

Chemical Profiles

Methane

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What are other names or identifying information for methane?

CAS Registry No.: 74-82-8

Other Names: Methane, compressed gas; Methane, refrigerated liquid; Marsh gas

Main Uses: Manufacture of other chemicals; component of natural gas.

Appearance: Colourless gas.

Odour: Odourless. Commercial methane may have an added odourant.

Canadian TDG: UN1971; UN1972

What is the WHMIS classification?

According to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST), [methane](#) can be classified as:

Flammable gases - Category 1



Gases under pressure - Compressed gas



Simple asphyxiants - Category 1

The signal word is danger.

The hazard statements are:

- Extremely flammable gas
- Contains gas under pressure; may explode if heated
- May displace oxygen and cause rapid suffocation

Please note that this classification was retrieved from the [CNESST](#) site on February 22, 2023 and was established by CNESST personnel to the best of their knowledge based on data obtained from scientific literature and it incorporates the criteria contained in the *Hazardous Products Regulations* (SOR/2015-17). It does not replace the supplier's classification which can be found on its Safety Data Sheet.

What are the most important things to know about methane in an emergency?

Emergency Overview: Colourless gas. Odourless. EXTREMELY FLAMMABLE GAS. Distant ignition and flashback are possible. CONFINED SPACE HAZARD. Can accumulate in hazardous amounts in low-lying areas especially inside confined spaces. COMPRESSED GAS. Contains gas under pressure. May explode if heated. [ASPHYXIAN](#)T. High concentrations can displace oxygen in air and cause suffocation. May cause frostbite.

What are the potential health effects of methane?

Main Routes of Exposure: Inhalation.

- **Inhalation:** Low concentrations are not harmful. A high concentration can displace oxygen in the air. If less oxygen is available to breathe, symptoms such as rapid breathing, rapid heart rate, clumsiness, emotional upsets and fatigue can result. As less oxygen becomes available, nausea and vomiting, collapse, convulsions, coma and death can occur. Symptoms occur more quickly with physical effort. Lack of oxygen can cause permanent damage to organs including the brain and heart.
- **Skin Contact:** Not irritating. Direct contact with the liquefied gas can chill or freeze the skin (frostbite). Symptoms of mild frostbite include numbness, prickling and itching. Symptoms of more severe frostbite include a burning sensation and stiffness. The skin may become waxy white or yellow. Blistering, tissue death and infection may develop in severe cases.
- **Eye Contact:** Not irritating. Direct contact with the liquefied gas can freeze the eye. Permanent eye damage or blindness can result.
- **Ingestion:** Not a relevant route of exposure (gas).
- **Effects of Long-Term (Chronic) Exposure:** Not harmful.
- **Carcinogenicity:** Not a carcinogen.
 - International Agency for Research on Cancer (IARC): Not specifically evaluated.
 - American Conference for Governmental Industrial Hygienists (ACGIH): Not specifically designated.
- **Teratogenicity / Embryotoxicity:** Not known to harm the unborn child.
- **Reproductive Toxicity:** Not known to be a reproductive hazard.
- **Mutagenicity:** Not known to be a mutagen.

What are first aid measures for methane?

Inhalation: Take precautions to prevent a fire (e.g., remove sources of ignition). In case of oxygen deficiency: take precautions to ensure your own safety before attempting rescue (e.g., wear appropriate protective equipment). Move victim to fresh air. Keep at rest in a position comfortable for breathing. If breathing is difficult, trained personnel should administer emergency oxygen. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Get medical attention immediately. Treatment is urgently required. Transport to a hospital.

Skin Contact: Not applicable (gas). Liquefied gas: quickly remove victim from source of contamination. DO NOT attempt to rewarm the affected area on site. DO NOT rub area, flush with water, or apply direct heat. Carefully cut around clothing that sticks to the skin and remove the rest of the garment. Do not remove frozen clothing from frostbitten areas. Loosely cover the affected area with a sterile dressing. DO NOT allow victim to drink alcohol or smoke. Get medical attention immediately. Treatment is urgently required. Transport to a hospital.

Eye Contact: Not applicable (gas). Liquefied gas: immediately flush with gently flowing water, occasionally lifting the upper and lower eyelids. DO NOT attempt to rewarm. Cover both eyes with a sterile dressing. DO NOT allow victim to drink alcohol or smoke. Get medical attention immediately. Treatment is urgently required. Transport to a hospital.

Ingestion: Not applicable (gas).

First Aid Comments: Some of the first aid procedures recommended here require advanced first aid training. All first aid procedures should be periodically reviewed by a medical professional familiar with the chemical and its conditions of use in the workplace.

What are fire hazards and extinguishing media for methane?

Flammable Properties: FLAMMABLE GAS. Can easily ignite. Can readily form an explosive mixture with air at room temperature. Can be ignited by static discharge.

Suitable Extinguishing Media: Dry chemical powder and high-expansion foam. Foam manufacturers should be consulted for recommendations regarding types of foams and application rates.

Unsuitable Extinguishing Media: DO NOT use carbon dioxide, low expansion foams, and direct application of water on liquefied gas.

Specific Hazards Arising from the Chemical: Gas or vapour may travel a considerable distance to a source of ignition and flash back to a leak or open container. Gas or vapour may accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a health hazard. Can displace oxygen in the air, causing suffocation. Direct addition of water to liquefied gas will cause flash vapourization resulting in an explosion (either immediately or delayed) known as a "boiling liquid, expanding vapour explosion (BLEVE)". Heat from fire can cause a rapid build-up of pressure inside cylinders. Explosive rupture and a sudden release of large amounts of gas may result. Cylinder may rocket. In a fire, the following hazardous materials may be generated: very toxic carbon monoxide, carbon dioxide.

What are the stability and reactivity hazards of methane?

- **Chemical Stability:** Normally stable.

- **Conditions to Avoid:** Open flames, sparks, static discharge, heat and other ignition sources.
 - **Incompatible Materials:** Increased risk of fire and explosion on contact with: strong oxidizing agents (e.g. perchloric acid), halogens (e.g. chlorine). Not corrosive to: aluminum alloys, carbon steel.
 - **Hazardous Decomposition Products:** None known.
 - **Possibility of Hazardous Reactions:** None known.
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What are unintentional release measures for methane?

Personal Precautions: Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Eliminate all ignition sources. Use grounded, explosion-proof equipment.

Methods for Containment and Clean-up: Stop or reduce leak if safe to do so. Knock down vapour with fog or fine water spray. Ventilate the area to prevent the gas from accumulating, especially in confined spaces.

What handling and storage practices should be used when working with methane?

Handling: Eliminate heat and ignition sources such as sparks, open flames, hot surfaces and static discharge. Post "No Smoking" signs. If used in a confined space, check for oxygen deficiency before worker entry and during work. Secure cylinder in an up-right position. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Prevent unintentional contact with incompatible chemicals. Additional information for handling refrigerated liquefied methane: ensure that cryogen dewar can withstand extremely low temperature. Cool the receiving container prior to transfer. Slowly fill containers or put objects into liquefied gas to minimize boiling and splashing. Do not overfill portable dewars.

Storage: Store in an area that is: cool, well-ventilated, temperature-controlled, out of direct sunlight and away from heat and ignition sources, clear of combustible and flammable materials (e.g. old rags, cardboard), separate from incompatible materials. Always secure (e.g. chain) cylinders in an upright position to a wall, rack or other solid structure.

What is the American Conference of Governmental Industrial Hygienists (ACGIH®) recommended exposure limit for methane?

ACGIH® TLV® - TWA: Minimal oxygen content required. (D) (EX)

Exposure Guideline Comments: TLV® = Threshold Limit Value. TWA = Time-Weighted Average. (D) Simple asphyxiant. (EX) Explosion hazard: The substance is a flammable asphyxiant or excursions above the TLV® could approach 10% of the lower explosion limit.

Adapted from: 2022 TLVs® and BEIs® - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH)

NOTE: In many (but not all) Canadian jurisdictions, the exposure limits are similar to the ACGIH® TLVs®. Since legislation varies by jurisdiction, contact your local jurisdiction for exact details. A list is available in the OSH Answers on [Canadian Governmental Occupational Health & Safety Departments](#).

A list of which acts and regulations that cover [exposure limits to chemical and biological agents](#) is available on our website. Please note that while you can see the list of legislation for free, you will need a subscription to view the actual documentation.

What are the engineering controls for methane?

Engineering Controls: Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored. Do not allow product to accumulate in the air in work or storage areas, or in confined spaces. For large scale use of this product: use stringent control measures such as process enclosure to prevent product release into the workplace.

What Personal Protective Equipment (PPE) is needed when working with methane?

Eye/Face Protection: Wear chemical safety goggles and face shield when contact is possible.

Skin Protection: Always wear insulated protective clothing, if contact with refrigerated gas is possible.

Respiratory Protection: Not normally required.

In areas of potential oxygen deficiency or where equipment failure may cause an immediate high concentration of methane, approved respiratory protection should be readily available.

Emergency or planned entry into unknown concentrations or into an area where there is less than 18% oxygen:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; or Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus.

APF = Assigned Protection Factor

Recommendations apply only to National Institute for Occupational Safety and Health (NIOSH) approved respirators. Refer to the [NIOSH Pocket Guide to Chemical Hazards](#) for more information.

Fact sheet last revised: 2023-02-07

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