

# Safety Data Sheet



## 1. Identification of the Substance/Mixture and the Supplier

Supplier : National Institute of Advanced Industrial Science and Technology (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  
 Person in Charge : Certified Reference Material Staff  
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 Emergency Contact : Same as above

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Reference No. : 4051003

Identity of Substance/Mixture : Certified reference material NMIJ CRM 4051-c  
 Methane  
 Recommended Use of the Chemical and Restriction on Use : This certified reference material (CRM) is for use in calibration of analytical instruments. Do not use this reference material for other purposes than testing/research.  
 This CRM is a reference material (specified in the Japanese Industrial Standard (JIS) Q 0030).

## 2. Hazards Identification

GHS classification

Flammable gases	: Class 1
Oxidizing gas	: Not classified
Gas under pressure	: Compressed gas
Acute toxicity (Oral)	: Classification not possible
Acute toxicity (Dermal)	: Classification not possible
Acute toxicity (Inhalation, gas)	: Not classified
Skin corrosivity/irritant	: Not classified
Severe eye damages/eye irritant	: Not classified
Respiratory sensitization	: Not applicable
Skin sensitization	: Not applicable
Germ-cell mutagenicity	: Not applicable
Carcinogenicity	: Not applicable
Reproductive toxicity	: Not applicable
Specific target organ toxicity/systemic toxicity (Single exposure)	: Not classified
Specific target organ toxicity /systemic toxicity (Repeated exposure)	: Not classified
Aspiration hazard	: Classification not possible
Hazardous to the aquatic environment, acute hazard	: Not applicable

Hazardous to the aquatic environment, long-term hazard : Not applicable

GHS label element :



Signal word :

Danger

Hazard and toxicity :

May explode when heated.  
Highly combustible, flammable gas.

Other hazard and toxicity :

If gas blowouts from the high-pressure gas container and enters the eyes, there is a risk of eye damage or loss of vision.

Precautionary statement :

[Preventive measures]

Keep away from ignition sources such as heat, sparks, open flames, high temperature ones.

No smoking.

[First-aid measures]

Leaky gas fire: Do not extinguish unless leakage is safely stopped.

Eliminate ignition sources if safe to deal with.

If inhaled: If breathing is difficult, move air to a fresh place and rest in an easy-to-breathe posture. In case of symptoms related to breathing, call a doctor.

[Storage]

Handle in accordance with the High Pressure Gas Safety Act.

Storage of containers should be done in a well-ventilated area at 40 ° C or less without direct sunlight and without fire.

Close the container valve, protect it with cap, lock it and keep it safe.

[Disposal]

When disposing of the content, discharge it little by little in a place with good ventilation with no flame and inflammable material around it, to avoid danger.

Dispose of this CRM in accordance with applicable legislation and local government ordinance. Entrust disposal of this CRM to a professional waste disposal company licensed by the prefectural governor.

Inside Japan, return the cylinder of this CRM to the supplier when it is no longer needed or exceeds its shelf life.

Hazardous and toxic properties not specified in the above are not subject to the classification or not classifiable.

### 3. Composition/Information on Ingredients

Substance or mixture : Single substance  
 Chemical name : Methane  
 Synonym : Marsh gas  
 Chemical formula : CH<sub>4</sub>  
 Molecular weight : 16.042  
 CAS number : 74-82-8  
 Content : 99.99 %

Reference Number in : Act on the Evaluation of Chemical Substances and Regulation of Their  
Gazetted List in Japan : Manufacture, etc. : (2)-1  
Industrial Safety and Health Act : Published  
Hazardous Component : CH<sub>4</sub>

#### 4. First-aid Measures

- If inhaled : Move to a fresh air place and rest in an easy-to-breathe posture.  
If you feel uncomfortable, get medical attention
- If on skin : If you feel uncomfortable, get medical attention
- If in eyes : Rinse carefully with water for several minutes. If contact lenses are  
inserted, take them out if possible, and continue to rinse.  
If eye irritation persists, if you feel uncomfortable, get medical advice /  
attention.
- If swallowed : Wash mouth thoroughly with water  
If you feel uncomfortable, get medical attention
- The most important : Inhalation: Choking. Higher concentrations in the air cause oxygen  
characteristics and : deficiency and risk of loss of consciousness or death.  
symptoms : When liquefied gas touching the skin, it may cause frostbite
- Measures to be taken to : Use personal protective equipment.  
protect the person  
applying first aid

#### 5. Fire-fighting Measures

- Extinguishing media : In case of minor fire: Carbon dioxide, Dry chemical extinguisher  
In case of major fire: Water spray, Water fog  
Unsuitable extinguishing media: Direct water jet
- Specific hazards at the : May ignite easily.  
time of fire : Container may explode if heated.  
Burst container may fly.  
In case of fire: May emit irritating or toxic gas.  
Extremely flammable gas
- Specific extinguishing : Do not extinguish, unless leakage can be stopped safely.  
measures : Eliminate all ignition sources if safe to do so.  
Move containers away from area of fire if this can be done without  
risk.  
Fight fire upwind from a place where gas is not stagnated and take  
measures to prevent leakage.  
If containers cannot be moved, cool them down by spraying water to  
them and their surroundings.  
Keep cooling container thoroughly with plenty of water even after  
extinction.  
Do not spray water directly to gas leaking point or safety device, which  
may make them frozen.  
Fight fire from a reasonable distance.  
Cool down the surroundings by spraying water in order to prevent  
temperature increase of surrounding facilities, etc. due to radiation

heat.

If fire-fighting is considered to raise risks, when taking account of state of surroundings and leakage, let fire go on till container gets empty, while continuing water fog and water spray to surroundings to prevent fire spread.

Protection of Fire-Fighters : Wear complete protective clothing (heat-resistant) and appropriate compressed air open-circuit self-contained breathing apparatus.

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## 6. Accidental Release Measures

Personal precautions : Do not touch or walk in leaked materials.  
Immediately designate restricted leakage area with appropriate distance taken in every direction and keep out unauthorized people. Maintain the restricted area until gas diffuses.  
Keep out unauthorized people.  
Wear appropriate personal protective equipment (See “8. Exposure Controls/Personal Protection” during the operation to avoid contact with eyes and skin and inhalation of gas.

Protective equipment and emergency procedure : Ventilate affected areas thoroughly, if it is in an indoor environment, until the clean-up operation is completed.  
Use tightly-sealed impervious protection clothing if fire is not induced by the leakage.  
Stay upwind.  
Evacuate from low-level grounds.  
Before entering a confined area, ventilate the area.  
Maintain the restricted area until gas diffuses.

Environmental precaution : This reference material is allowed to be evaporated.

Recovery, neutralization : No information available

Measures to prevent secondary accident : If possible, turn leaking container so as to let gas, instead of liquid, be released.  
Eliminate all ignition sources immediately (No smoking, sparks or flame in surrounding areas).  
Prevent leaked materials from entering sewers, drainage systems, basement rooms or confined space.  
Do not spray water directly to leaked materials or their source.  
Maintain the restricted area until gas diffuses.  
Ground all tools used to handle leaked materials.

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## 7. Handling and Storage

Handling

Technological counter measures : Strict ban on fire. Keep away from hot surfaces and sparks.  
Take the engineering precautions stipulated in “8. Exposure Controls/Personal Protection” and use personal protective equipment.

Local ventilation/general ventilation : Provide local and general ventilation stipulated in “8. Exposure Controls/Personal Protection.”

Precautions for safe handling : Prohibit use of hot surfaces, sparks and fire in surrounding areas.  
Contains gas under pressure: May explode if heated.  
Handle container cautiously and avoid giving a shock or knocking over.  
After use, close container valve completely and then put valve guard and

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- protection cap in place.  
Ignition and explosion risk in case of leakage.  
If in eyes or mouth: May cause irritation. Take thorough precautions when using this reference material.  
Take thorough precautions against leakage when mounting and dismantling container.  
If inhaled in large amount, may cause suffocation.
- Contact Avoidance Information : See “10. Stability and Reactivity.”
- Storage  
Appropriate Storage Conditions : Keep away from ignition sources such as heat, sparks and open flame. No smoking.  
Store in a well-ventilated place.  
Keep away from oxidizer, oxygen, explosives, halogen, compressed air, acids, bases, food chemicals, etc.  
Protect from direct sunlight, and store away from fire at temperatures not exceeding 40 °C.  
Keep container tightly closed, and store it in a well-ventilated place.  
Store locked up.
- Incompatible material : See “10. Stability and Reactivity.”
- Safe packing material : Use container stipulated in the High Pressure Gas Safety Act and the United Nations Recommendations on the Transport of Dangerous Goods.

※ See the Certificate for the details on appropriate storage conditions and instructions for use as a reference material.

## 8. Exposure Controls/Personal Protection

### Administrative levels

Not established

### Occupational exposure limit (Methane)

- ACGIH TLV-TWA : 1000 ppm
- Japan Society for Occupational Health Recommended Reference Value : Not established

### Facility engineering control

- Ventilation, exhaust : Local exhaust of explosion-proof specification.
- Safety management, gas detection : Measuring equipment, Detecting

- Storage precaution : Keep away from direct sunlight in a well-drained and well-ventilated area.

### Protective equipment

- Respiratory organ : Wear appropriate respiratory protective equipment such as air respirator if necessary.
- Hand : Wear leather gloves etc.
- Eyes : Wear eye / face protection such as safety goggles.
- Skin and body : Wear appropriate protective equipment such as safety shoes.

### Hygiene Controls

Handle this reference material in accordance with industrial health and safety standards.

## 9. Physical and Chemical Properties

Appearance, etc.	: Compressed gas
Color	: Colorless transparent
Odor	: Odorless
pH	: No data
Melting point	: -183 °C
Boiling point	: -161 °C
Flashing point	: Not applicable
Explosive range	: Lower limit: 5 vol%, upper limit: 15 vol%
Vapor pressure	: 147 kPa (15 °C)
Relative vapor density(Air=1)	: 0.6
Specific gravity or bulk specific gravity	: 0.466 (-164 °C)
Solubility	: 33 mL/L (20 °C, in water) Soluble in alcohol, ether, and other organic solvents.
<i>n</i> -Octanol/water partition coefficient (Log Po/w)	: log Pow = 1.09
Auto-ignition temperature	: 537 °C
Decomposition temperature	: No data
Flammability	: Forming flammable mixture with air of concentration down to 13 % or less. Classified as class 2.1 by UNRTDG. Highly flammable gas
Viscosity	: 0.0109 mPa · s (20 °C)

## 10. Stability and Reactivity

Stability	: Fire at high temperature surfaces, sparks or open flames. When releasing the gas from the container, a large amount of cold mist and explosive mixture are generated rapidly, and the mixture expands to the surroundings.
Reactivity	: Reacts with strong oxidants, causing fire and explosion hazard.
Possibility of hazardous reactions	: A fire or explosion occurs when methan comes in contact with fluorine, chlorine, bromine, iodine, bromine pentafluoride, chlorine trifluoride, trioxxygen difluoride, and dioxygen difluoride.
Conditions to avoid	: High temperature objects, sparks, naked fires.
Incompatible materials	: Strong oxidizing agent, fluorine, chlorine, bromine, iodine, bromine pentafluoride, chlorine trifluoride, trioxxygen difluoride, dioxygen difluoride.
Hazardous decomposition products	: Harmful gases such as carbon monoxide and carbon dioxide are generated by combustion at the time of fire.

## 11. Toxicological information

Acute toxicity	Oral: No data Skin: No data Inhalation (Gas): Mouse LC50(2Hr) > 500000 ppm, LC50(4Hr) > 353553 ppm
Skin corrosivity/ irritation	: It does not irritate the skin
Severe damage to eyes/ eye irritation	: It does not irritate the eyes
Respiratory sensitization	: No data
Skin sensitization	: No data
Germ cell mutagenicity	: In vitro data only
Carcinogenicity	: No data
Reproductive toxicity	: No data
Specific organ toxicity/(single exposure)	: There is description that it is not harmful.
Specific organ toxicity/(repeated exposure)	: There is description that it is not harmful.
Aspiration hazard	: This CRM is gas at room temperature and classification not possible. because 常温気体であり、分類対象外である。

## 12. Ecological Information

Hazardous to the aquatic environment, short-term (Acute)	: No data
Hazardous to the aquatic environment, long-term (Chronic)	: No data
Ecotoxicity	: No data
Persistence and Degradability	: No data
Bioaccumulation	: No data
Mobility in soil	: No data
Ozone depletion potential	: No data

## 13. Disposal Considerations

Residual waste	: Incinerate in an incinerator equipped with scrubber. Return the unnecessary cylinder to the gas supplier. Dispose of gas under pressure in accordance with the Regulation on Safety of General High Pressure Gas of the High Pressure Gas Safety Act.
Contaminated container and package	: Dispose of this CRM in accordance with applicable legislation and local government ordinance. Entrust disposal of this CRM to a professional waste disposal company licensed by the prefectural governor. Inside Japan, return the used empty and unnecessary cylinders to the office

in charge shown in "1. Identification of the Substance/Mixture and the Supplier", when it is no longer needed or exceeds its shelf life.

The owner of the cylinder is National Institute of Advanced Industrial Science and Technology (AIST). The cylinder will be disposed of by its owner in accordance with relevant legislation. The User must not dispose of cylinder without the owner's consent.

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#### 14. Transport Information

UN Number	: 1971
UN Classification	: Class 2.1
Material name	: METHANE
Container grade	: -
ICAO/IATA	: Hazard Class 2.1, UN 1971
Marine pollutant	: Not applicable
Precautions	: Follows the provisions of the ship safety law. Transport this reference material carefully while keeping it away from direct sunlight and fire and preventing accidental release due to falling, overturning, etc.

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#### 15. Regulatory Information

Industrial Safety and Health Act	: Dangerous goods/Flammable gas(Enforcement order, Appendix 1-5)
High Pressure Gas Safety Act	: Compressed gas (Article 2-1) Flammable gas (General High Pressure Gas Safety Regulation Article 2-1)
Civil Aeronautical Act	: High Pressure Gas (Regulation Article 194 Notification of dangerous goods Appendix No. 1)
Ship Safety Law	: High Pressure Gas (Regulation Article 3 Notification of dangerous goods Appendix No. 1)
Act on Port Regulations	: Other dangerous goods / high pressure gas (Article21-2)
Road act	: Restriction on the passage of vehicles (Article 19-13 of the Enforcement Order, Public Notice of Japan Highway Ownership and Debt Repayment Organization No. 12, Appended Table 2)

- © **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.**

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#### 16. Other Information

##### Others

The information in this document is not intended to be exhaustive and is based on currently available information and data. The measures given in this document are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety measures appropriate to each specific application and context of use. This document is intended to provide information and not intended to guarantee anything in handling this reference material.



