

資料P-1 (CD)

## Propane

- Dimethylmethane
- Propyl hydride
- Petroleum gas
- PRP

**Formula** CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>

**Structure** 

**Description** Colorless gas. Unodorized propane has a slightly sweet odor. If an odorant has been added it will have a strong unpleasant odor.

**Uses** Component of liquid petroleum gas for commercial and industrial usage, feedstock in thermal cracking processes used to manufacture ethylene and propylene, refrigerant in chemical refining and gas processing operations, fuel in welding and cutting operations.

### Registry Numbers and Inventories.

<b>CAS</b>	74-98-6
<b>EC (EINECS/ELINCS)</b>	200-827-9
<b>EC Index Number</b>	601-003-00-5
<b>EC Class</b>	Extremely flammable
<b>RTECS</b>	TX2275000
<b>RTECS class</b>	Agricultural Chemical and Pesticide
<b>UN (DOT)</b>	1978
<b>Merck</b>	12,7982
<b>Beilstein/Gmelin</b>	1730718
<b>Beilstein Reference</b>	4-01-00-00176
<b>Swiss Giftliste 1</b>	G-2784
<b>Canada DSL/NDSL</b>	DSL
<b>US TSCA</b>	Listed
<b>Australia AICS</b>	Listed
<b>New Zealand</b>	Listed
<b>Japan ENCS (MITI)</b>	Listed
<b>Korea ECL</b>	Listed

**Odor Threshold** Odor threshold 36,000 mg/m<sup>3</sup>

### Properties.

**Formula** C<sub>3</sub>H<sub>8</sub>

**Formula mass** 44.1

<b>Melting point, °C</b>	-188
<b>Boiling point, °C</b>	-42
<b>Vapor pressure, mm<sub>Hg</sub></b>	7270 (25 C)
<b>Vapor density (air=1)</b>	0.117
<b>Evaporization number</b>	Gas
<b>Critical temperature</b>	96.81
<b>Critical pressure</b>	42.01
<b>Density</b>	0.515 g/cm <sup>3</sup> (10 C) (liquid)
<b>Solubility in water</b>	100 mg/L (20 C)
<b>Viscosity</b>	0.2 cp (-40 C)
<b>Surface tension</b>	15.15 g/s <sup>2</sup> (-40 C)
<b>Refractive index</b>	1.3407 (-42 C)
<b>Dipole moment</b>	0.08 D
<b>Dielectric constant</b>	1.61 (0 C)
<b>Partition coefficient, pK<sub>ow</sub></b>	2.36
<b>Thermal expansion</b>	0.003/K at 15 C
<b>Heat of fusion</b>	2.6 kJ/mol
<b>Heat of vaporization</b>	19.7 kJ/mol
<b>Heat of combustion</b>	-2206 kJ/mol

### Hazards and Protection.

### Storage

Specific requirements are listed in NFPA 58. Cylinder storage locations should be well-protected, well-ventilated, dry, and separated from combustible materials. Cylinders should never knowingly be allowed to reach a temperature exceeding 52C. Cylinders of propane should be separated from oxygen cylinders or other oxidizers by a minimum distance of 20 ft., or by a barrier of non-combustible material at least 5 ft. high having a fire resistance rating of at least hour. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Protect cylinders from physical damage; do not drag, roll, slide or drop. Use a suitable hand truck for cylinder movement.

### WHMIS

A B1

Propane is heavier than air and may collect in low areas that

<b>Handling</b>	are without proper ventilation. Leak check system with leak detection solution, never with flame. If user experiences difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Non-sparking tools should be used. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Electrically bond and ground cylinder when transferring liquid product
<b>Protection</b>	Wear appropriate protective gloves, clothing and goggles. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
<b>Respirators</b>	Wear positive pressure self-contained breathing apparatus (SCBA).
<b>Small spills/leaks</b>	Evacuate the immediate area. Eliminate any possible sources of ignition, and provide maximum explosion-proof ventilation. Shut off source of propane, if possible. If leaking from cylinder, or valve, contact your supplier. Never enter a confined space or other area where the concentration is greater than 10% of the lower flammable limit which is 0.22%.
<b>Stability</b>	Stable at normal temperatures and pressures.
<b>Incompatibilities</b>	Incompatible with strong oxidizing agents.
<b>Decomposition</b>	At 650 C decomposes to ethylene and ethane.
<b>Fire.</b>	
<b>Flash Point, °C</b>	-104
<b>Autoignition, °C</b>	432
<b>Upper exp. limit, %</b>	9.5
<b>Lower exp. limit, %</b>	2.1
<b>Fire fighting</b>	Evacuate all personnel from danger area. Immediately cool container with water spray from maximum distance, taking care not to extinguish flames. If flames are accidentally extinguished, explosive re-ignition may occur. Stop flow of gas if without risk while continuing cooling water spray. Extinguish using CO <sub>2</sub> , dry chemical, water spray or fog for surrounding area. Do not extinguish until propane source is shut off.
<b>Fire potential</b>	Very flammable, combustion imminent.
<b>Hazards</b>	Containers may explode. Vapor is heavier than air and may travel a long distance to a source of ignition and flash back.
<b>NFPA Health</b>	1
<b>Flammability</b>	4
<b>Reactivity</b>	0

**Health.****Exposure limit(s)**

OSHA PEL: TWA 1000 ppm (1800 mg/m<sup>3</sup>) NIOSH REL: TWA 1000 ppm (1800 mg/m<sup>3</sup>) NIOSH IDLH: 2100 ppm LEL

**Poison\_Class**

-

**Exposure effects**

Rapid breathing and rapid heart rate are common. In severe cases abnormally low blood pressure, apnea, and cardiac arrest develop. Various disturbances including headache, dizziness, mood disturbances, numbness of the extremities, sleepiness, mental confusion, poor judgement and coordination, and memory loss may occur. Prolonged or severe hypoxia results in unconsciousness. Prolonged asphyxia may produce CNS injury. Hemiparesis has been reported with volatile substance abuse. Cerebral edema with brainstem herniation may occur. Seizures have been reported following intentional inhalation.

**Ingestion**

Unlikely route of exposure.

**Inhalation**

Simple asphyxiant. It should be noted that before suffocation could occur, the lower flammability limit of propane in air would be exceeded; possibly causing both an oxygen-deficient and explosive atmosphere. Exposure to concentrations (> 10%) may cause dizziness. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning, and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.

**Skin**

Contact with liquid or cold vapor can cause frostbite.

**Eyes**

Contact with liquid or cold vapor can cause freezing of tissue.

**First aid****Ingestion**

Seek medical assistance.

**Inhalation**

Administer 100% humidified supplemental oxygen with assisted ventilation as required. If hypoxia has been severe or prolonged, carefully evaluate for neurologic sequelae and provide supportive treatment as indicated.

**Skin**

Rewarming and a variety of topical treatments are indicated for frostbite injury. See main section for more information.

**Eyes**

Irrigate exposed eyes with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, lacrimation, or photophobia persist, the patient should be seen in a health care facility.

**Transport.****UN number**

1978

**Response guide**

[115](#)

**Hazard class** 2.1

**USCG CHRIS Code** PRP

**USCG  
Compatatibility  
Group** 31 Paraffins

**Std. Transport #** 4905781 4905776

**IMO Gas Code** B



**PROPANE****0319**

November 2003

CAS No: 74-98-6  
 RTECS No: TX2275000  
 UN No: 1978  
 EC No: 601-003-00-5

n-Propane  
 (cylinder)  
 $C_3H_8$  /  $CH_3CH_2CH_3$   
 Molecular mass: 44.1

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
<b>FIRE</b>	Extremely flammable.	NO open flames, NO sparks, and NO smoking.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with powder, carbon dioxide.
<b>EXPLOSION</b>	Gas/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Use non-sparking handtools.	In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

EXPOSURE			
<b>Inhalation</b>	Drowsiness. Unconsciousness.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
<b>Skin</b>	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves. Protective clothing.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
<b>Eyes</b>	ON CONTACT WITH LIQUID: FROSTBITE.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
<b>Ingestion</b>			

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Remove all ignition sources. Ventilation. NEVER direct water jet on liquid. (Extra personal protection: self-contained breathing apparatus.)	EU classification F+ Symbol R: 12 S: (2-)9-16 UN classification UN Hazard Class: 2.1

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-20S1978 NFPA Code: H1; F4; R0	Fireproof. Cool.

**IPCS**

International Programme on Chemical Safety



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 IPCS 2006

SEE IMPORTANT INFORMATION ON THE BACK.

### IMPORTANT DATA

**Physical State; Appearance**

ODOURLESS, COLOURLESS COMPRESSED LIQUEFIED GAS.

**Physical dangers**

The gas is heavier than air and may travel along the ground; distant ignition possible, and may accumulate in low ceiling spaces causing deficiency of oxygen. As a result of flow, agitation, etc., electrostatic charges can be generated.

**Occupational exposure limits**

TLV: 1000 ppm as TWA; (ACGIH 2005).  
MAK: 1000 ppm, 1800 mg/m<sup>3</sup>; Peak limitation category: II(4);  
Pregnancy risk group: IIc; (DFG 2005).

**Routes of exposure**

The substance can be absorbed into the body by inhalation.

**Inhalation risk**

On loss of containment this liquid evaporates very quickly displacing the air and causing a serious risk of suffocation when in confined areas.

**Effects of short-term exposure**

Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system.

### PHYSICAL PROPERTIES

Boiling point: -42-C

Melting point: -189.7-C

Relative density (water = 1): 0.5

Solubility in water, g/100 ml at 20-C: 0.007

Vapour pressure, kPa at 20-C: 840

Relative vapour density (air = 1): 1.6

Flash point: -104-C

Auto-ignition temperature: 450-C

Explosive limits, vol% in air: 2.1-9.5

Octanol/water partition coefficient as log Pow: 2.36

### ENVIRONMENTAL DATA

### NOTES

Check oxygen content before entering area.

Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death.

### ADDITIONAL INFORMATION

**LEGAL NOTICE**

Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible for the use which might be made of this information

# 国際化学物質安全性カード

プロパン

ICSC番号:0319

<p>プロパン PROPANE n-Propane (圧力容器)(液化) C<sub>3</sub>H<sub>8</sub> / CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub> 分子量:44.1</p>
<p>CAS登録番号:74-98-6 RTECS番号:TX2275000 ICSC番号:0319 国連番号:1978 EC番号:601-003-00-5</p>

災害/ 暴露のタイプ	一次災害/ 急性症状	予防	応急処置/ 消火薬剤
火災	引火性がきわめて高い。	裸火禁止、火花禁止、禁煙。	供給源を遮断する。それが不可能でかつ周辺に危険が及ばなければ、燃え尽きるにまかせる。その他の場合は粉末消火薬剤、二酸化炭素を用いて消火する。
爆発	気体/空気の混合気体は爆発性である。	密閉系、換気、防爆型電気および照明設備。液状であれば、帯電を防ぐ(例えばアースを使用)。防爆用工具を使用する。	火災時: 圧力容器に水を噴霧して冷却する。 安全な場所から消火作業を行う。
身体への暴露			
吸入	嗜眠、意識喪失。	密閉系および換気。	新鮮な空気、安静。必要な場合には人工呼吸。医療機関に連絡する。
皮膚	液体に触れた場合: 凍傷。	保温用手袋、保護衣。	凍傷の場合: 多量の水で洗い流し、衣服は脱がせない。医療機関に連絡する。
眼	液体に触れた場合: 凍傷。	顔面シールド。	数分間多量の水で洗い流し(できればコンタクトレンズをはずして)、医師に連れて行く。
経口摂取			

漏洩物処理	貯蔵	包装・表示
<ul style="list-style-type: none"> <li>・危険区域から立ち退く!</li> <li>・専門家に相談する!</li> <li>・すべての発火源を取り除く。</li> <li>・換気。</li> <li>・液体に向けて水を噴射してはならない。</li> <li>・特別個人用保護具: 自給式呼吸器。</li> </ul>	<ul style="list-style-type: none"> <li>・耐火設備(条件)。</li> <li>・涼しい場所。</li> </ul>	<ul style="list-style-type: none"> <li>・EU分類</li> <li>記号: F+</li> <li>R: 12</li> <li>S: 2-9-16</li> <li>・国連危険物分類(UN Hazard Class): 2.1</li> </ul>

重要データは次ページ参照

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# 国際化学物質安全性カード

プロパン

ICSC番号:0319

重 要 デ ー タ	<p><b>物理的状态; 外観:</b> 無色、無臭の圧縮液化ガス。</p> <p><b>物理的危険性:</b> この気体は空気より重く、地面あるいは床に沿って移動することがある。遠距離引火の可能性はある。天井が低い場所では滞留して酸素欠乏を引き起こすことがある。流動、攪拌などにより、静電気が発生することがある。</p> <p><b>化学的危険性:</b></p> <p><b>許容濃度:</b> TLV: 脂肪族炭化水素ガス(アルカンC1~C4)として 1000 ppm (TWA) (ACGIH 2006)。</p> <p>MAK: 1000 ppm, 1800 mg/m<sup>3</sup>; ピーク暴露限度カテゴリ: II(4); 妊娠中のリスクグループ: D (DFG 2006)。 (訳注: 詳細は DFG の List of MAK and BAT values を参照)</p>	<p><b>暴露の経路:</b> 体内への吸収経路: 吸入。</p> <p><b>吸入の危険性:</b> 容器を開放すると液体がきわめて急速に気化し、閉ざされた場所では空気を追い出し、窒息の危険を生じる。</p> <p><b>短期暴露の影響:</b> この液体が急速に気化すると、凍傷を起こすことがある。中枢神経系に影響を与えることがある。</p> <p><b>長期または反復暴露の影響:</b></p>
	<p><b>物理的性質</b></p> <ul style="list-style-type: none"> <li>・沸点: -42°C</li> <li>・融点: -189.7°C</li> <li>・比重(水=1): 0.5</li> <li>・水への溶解度: 0.007 g/100 ml(20°C)</li> </ul> <ul style="list-style-type: none"> <li>・蒸気圧: 840 kPa(20°C)</li> <li>・相対蒸気密度(空気=1): 1.6</li> <li>・引火点: -104°C</li> <li>・発火温度: 450°C</li> <li>・爆発限界: 2.1~9.5 vol%(空气中)</li> <li>・log Pow (オクタノール/水分配係数): 2.36</li> </ul>	
環境に関するデータ		
注		
<ul style="list-style-type: none"> <li>・区域内に入る前に酸素濃度を測定する。</li> <li>・空気中の濃度が高いと酸素の欠乏が起こり、意識喪失または死亡の危険を伴う。</li> <li>・圧力容器が漏出しているときは、気体が液状で漏れるのを防ぐため、洩れ口を上にする。</li> </ul> <p style="text-align: center;">Transport Emergency Card(輸送時応急処理カード): TEC(R)-20S1978 NFPA(米国防火協会)コード: H(健康危険性)1; F(燃焼危険性)4; R(反応危険性)0</p>		
付加情報		
ICSC番号:0319 更新日: 2003.11		プロパン
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・ ICSCホームページへもどる



## Full Record

Propane [USAN]  
RN: 74-98-6

## Structure Descriptors

## InChI

InChI=1/C3H8/c1-3-2/h3H2,1-2H3  
[Download](#) | [View Full InChI](#)

## Smiles

C(C)C

[Download](#)Names and  
Synonyms

## MeSH Heading

[i](#) Propane

## Name of Substance

[i](#) Propane

## Synonyms

- [i](#) A-108
- [i](#) Dimethylmethane
- [i](#) EINECS 200-827-9
- [i](#) HC 290
- [i](#) HSDB 1672
- [i](#) Hydrocarbon Propellant A-108
- [i](#) LPG
- [i](#) Liquefied petroleum gas
- [i](#) Petroleum gas, liquefied
- [i](#) Propane
- [i](#) Propyl hydride
- [i](#) Propyldihydride
- [i](#) R 290
- [i](#) n-Propane

## Systematic Name

- [i](#) Propane
- [i](#) Propane liquefied

## Superlist Name

- [i](#) Dimethylmethane

- [i](#) Propane
- [i](#) Propane or propane mixtures [UN1978] [Flammable gas]
- [i](#) Propyl hydride
- [i](#) UN1978

## Registry Numbers

**CAS Registry Number**[i](#) 74-98-6**System Generated Number**[i](#) 000074986

## Classification Codes

**Classification Code**

- [i](#) Aerosol propellant
- [i](#) Agricultural Chemical
- [i](#) Herbicide

**Superlist Classification Code**

- [i](#) TWA 1000 ppm (1800 mg/m3)
- [i](#) TWA 2500 ppm

## Formulas

**Molecular Formula**[i](#) C3-H8

## Locators

**File Locator**

- |                    |  |
|--------------------|--|
| PubMed Cancer      | <a href="#">i</a> Cancer Citations from PubMed     |
| DART               | <a href="#">i</a> Developmental and Reprod.Tox.    |
| DSL                | <a href="#">i</a> Domestic Sub. List of Canada     |
| EINECS             | <a href="#">i</a> EU Inv of Exist. Comm. Chem Sub  |
| EMIC               | <a href="#">i</a> Env. Mutagen Info. Center        |
| Haz-Map            | <a href="#">i</a> Occ. Exposure to Haz. Agents     |
| HSDB               | <a href="#">i</a> Hazardous Substances Data Bank   |
| PubMed             | <a href="#">i</a> Biomedical Citations From PubMed |
| MeSH Heading       | <a href="#">i</a> Medical Subject Headings         |
| MeSH               | <a href="#">i</a> Medical Subject Headings File    |
| RTECS              | <a href="#">i</a> Reg. of Toxic Eff. of Chem. Sub. |
| PubMed Toxicology  | <a href="#">i</a> Toxicology Citations From PubMed |
| TOXLINE            | <a href="#">i</a> NLM TOXLINE on TOXNET            |
| TSCAINV            | <a href="#">i</a> EPA Chem. Sub. Inventory         |
| PubChem            | <a href="#">i</a> PubChem                          |
| Household Products | <a href="#">i</a> Household Products Database      |
| USA.gov            | <a href="#">i</a> USA.gov Search Engine            |
| WebWISER           | <a href="#">i</a> Wireless Info Sys for Emerg Resp |
| TOXMAP             | <a href="#">i</a> NLM Enviro. Health e-Maps        |

**Superlist Locator**

- |      |   |
|------|---|
| CGB  | <a href="#">i</a> DOT Coast Guard Bulk Haz. Mat.  |
| DOT  | <a href="#">i</a> DOT Hazardous Materials         |
| GRAS | <a href="#">i</a> FDA Sub. Generally Rec. as Safe |
| HPV  | <a href="#">i</a> EPA High Production Vol. Chem.  |
| INER | <a href="#">i</a> EPA Pesticide Inert Ingredients |

MA	<a href="#">i</a> Massachusetts Right-to-know Sub.
NJ	<a href="#">i</a> New Jersey Right-to-know Sub.
PAFA	<a href="#">i</a> FDA Substances added to food
PA	<a href="#">i</a> Pennsylvania Right-to-know Sub.
REL	<a href="#">i</a> NIOSH Rec. Exposure Limits
TLV	<a href="#">i</a> ACGIH Threshold Limit Values
PEL	<a href="#">i</a> OSHA Toxic and Haz. Sub.

**Internet Locator**

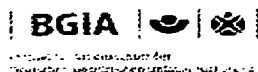
EPA SRS	<a href="#">i</a> EPA Substance Registry System
EPA Envirofacts	<a href="#">i</a> EPA Master Chemical Integrator
NIOSH ICSC	<a href="#">i</a> NIOSH Intl. Chem. Safety Cards
NIOSH Pocket Guide	<a href="#">i</a> NIOSH Pocket Guide to Chem Haz
NIST WebBook	<a href="#">i</a> NIST Chemistry WebBook
SRC CHEMFATE	<a href="#">i</a> Syracuse Res. Corp. CHEMFATE
OSHA Chem	<a href="#">i</a> OSHA Chemical Sampling Info
EPA HPVIS	<a href="#">i</a> EPA High Prod Vol Info System
NJ-HSFS	<a href="#">i</a> New Jersey Haz. Sub. Fact Sheets

## Physical Properties

Physical Property	Value	Units	Temp (deg C)	Source
Melting Point	-1.88E+02	deg C		EXP
Boiling Point	-4.21E+01	deg C		EXP
log P (octanol-water)	2.36	(none)		EXP
Water Solubility	62.4	mg/L	25	EXP
Vapor Pressure	7150	mm Hg	25	EXP
Henry's Law Constant	0.707	atm-m <sup>3</sup> /mole	25	EST
Atmospheric OH Rate Constant	1.15E-12	cm <sup>3</sup> /molecule-sec	25	EXP

Physical property data is provided to ChemIDplus by [Syracuse Research Corporation](#).  
See [all available property data for this compound](#), including references.

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National Institutes of Health, Department of Health & Human Services  
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Customer Service: [tehip@tehl.nlm.nih.gov](mailto:tehip@tehl.nlm.nih.gov).



**GESTIS - Stoffdatenbank**  
GESTIS is the Information system on hazardous substances of the  
Berufsgenossenschaften  
(German institutions for statutory accident insurance and prevention)

## Propane

Information is included to the following main chapters:

[Identification](#) | [Physical and chemical properties](#) | [Occupational health and first aid](#) | [Handling and usage](#) | [Regulations](#) | [Literature register](#)

### IDENTIFICATION

Propane

R 290

n-Propane

ZVG-Number : 10020

CAS-Number : 74-98-6

INDEX-Number : 601-003-00-5

EC-Number : 200-827-9

Substance classification :

140110 Hydrocarbons, aliphatic, saturated

139900 organic gases

State of aggregation : gaseous  
at 1013 mbar/20 degrees C

Colour : colourless

Odour : odourless

Characterisation :

Extremely flammable gas.

Forms explosive mixtures with air.

Practically insoluble in water.

Gas is heavier than air.

FORMULA :



C3-H8

Molar 44,10 g/mol

Conversion factor : 1 ml/m<sup>3</sup> = 1,83 mg/m<sup>3</sup>  
at 1013 mbar/20 degrees C

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The following main sections contain further information about this material.  
[Identification](#) | [Physical and chemical properties](#) | [Occupational health and first aid](#) | [Handling and](#)

**Propane****PHYSICAL AND CHEMICAL PROPERTIES**

Data is available for the following sections :

[Melting point](#) | [Boiling point](#) | [Density](#) | [Vapor pressure](#) | [Flash point](#) | [Ignition temperature](#) | [Explosion limits](#) | [Solubility](#) | [Hazardous reactions](#) | [Futher information](#)

**MELTING POINT**

Melting point : -187,7 Grad C

**BOILING POINT**

Boiling point : -42,1 Grad C

**DENSITY****VAPOUR DENSITY**

under standard conditions (0 Deg. C, 1013 mbar)

Value : 2,0098 kg/m3

**DENSITY OF LIQUID PHASE AT BOILING POINT**

Value : 0,5812 kg/l

**RELATIVE VAPOUR DENSITY**

Ratio of the density to dry air at the same temperature and pressure

Value : 1,554

**VAPOUR DENSITY**

Value : 1,874 kg/m3

at 1 bar

Temperature : 15 Grad C

**VAPOUR PRESSURE**

Vapour pressure : 8,327 bar

Temperature : 20 Grad C

Vapour pressure : 10,8 bar

Temperature : 30 Grad C

Vapour pressure : 17,081 bar

Temperature : 50 Grad C

**FLASH POINT**

Flash point : -104 Grad C

**IGNITION TEMPERATURE**

Ignition temperature : 470 Grad C

Temperature T1

Minimum ignition energy : 0,24 mJ  
Max. exper. safe gap (MESG) : 0,92 mm  
Explosion group : IIA

## EXPLOSION LIMITS

Lower explosion limit :  
1,7 Vol.-%  
31 g/m<sup>3</sup>  
Upper explosion limit :  
10,8 Vol.-%  
202 g/m<sup>3</sup>  
Limiting oxygen concentration (LOC) :  
9,8 Vol.-%  
Maximum explosion pressure :  
9,4 bar

## SOLUBILITY IN WATER

Concentration : 75 mg/l  
Temperature : 20 Grad C

## HAZARDOUS REACTIONS

Decomposition temperature : 780 ... 800 Grad C

### Decompositon products :

Ethene; propene; methane; hydrogen;

### Hazardous chemical reactions :

Risk of explosion with:  
chlorine dioxide

The substance forms an explosive mixture with air.

Violent exothermic reaction, development of heat, risk of inflammability resp. development of inflammable gas or vapour with:  
barium peroxide

Violent exothermic reaction, development of heat, risk of inflammability resp. development of inflammable gas or vapour, risk of explosion with:  
strong oxidants

## FURTHER INFORMATION

critical temperature : 96,8 degree C  
critical pressure : 42,6 bar  
critical density : 0,226 kg/l  
triple point temperature : -187,70 degree C  
triple point pressure : 0,196 nanobar

global warming potential : 3  
ozone depletion potential : 0

## Propane

<b>REGULATIONS</b>
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Data is available for the following sections :

[Classification](#) | [Labelling](#) | [Workplace labelling](#) | [Water pollution class](#) | [Air pollution prevention](#) | [Transport Regulations](#) | [Threshold limit values](#) | [Recommendations of MAK](#) | [Ordinance of failure](#) | [Further regulations](#)

**EUROPEAN CLASSIFICATION**

F+; R12

**EUROPEAN LABELLING**

Hazard symbol :



F+ Extremely flammable

Risk phrases (R-phrases) :

R 12

Extremely flammable

Safety advices (S-phrases) :

S (2)

Keep out of the reach of children (if sold to the general public)

S 9

Keep container in an well-ventilated place

S 16

Keep away from sources of ignition - No smoking

EC-Classification, 21st adaption directive 94/69/EEC

Quelle : 07558

**WORKPLACE LABELLING ACCORDING TO GERMAN ASR A1.3**

Prohibition label :



No fire, open flame and smoking



No admittance for unauthorized persons

Warning label :

Caution - gas cylinder





Caution - explosive atmosphere

Precept label :



Use safety goggles



Wear safety shoes

## GERMAN WATER HAZARD CLASS

Substance No. : 560

non-hazardous to waters

Classification according to the Administrative Regulation  
of Substances Hazardous to Water (VwVwS)

## TECHNICAL INSTRUCTION OF AIR POLLUTION PREVENTION (TA Luft)

Chapter 5.2.5 Organic Substances

Organic substances, except dusts.

The following values, specified as overall carbon, are in  
all not allowed to be exceeded in exhaust gas:

Mass flow : 0,50 kg/h

or

Mass concentration : 50 mg/m<sup>3</sup>

At old units with an annual mass flow till 1,5 Mg/a,  
specified as total carbon, the emissions in exhaust gas  
are not allowed to exceed 1,5 kg/h.

## TRANSPORT REGULATIONS

UN-Number: 1978

Shipping name: Propane

Hazard Identification Number: 23

Class: 2.1 (Flammable Gases)

Packing Group: -



Danger Label: 2.1

Tunnel Restrictions:

Passage forbidden through tunnels of category B and C when  
carried in tanks.

Passage forbidden through tunnels of category D and E.

## TRGS 900 - GERMAN OCCUPATIONAL EXPOSURE LIMIT VALUES

1000 ml/m<sup>3</sup>  
1800 mg/m<sup>3</sup>

Peak limitation

Excursion factor 4

Duration 15 min, mean; 4 times per shift; interval 1 hour

Category II - Substances with systemic effects

Source : DFG

Quelle : 05350

## RECOMMENDATIONS OF MAK-COMMISSION

This data is recommended by scientific experience and is not established law.

1000 ml/m<sup>3</sup>  
1800 mg/m<sup>3</sup>

Limitation of exposure peaks :

Excursion factor 4

Duration 15 min, mean; 4 times per shift; interval 1 hour

Pregnancy : Group D

A classification according to groups A-C is not possible, because either there is no data available or the available data is insufficient for a final evaluation.

Quelle : 08079

## GERMAN ORDINANCE OF FAILURE

Annex I - No.: 11

Threshold for operating range to § 1 sec. 1

- Record 1: 50000 kg

- Record 2: 200000 kg

Scope: extremely flammable, liquified gases (including liquid gas) and natural gas

## FURTHER REGULATIONS

TRGS 200

Einstufung und Kennzeichnung von Stoffen, Zubereitungen und Erzeugnissen

Ausgabe Februar 2007

TRGS 201

Einstufung und Kennzeichnung von Abfällen zur Beseitigung beim Umgang

Ausgabe Juli 2002; BArbBl. 7-8/2002 S. 140-142

TRGS 400

Ermitteln und Beurteilen der Gefährdungen durch Gefahrstoffe am Arbeitsplatz: Anforderungen

Ausgabe März 1998; BArbBl. 3/1998 S. 53-56; mit Änderungen und Ergänzungen BArbBl. 3/1999 S. 62 53-64

**TRGS 440**

Ermitteln und Beurteilen von Gefährdungen durch Gefahrstoffe am Arbeitsplatz: Ermitteln von Gefahrstoffen und Methoden zur Ersatzstoffprüfung  
Ausgabe März 2001; BArbBl. 3/2001 S. 105-112; zuletzt geändert BArbBl. 3/2002 S. 68-70

**TRGS 555**

Betriebsanweisung und Unterweisung nach § 20 GefStoffV  
Ausgabe Dezember 1997; BArbBl. 12/1997 S. 49-58

**TRGS 402**

Ermittlung und Beurteilung der Konzentrationen gefährlicher Stoffe in der Luft in Arbeitsbereichen  
Ausgabe November 1997; BArbBl. 11/1997 S. 27-33

**TRGS 403**

Bewertung von Stoffgemischen in der Luft am Arbeitsplatz  
Ausgabe Oktober 1989; BArbBl. 10/1989 S. 71-72

**TRGS 420**

Ermitteln und Beurteilen der Gefährdungen durch Gefahrstoffe am Arbeitsplatz: Verfahrens- und stoffspezifische Kriterien (VSK) für die betriebliche Arbeitsbereichsüberwachung  
Ausgabe September 1999; BArbBl. 9/1999 S. 53-58; mit zuletzt geändert BArbBl. 1/2003 S. 58-60

**TRGS 500**

Schutzmaßnahmen: Mindeststandards  
Ausgabe März 1998; BArbBl. 3/1998 S. 57-59

**BG-Vorschrift D 34 (VBG 21)**

"Verwendung von Flüssiggas"  
Fassung 1.10.93/1.01.97

**Technische Regeln Druckbehälter (TRB)**

Technische Regeln Druckgase (TRG)

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The following **main sections** contain further information about this material.

Identification | Physical and chemical properties | Occupational health and first aid | Handling and usage | Regulations | Literature register

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This material data sheet was carefully compiled. However no liability can be assumed for the data content, whatever the legal cause may be.

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## Propane

**OCCUPATIONAL HEALTH AND FIRST AID**

Data is available for the following sections :

[Routes of exposure](#) | [Toxic effects](#) | [First aid](#)

**ROUTES OF EXPOSURE****Main Routes of exposure :**

The only toxicologically relevant intake pathway for propane (P.) proceeds via the respiratory tract.

**Respiratory tract :**

Kinetic studies on mice provided detectable concentrations of metabolites and also showed absorptive-toxic effects, so effective absorption could be assumed.

However, because of the high vapor pressure, the amount really retained is probably low.

**Skin :**

The amount absorbable through the skin is considered to be small.

This is plausible because the gas is poorly soluble in water (62.4 mg/l at 20 degrees C) and even liquid homologues of P., eg pentane, 2-methylpentane or hexane only showed penetration rates of a few ug/cm<sup>2</sup> x h under occlusive conditions.

**Gastrointestinal tract :**

As a result of the physico-chemical properties, unintentional oral intake of toxicologically relevant concentrations is not possible under conditions encountered in practice.

**TOXIC EFFECTS**

Data is available for the following sections :

[Main toxic effects](#) | [Acute toxicity](#) | [Chronic toxicity](#) | [Reproductive toxicity, mutagenicity, carcinogenicity](#) | [Biotransformation and Excretion](#)

**Main toxic effects :****Acute:**

Frostbite following skin contact with the gas which has been let down; central-nervous disturbances;  
in extreme situations suffocation due to oxygen deficiency

**Chronic:**

Dessication of the mucous membranes, cough, gastrointestinal disturbances and functional changes to the heart through high concentrations

**Acute toxicity :**

Gaseous P. in concentrations up to 10 vol.% does not cause any noticeable irritation to the skin or mucous membranes