

# Safety Data Sheet

## 1. Identification of the Substances and the Organization

Organization : National Institute of Advanced Industrial Science and Technology  
name (AIST)  
Address : 1-3-1, Kasumigaseki, Chiyoda, Tokyo, Japan  
Office in Charge : Reference Materials Office, Center for Quality Management of  
Metrology, National Metrology Institute of Japan (NMIJ)  
Person in Charge : Person in Charge of Certified Reference Materials  
Telephone No : +81-29-861-4059 Fax No. : +81-29-861-4009  
Emergency No. : Same as above

Prepared on : January 19, 2011

Revised on : April 1, 2015

Reference No. : 4052002

Identification of : Certified Reference Material NMIJ CRM 4052-b Propane  
the Material

## 2. Hazard Identification

GHS Classification: Combustible/flammable : Class 1  
gas  
High-pressure gas : Liquefied gas  
Particular target : Class 3 (Anesthetic action)  
organ/systemic toxicity  
(Single exposure)

GHS Label Element:



Signal Word: Danger

Hazard and Toxicity: Liquefied gas; May explode when heated.  
Highly combustible, flammable gas.  
May cause drowsiness or dizziness.

Precautionary [Preventive Measures]

Statement

Take measures to prevent the container from falling, dropping, etc,  
and do not  
handle it roughly.

Keep away from ignition sources such as heat/ sparks/open  
flame/high temperature matters. No smoking.

Use the material at outdoor work place or well ventilated place only.

Avoid inhaling gas/spray.

[Response]

A fire due to leaked gas: Do not extinguish until the leakage stops. If  
it is safe and possible to deal with the situation, remove the source of  
ignition.

If feeling ill: Seek medical advice.

If inhaled: Move to get a fresh air, take a comfortable posture to ease breathing and rest.

[Storage]

Protect from sunlight and store in a well ventilated place at the temperature of below 40 °C

[Disposal]

When this product is no longer necessary or passed the expiration date, do not dispose of the container and the remaining gas, but return them to the department in charge provided in the 1. Chemical Substances, etc. and The Manufacturer Information

Hazardous and toxic properties not specified in the above are neither the object of the classification nor classifiable.

### 3. Composition/Component Information

Single or Compound : Single product

Product

Chemical Name : Propane

Other Name : Propylhydride, Dimethylmethane

Content : 99.99 %

Authorization Value

The authorization value of this material is as below

Chemical name	Authorization value Mol fraction (mol/mol)	Expanded uncertainty Mol fraction (mol/mol)
Propane	0.9999	0.0001

Chemical or Structural : Molecular formula: C<sub>3</sub>H<sub>8</sub>

Formula

Molecular Weight : 44.11

Official Gazette Public : Act on the Evaluation of Chemical Substance and

Reference No Regulation of their Manufacturer : (2)-3

Industrial Safety and Health Act

CAS Number : 74-98-6

TSCA : Listed

EINECS : 200-827-9

Hazardous Component : Propane

### 4. Emergency Measures

If in Eyes : Rinse well with clean water. If the irritation in eyes persists or feeling ill, seek medical advice, treatment.

If on Skin : Rinse well with clean water. Take off the contaminated clothes and shoes, etc. Seek medical advice. Treat cryogenic burn.

If Inhaled : Move to get a fresh air and keep warm and rest. Seek medical advice. If inhaled in large amounts, take measures against oxygen deprivation I having difficulty breathing, have him/her on pure oxygen. Apply humidified oxygen inhalation. In case of respiration

	arrest, give artificial respiration.
If Swallowed	: Wash mouth well with water. Seek medical advice.
Anticipated Acute Symptoms and Delayed Symptoms	: Inhalation : Serious drowsiness (the condition that a person is not in a wakeful state or responsive unless vigorous stimulation is applied), asphyxiation. The concentration in the air causes oxygen deficiency accompanied by loss of consciousness or risk of death. Contact with skin : Cryogenic burn Contact with eyes : Cryogenic burn
Most Important Characteristics and Symptoms	: When inhaling high concentration propane, loses consciousness in a breathing. If this condition continues, it results in death.
Measures to be Taken to Protect the Person Applying First Aid	: When handling propane in a place where liquid propane is leaking or spouting out, use protective equipment to protect the skin from contacting the propane. Ventilate the place where propane is leaking or spouting out because oxygen concentration of the air may be low When the concentration of leaked propane is about 1.8~9.5% of the air, ventilate well to prevent possible explosion if there is any ignition sources In case of handling in outdoor workplace, prevent an explosion due to scattering the gas by sprinkling water with spray nozzle, etc.

---

## 5. Fire-Fighting Measure

Extinguishing Media	: In the initial stage of the fire extinguishing, use powder, carbon dioxide, powder extinguishing facility or tool.
Prohibited Extinguishing Device	: Absolutely no use of straight stream firefighting nozzle.
Specific Hazards at the Time of Fire	: Easily flammable substance A container may explode by heating. A exploded cylinder may fly. May form irritating or toxic gas due to a fire. Highly flammable and combustible gas
Specific Extinguishing Measures	: Do not extinguish until it stops leaking completely. Remove ignition sources if it is possible to handle safely. Transfer the container from fire area if it is not dangerous. Extinguish from the windward where there is no gas stagnation and take preventive measures against leakage. If it is impossible to transfer, spray water onto the container and the periphery to cool down. Continue to cool the container with a large amount of water for some time after the fire is extinguished. Do not water the leaked area or fail-safe device directly. It may freeze. Extinguishing activity should be from the distance sufficient

enough for effective extinguishing.

To prevent the radiation heat rising of the peripheral equipment, etc., cool the periphery with water spray.

Judging from the situation of the periphery and leakage, if there is increased danger of the fire due to extinguishing activity, in order to prevent the fire from spreading further, keep spraying water around the periphery and let the gas burn until the container is completely empty.

- Protecting Fire-Fighting Personnel : Extinguishing activities on windward side, avoid inhaling toxic gases.
- Use protective equipment such as fire-resistant clothing, heat-resistant protective clothing, protective clothing, air-breathing apparatus, closed-circuit self-contained oxygen breathing apparatus, rubber gloves, rubber boots, etc.

## 6. Accidental Release Measures

- Personal Precautions : If there is an ignition source within the concentration range of 1.8 % to 9.5 % in the air, do not step closer to the area if the safety of the atmosphere cannot be ensured.
- Ventilate well to prevent asphyxiation, because when the leaked liquid vaporizes, it increases in about 250-folds volume and decreases oxygen concentration in the air.
- Contact with liquid propane directly causes cryogenic burn due to vaporization heat. Use dry leather gloves as necessary.
- Promptly remove ignition sources nearby.
- Keep extinguishing equipment on hand in anticipation of ignition.
- Protective Equipment and Emergency Procedure : If released indoor, ventilate well until the treatment is completed.
- Use suitable protective equipment to protect the skin from airborne droplets, etc., and avoid inhaling dust and gas. Use antistatic protective clothes/shoes, leather gloves. Use air respirator and protective clothes as necessary.
- Environmental Precaution : There is no established information on environmental impact related to this material.
- Recovery, Neutralization : Adsorb the leaked liquid to waste cloth or to sand and soil and collect in an empty container to prevent the leaked liquid and vapor from spreading.
- Measures to Prevent Secondary Accident : Remove ignition sources nearby. Close the container valve and cut off gas supply.
- Stop the leakage at the source of leak.
- Rope-off the leaked area and restrict access only to the authorized persons.
- Specific gravity of propane is heavier than the air, thus ventilate and disperse, etc. to prevent the gas from possible stagnation.

## 7. Handling and Storage

Handling  
Technological  
Counter  
Measures.

: Handle according to High Pressure Gas Safety Act.  
Take preventive measures against overturning, dropping, falling, etc for the container, do not handle roughly.  
When overturned, the container may fly like a rocket when high pressure as spouts out due to the damage, etc. to the container valve.

Take off desorption protective cap and tube pin before using.  
Close the tube pin securely first and then reinstall the protective cap after using.

Fit on a pressure regulator following the correct procedure first, and then, before opening the container valve, loosen the pressure regulator handle by rotating the pressure regulator in anticlockwise direction Then, open the container valve slowly, but preferably vacuuming inside the pressure reducing valve to prevent the standard gas from contamination before opening the valve.

When opening container valves, stand on a side of pressure regulator, do no stand in the front or the back of the regulator.  
The valves should be firmly closed. Do not fill the container with the gas. Do not change, erase or peel off the container engrave, label, etc.

Except for a special use method, do not use the gas directly from the container, make sure to use pressure regulator

Use bubble solution such as soap water, etc. to ensure that there is no leakage at joints, hose, piping and equipment before using.

Local Ventilation,  
General  
Ventilation

: Sufficient air supply and exhaust treatment should be provided to prevent incomplete combustion.

Appropriated countermeasure should be established when using in a place where liquefied petroleum gas may stagnate.

Precautions for Safe  
Handling

: Do not handle the container roughly such as overturning, dropping, dragging, etc.

Avoid leakage, scattering, etc. and prevent from forming vapor.

Prohibit unauthorized persons enter the handling area.

Use appropriate protective equipment to prevent inhalation, contact with eyes, skin and clothes.

Propane forms explosive mixture gas when mixed with air or oxygen. The explosive range in the air is about 1.8 % to 9.5 %, low in the lower explosion limit, and is naturally highly hazardous, thus, persons handling should be very careful about leakage.

Being highly flammable gas, use of fire nearby is strictly prohibited.

Leave the protective cap of the container equipped with desorption protective cap on except when using.

Do not use up the gas, leave the residual pressure

Storage	
Appropriate Condition	<p>Inhaling in large amounts causes asphyxiation.</p> <p>: Store the container in a well drained and ventilated dry place Do not expose the container to sunlight, store in a place below 40 °C. Do not expose to continuous vibration. Keep away from oxidizers, oxygen, explosives, halogen, compressed air, acid, base, food chemicals, etc. Store in a place where unauthorized persons do not enter. Post warning signs 'FLAMMABLE GAS' or 'LP GAS' conspicuously when storing the container in the container storage area. If a container storage area is established, keep the container separate from toxic gas and oxygen filling container. Moreover, within 2 meters around the container storage area, do not keep fire, flammable and ignitable matters except in the area installed with a necessary barrier. Promptly return the used container to the department in charge provided in the 1. Chemical Substances, etc. and The Manufacturer Information. Do not expose to corrosive atmosphere.</p>
Safe Packing Material	: Container for liquefied petroleum gas specified in High Pressure Gas Safety Act.

## 8. Exposure Control/Personal Protection

Administrative level

Not established

Occupational exposure levels (Chemical name) Propane

•ACGIH TLV-TWA(2005) : 1000 ppm

•Japan Society for Occupational : Not established

Health

Recommended Reference

Value(2005)

Facility engineering

Ventilation, Exhaust

: Install explosion-proof local exhaust ventilation system.  
Beware of oxygen deficiency. When handling indoors, ventilate well to prevent the oxygen concentration becoming under 18 vol%

Safety Management,

Gas

Detection

: Measuring device, detector  
Install gas-leak alarm that activates the alarm when the gas concentration in the air is under about 0.5 % (1/4 of lower explosion limit).

Storage Precaution

: Ventilate along the floor surface. Seal. Do not keep fire or flammable or ignitable matters.  
Store the container by stabling with rope or chain, etc. to prevent from overturn.

**Protective Equipment**

- Respiratory Organ : Use air respirator as necessary.  
 Hand : Use dry leather gloves as necessary.  
 Eyes : Use protective eye glasses as necessary  
 Skin and Body : Clothes appropriate for type of usage, helmet.

**Sanitary Requirement**

- Wash hands after handling.

**9. Physical and Chemical Properties**

- Appearance, etc. : Liquefied gas
- Color : Colorless
- Odor : Odorless
- pH : No data available
- Melting Point : -189.69 °C
- Boiling Point : -42.04 °C
- Flashing Point : -104.4 °C
- Explosion Range : Lower limit 2.1 vol%, upper limit 9.5 vol%
- Vapor Pressure : 1.275 MPa (40 °C)
- Gas Specific Gravity (Air=1) : 1.6
- Liquid Specific Gravity (Water=1) : 0.5
- Solubility : 62.4 mg/L (25 °C)(Water)  
Soluble in ether, ethanol and in other organic solvents.
- n-Octanol/Water Partition Coefficient log Pow : 2.36
- Spontaneous ignition temperature : 450 °C
- Viscosity : 0.0081 MPa/s (20 °C)
- Other data : Ignitable if the mixture with air is less than 13 %.

**10. Stability and Reactivity**

## ◇ Stability

- Stable under normal condition
- Ignition sources such as high temperature surface, sparks or open flame, etc. cause ignition.
- When emitting gas, forms explosive mixture gas which spreads in the periphery.
- Stable substance, but begins degrading at about 700 °C, and forms ethylene and propylene.

## ◇ Reactivity

- Reacts violently with oxidizing substance.
- Explodes violently with chlorine dioxide.

## ◇ Conditions to Avoid

- Contact with sunlight, heat, oxidizer.
- Avoid using natural rubber, butyl rubber as a material.

◇ Hazardous Decomposition Product

- Forms toxic gases such as carbon monoxide, carbon dioxide, etc. due to combustion at the time of fire.

### 11. Toxicological Information

Acute Toxicity	Based on the following description, Inhalation guinea pig LC50(2H) > 55000 ppm (4H corresponding value: > 38890 ppm) (ACGIH 7th, 2001), considered unclassifiable.
Skin	From the description in ACGIH (7th, 2001), only temporal minor degree erythema on humans and primary skin irritation can be disregarded, considered unclassifiable.
Corrosivity/Irritation	From the description in ACGIH (7th, 2001), observed anesthetic action to humans, Classified as 3 (anesthetic action)
Particular Target Organ/ Systemic Toxicity (Single Exposure)	
Other	Beware of gas leakage, ventilate the room well to prevent asphyxiation due to oxygen deficiency at highly-concentrated condition.

  

Oxygen concentration (vol%)	Effect
Less than 18	Shows initial stage oxygen deficiency.
16 to 12	Symptoms such as increase in pulse, respiration rate, requires effort to concentrate mentally, difficult to work involving detailed muscle movement, headache, etc.
10 to 6	Unconscious, central nervous system damage, convulsion, coma, respiratory arrest, and cardiac arrest in 6 to 8 minutes,
6 or less	Under extreme low concentration, fainting, coma, respiratory arrest, convulsion in an instant upon breathing, and dies in about 6 minutes.

### 12. Ecological Information

Degradability, Concentration

- No data available

Bioaccumulation

- No data available

Ecotoxicity

- No data available

### 13. Disposal Consideration

- Residual Waste : Do not emit into atmosphere in the form of liquid.  
If there is no alternative but to emit in the form of gas, emit the gas gradually into the airy atmosphere in outdoors where there is no fire by making sure that the ground level concentration is less than 0.5 %.  
Do not dispose of the container either



Contaminated Container and Packaging : Return the used empty container and unnecessary container to the department in charge provided in '1. Chemical Substances, etc. and The Manufacturer Information'

## 14. Transport Information

### International Regulation

Marine Regulation Information : Comply with IMO regulations.

UN No. : 1978

Proper Shipping Name : PROPANE

Class : 2.1

Marine Pollutant : Not applicable

Aviation Regulation : Comply with ICAO/IATA regulations

### Information

UN No. : 1978

Proper Shipping Name : PROPANE

Class : 2.1

### National regulation

Land Regulation Information : Comply with the regulations on High Pressure Gas Safety Act

Maritime Regulation : Comply with the regulations on Ship Safety Act.

### Information

UN No. : 1978

Proper Shipping Name : PROPANE

Class : 2.1

Marine Pollutant : Not applicable

Aeronautical Regulation : Comply with the regulations on Civil Aeronautics Act

### Information

UN No. : 1978

Proper Shipping Name : PROPANE

Class : 2.1

### Precautions

: Transport according to High Pressure Gas Safety Act and handle with care by keeping in mind that this mixture gas is a reference material. Handle with care as not to give a shock to the filling container.

Take necessary measures to prevent the container from overturning, damaging the valve, etc. when transporting.

Do not confuse with the hazardous materials regulated by Fire Service Act.

Secure the container to protect from moving, overturn, impact, friction, etc.

When moving, keep the container less than 40 °C. Especially, in summer, cover with a seat to prevent the temperature to rise.

Keep away from fire, heat, direct sunlight.

Avoid direct contact with steel part.

Do not load the container with heavy thing.

Post conspicuously a warning sign label 'High Pressure Gas' on

a vehicle transporting the containers Fire extinguisher, tool to take appropriate countermeasures against possible emergency situation, etc. should be loaded in the same vehicle. Necessary to have yellow card along when transporting.

---

## 15. Applicable Laws and Regulations

### ◇Industrial Safety and Health Act

- Hazardous, combustible gas (Enforcement Ordinance Appendix No.1, 4)

### ◇High Pressure Gas Safety Act

- Liquefied gas (Law Article 2-3)

### ◇Law Concerning the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas

- Liquefied Petroleum Gas (Law Article 2)

### ◇Ship Safety Act

- High Pressure Gas (Regulation Article 2-3 Notification of dangerous goods Appendix No. 1)

### ◇Civil Aeronautical Act

- High Pressure Gas (Regulation Article 194 Notification of dangerous goods Appendix No. 1)

- ◎ **This SDS is originally prepared for the use of the material in Japan, thus the stated laws and regulations are stipulated and carried out in Japan. The use of the material in other countries should be referred to and by application of the relevant laws and regulations of the country in which the material will be used.**

---

## 16. Other Information

### Other

The information in this Safety Data Sheet is not intended to be exhaustive and is based on currently-available information and data. The precautions given in this data sheet are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety precautions appropriate to each specific application and context of use. This Safety Data Sheet (SDS) is intended to provide information and not intended to guarantee anything in handling the reference material. This Safety Data Sheet (SDS) is prepared based on JIS Z7253, and presents identical information to Material Safety Data Sheet (MSDS) prepared based on JIS Z7250:2010.

---