

SECTION 1: Identification

1.1. Identification

| | |
|----------------|---|
| Product form | : Substance |
| Substance name | : Propane |
| CAS No | : 74-98-6 |
| Product code | : SG-1001-06868 |
| Formula | : C3H8 |
| Synonyms | : Propane liquefied / Dimethylmethane / Freon 290 / n-Propane |

1.2. Relevant identified uses of the substance or mixture and uses advised against

| | |
|------------------------------|---|
| Use of the substance/mixture | : Manufacture of substances Semiconductor Purposes Laboratory chemicals |
|------------------------------|---|

1.3. Details of the supplier of the safety data sheet

Air Liquide USA LLC and its affiliates
9811 Katy Freeway, Suite 100
Houston, TX 77024 - USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable gases H220
Category 1
Gases under pressure H280
Liquefied gas

Full text of H statements : see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
OSHA-H01 - May displace oxygen and cause rapid suffocation
CGA-HG01 - May cause frostbite
CGA-HG04 - May form explosive mixtures with air

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, face protection, protective gloves, protective clothing
P302 - IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area, Get immediate medical advice/attention
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
P403 - Store in a well-ventilated place
P501 - Dispose of contents/container in accordance with local/regional/national/international

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regulations
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG21 - Open valve slowly

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substance

| Name | Product identifier | % | GHS-US classification |
|-------------------------------|--------------------|------|--|
| Propane (Main constituent) | (CAS No) 74-98-6 | > 99 | Flam. Gas 1, H220 Liquefied gas, H280 |

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
- First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation.
- Symptoms/injuries after skin contact : May cause frostbite.
- Symptoms/injuries after eye contact : Contact with the product may cause cold burns or frostbite.
- Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.
- Symptoms/injuries upon intravenous administration : Not known.
- Chronic symptoms : Adverse effects not expected from this product.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : This product is flammable.
- Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form flammable/explosive vapor-air mixture.
- Reactivity : None known.

5.3. Advice for firefighters

- Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
- Protection during firefighting : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.
Emergency procedures : Evacuate personnel to a safe area. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
Emergency procedures : Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

6.2. Environmental precautions

Try to stop release if without risk.

6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if without risk.
Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. Handle empty containers with care because residual vapors are flammable. In use, may form flammable vapor-air mixture.
Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools.
Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.
Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area.
Incompatible products : None known.
Incompatible materials : Oxidizing materials. Air.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

| Propane (74-98-6) | | |
|-------------------|--------------------------------------|------------------------|
| OSHA | OSHA PEL (TWA) (mg/m ³) | 1800 mg/m ³ |
| OSHA | OSHA PEL (TWA) (ppm) | 1000 ppm |
| IDLH | US IDLH (ppm) | 2100 ppm (10% LEL) |
| NIOSH | NIOSH REL (TWA) (mg/m ³) | 1800 mg/m ³ |
| NIOSH | NIOSH REL (TWA) (ppm) | 1000 ppm |

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8.2. Exposure controls

| | |
|----------------------------------|---|
| Appropriate engineering controls | : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider work permit system e.g. for maintenance activities. |
| Hand protection | : Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand protection. |
| Eye protection | : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection. |
| Skin and body protection | : Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing. |
| Respiratory protection | : None necessary during normal and routine operations. See Sections 5 & 6. |
| Thermal hazard protection | : None necessary during normal and routine operations. |
| Environmental exposure controls | : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. |
| Other information | : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection. |

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---|---|
| Physical state | : Gas |
| Appearance | : Colorless gas. |
| Color | : Colorless. |
| Odor | : Odorless Stenchant often added. |
| Odor threshold | : No data available |
| pH | : Not applicable. |
| Melting point | : -187.69 °C |
| Freezing point | : -187.69 °C |
| Boiling point | : -42.04 °C |
| Critical temperature | : 97.65 °C |
| Critical pressure | : 4248 kPa |
| Flash point | : Not applicable. |
| Relative evaporation rate (butyl acetate=1) | : No data available |
| Relative evaporation rate (ether=1) | : Not applicable. |
| Flammability (solid, gas) | : See Section 2.1 and 2.2 |
| Explosion limits | : 2.2 - 9.5 vol % |
| Explosive properties | : Without adequate ventilation formation of explosive mixtures may be possible. |
| Oxidizing properties | : None. |
| Vapor pressure | : 756.9 kPa at 21.1 °C |
| Relative density | : No data available |
| Relative vapor density at 20 °C | : No data available |
| Specific gravity / density | : 1.858 kg/m ³ at 21.1 °C |
| Molecular mass | : 44.11 g/mol |
| Relative gas density | : 1.52 |
| Solubility | : Water: 0.065 g/l |
| Log Pow | : 2.36 |
| Auto-ignition temperature | : 450 °C |
| Decomposition temperature | : No data available |
| Viscosity | : No data available |
| Viscosity, kinematic | : Not applicable. |
| Viscosity, dynamic | : Not applicable. |

9.2. Other information

| | |
|------------------------|--|
| Gas group | : Liquefied gas |
| Additional information | : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level |

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

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10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react violently with oxidants. Can form explosive mixture with air.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials

Air, Oxidizer. For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

| Propane (74-98-6) | |
|----------------------------|--------------------|
| LC50 inhalation rat (mg/l) | 658 mg/l/4h |
| LC50 inhalation rat (ppm) | 282800 ppm/4h |
| ATE US (gases) | 282800.000 ppmV/4h |
| ATE US (vapors) | 658.000 mg/l/4h |
| ATE US (dust, mist) | 658.000 mg/l/4h |

Skin corrosion/irritation : Not classified
pH: Not applicable.

Serious eye damage/irritation : Not classified
pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation.

Symptoms/injuries after skin contact : May cause frostbite.

Symptoms/injuries after eye contact : Contact with the product may cause cold burns or frostbite.

Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

| Propane (74-98-6) | |
|-------------------------------|--|
| Persistence and degradability | The substance is biodegradable. Unlikely to persist. |

12.3. Bioaccumulative potential

| Propane (74-98-6) | |
|---------------------------|---|
| Log Pow | 2.36 |
| Bioaccumulative potential | Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9. |

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12.4. Mobility in soil

Propane (74-98-6)

| | |
|----------------|---|
| Ecology - soil | Because of its high volatility, the product is unlikely to cause ground or water pollution. |
|----------------|---|

12.5. Other adverse effects

Effect on ozone layer : None

Effect on the global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into areas where there is a risk of forming an explosive mixture with air.

Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1978 Propane see also Petroleum gases, liquefied, 2.1

UN-No.(DOT) : UN1978

Proper Shipping Name (DOT) : Propane
see also Petroleum gases, liquefied

Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

Hazard labels (DOT) : 2.1 - Flammable gas



DOT Packaging Non Bulk (49 CFR 173.xxx) : 304

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

DOT Special Provisions (49 CFR 172.102) : 19 - For domestic transportation only, the identification number UN1075 may be used in place of the identification number specified in column (4) of the 172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response information
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter

DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg

DOT Vessel Stowage Location : E - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Emergency Response Guide (ERG) Number : 115 (UN1075)

Other information : No supplementary information available.

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Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
- Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

TDG

Transport document description : UN1978 PROPANE, 2.1
UN-No. (TDG) : UN1978
Proper Shipping Name : PROPANE
TDG Primary Hazard Classes : 2.1 - Class 2.1 - Flammable Gas.
TDG Special Provisions : 88 - Despite the quantity limits in column 9 of Schedule 1 for these dangerous goods, a road vehicle is not a passenger carrying road vehicle unless the passengers in it are transported for hire or reward. SOR/2008-34
ERAP Index : 3 000
Explosive Limit and Limited Quantity Index : 0.125 L
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden
Passenger Carrying Ship Index : 110 kg

Transport by sea

UN-No. (IMDG) : 1978
Proper Shipping Name (IMDG) : Propane
Class (IMDG) : 2.1 - Flammable gases
MFAG-No : 115

Air transport

UN-No. (IATA) : 1978
Proper Shipping Name (IATA) : Propane
Class (IATA) : 2.1 - Gases : Flammable

SECTION 15: Regulatory information

15.1. US Federal regulations

Propane (74-98-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Propane (74-98-6)

Listed on the Canadian DSL (Domestic Substances List)

| | |
|----------------------|--|
| WHMIS Classification | Class A - Compressed Gas Class B Division 1 - Flammable Gas |
|----------------------|--|

EU-Regulations

Propane (74-98-6)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Propane (74-98-6)

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)

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15.3. US State regulations

Propane (74-98-6)

State or local regulations

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Full text of H-phrases:

| | |
|------|--|
| H220 | Extremely flammable gas |
| H280 | Contains gas under pressure; may explode if heated |

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide USA LLC and its affiliates' knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.