURES, COMPRESSED, 2.1

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**
UN2034, HYDROGEN AND METHANE MIXTURE, COMPRESSED, 2.1

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**
UN2034, HYDROGEN AND METHANE MIXTURE, COMPRESSED, 2.1

**ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))**
UN2034, HYDROGEN AND METHANE MIXTURE, COMPRESSED, 2.1, (B/D)
Crude Hydrogen

SECTION 15: Regulatory information

National legislation

SARA 311/312 Hazards: Flammable (gases, aerosols, liquids, or solids)
Gases under pressure
Simple Asphyxiant

EPCRA - EMERGENCY PLANNING COMMUNITY RIGHT - TO – KNOW

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 Ingredients: The following components are subject to reporting levels established by SARA Title III, Section 313:

: Ethylene - 74-85-1

Clean Air Act
Ozone-Depletion Potential: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

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

The following chemical(s) are listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F):
- Methane - 74-82-8
- Ethylene - 74-85-1
- Ethane - 74-84-0

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):
- Ethylene - 74-85-1

US State Regulations

Pennsylvania Right To Know:
- Fuel Gas - 68476-26-6
- Methane - 74-82-8
- Hydrogen - 1333-74-0
- Ethylene - 74-85-1
- Ethane - 74-84-0
- Nitrogen - 7727-37-9
- Carbon Monoxide - 630-08-0

California Prop. 65 Ingredients: WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

Notification status
Europe REACH: Not in compliance with the inventory
United States of America (USA) TSCA: Not in compliance with the inventory
Canada DSL: On the inventory, or in compliance with the inventory
Australia AICS: On the inventory, or in compliance with the inventory
New Zealand NZIoC: Not 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
Crude Hydrogen

Version 2.2

Revision Date 2017-12-21

SECTION 16: Other information

NFPA Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Hazard</td>
<td>0</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>4</td>
</tr>
<tr>
<td>Reactivity</td>
<td>0</td>
</tr>
</tbody>
</table>

Further information

Legacy SDS Number: 5860

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet

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

**New Chemical Substances**

<table>
<thead>
<tr>
<th>KECI</th>
<th>Korea, Existing Chemical Inventory</th>
<th>UVCB</th>
<th>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>