Safety Data Sheet: Natural Gas

Section 1: Identification

Product Name:	Natural Gas
SDS Number:	2015002
Synonyms/Other Means of Identification:	Methane, Compressed Natural Gas (CNG), Vaporized Natural Gas (VNG), Petroleum Gas, Pipeline Gas
Intended Use:	Fuel
Manufacturer:	Philadelphia Gas Works (PGW) 800 W. Montgomery Avenue Philadelphia, Pennsylvania 19122 (215) 684-6774
Emergency Health and Safety Number:	CHEMTREC: (800) 424-9300
Manufacturer Health and Safety Contact:	PGW Safety Manager: (215) 684-6554
Manufacturer Technical Information Contact:	PGW Chemical Services: (215) 787-4850

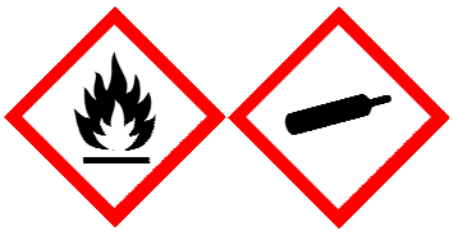
Section 2: Hazard(s) Identification

Classification/Hazard Category

Flammable Gases – Category 1
Gasses Under Pressure – Compressed Gas

Note: Under the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), the lower the hazard category number, the greater the hazard, and the higher the hazard category number, the less severe the hazard.

Pictograms



Signal Word

DANGER

Hazard Statements

Extremely flammable gas. (H220)*

Contains gas under pressure; may explode if heated. (H280)*

Precautionary Statements:

Do not use or handle unless all safety precautions have been read and understood. (P202)**
Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources, including internal combustion engines. No smoking. (P210)**
Eliminate all ignition sources if safe to do so. (P381)**
Do not extinguish fires from leaking gas unless leak can be stopped safely. (P377)*
Protect from sunlight. Store in a well-ventilated space. (P410 and P403)**

* Applicable GHS Hazard Code.
** Applicable GHS Precautionary Statement Code.

Supplementary Hazard Information:

High concentration may displace oxygen, especially in a confined space.

Section 3: Composition/Information on Ingredients

Natural gas is a complex combination of light gases separated from raw natural gas, which is a naturally occurring product. Natural gas consists primarily of methane and ethane; the table below identifies the components in natural gas that may be present in concentrations of 1 percent or more by volume. For health and safety determination purposes, the natural gas composition listed in the table below represents the widest range of components observed in the natural gas distributed by PGW based upon the results of sample analysis conducted between 2010 and 2015. The following constituents may also be present in natural gas at concentrations less than 1 percent by volume: propane, iso-butane, normal butane, pentanes, hexanes and heavier hydrocarbons (C6+), hydrogen sulfide, tertiary butyl mercaptan, isopropyl mercaptan, normal propyl mercaptan, and secondary butyl mercaptan. The mercaptan compounds listed above are added in trace amounts (typically about 2 parts per million) to odorize the natural gas for safety purposes.

Component Name	Synonyms	Chemical Formula	CAS Number	Concentration (% Volume)
Methane	Methyl hydride, marsh gas, carbane	CH_4	74-82-8	90-100
Ethane	N/A	C_2H_6	74-84-0	0-8.5
Nitrogen	N/A	N_2	7727-37-9	0-2
Carbon Dioxide	Carbon oxide, carbonic acid gas	CO_2	124-38-9	0-3

Section 4: First-Aid Measures

Eye Contact: Contact with pressurized gas may cause physical damage to unprotected eyes. If physical damage to eyes occurs, cover both eyes with loose, bulky, sterile dressing and seek immediate medical attention. Otherwise, natural gas is not toxic and is not irritating to the eyes.

Skin Contact: Contact with pressurized gas may cause physical damage to skin. If physical damage to skin occurs, the person exposed should be treated for shock and seek immediate medical treatment.

Inhalation (Breathing): Inhalation of large quantities of natural gas may cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. Natural gas is a simple asphyxiant and may cause loss of consciousness, serious injury, or death by displacing air, thereby resulting in insufficient oxygen to support life. Prompt medical attention is strongly recommended in all cases of inhalation overexposure. Rescue personnel should be equipped with a self-contained breathing apparatus. Remove inhalation victims to fresh air quickly. If inhalation victim is not breathing, ensure that their airways are open and administer cardiopulmonary resuscitation (CPR). If necessary, have a trained person administer air or oxygen once breathing is restored. Seek immediate medical treatment.

WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause loss of consciousness, serious injury, or death.

Ingestion (Swallowing): This material is a gas at atmospheric temperature and pressure and ingestion is unlikely. Seek immediate medical attention if material is ingested.

Section 5: Fire-Fighting Measures

Fire Fighting Instructions

Natural gas is extremely flammable and can be ignited by heat, sparks, flames, static electricity, and other sources of ignition, such as pilot lights, mechanical/electrical equipment, and electronic devices that are not intrinsically safe. Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. Vapors may accumulate in confined spaces.

Natural gas fires should not be extinguished unless the source of the leak can be stopped safely. In most cases, it is best to eliminate the source of the leak and allow the natural gas to burn off. Isolate the leak, particularly around the ends of storage vessels, and maintain a safe distance upwind and uphill of the leak. Let the vessel, tank, or container burn unless the leak can be stopped. Natural gas is stored under pressure and containers of pressurized natural gas exposed to excessive heat or flame may rupture violently and suddenly without warning due to vessel over-pressurization. Fragmentation of the container should be anticipated. Withdraw

immediately in the event of a rising sound from a venting safety device. Use water fog to cool equipment, surfaces, and containers exposed to fire and excessive heat. For large fires, use unmanned hose holders or monitor nozzles to minimize personnel exposure.

Appropriate fire extinguishing media include dry chemical and carbon dioxide. Hazardous combustion products include smoke, carbon monoxide, carbon dioxide, and other products of combustion. Oxides of nitrogen and sulfur may also form.

Refer to Section 8 for Exposure Controls/Personal Protection and refer to Section 9 for flash point and flammability limits (explosive range). Refer to Section 16 for the National Fire Protection Association® 704 Hazard Rating.

Section 6: Accidental Release Measures

In case of an accidental release, activate your facility's leak response plan, if available. Evacuate non-essential personnel and secure all ignition sources. Do not allow road flares, smoking, cell phones, or other sources of ignition in the hazardous area. Internal combustion engines generate sparks that would serve to ignite natural gas, so do not drive vehicles through an area where natural gas has been released, and do not attempt to start vehicles that are within the area affected by the natural gas leak. Evaluate wind direction and speed to determine the direction of product travel. Stay upwind and uphill, if possible, and avoid low lying areas. Test the area for hazardous atmospheres before re-entering.

Stop the source of the release, if safe to do so. Isolate the area until the gas has been dispersed. Ventilate confined areas and check for hazardous atmospheres before entering. Notify relevant authorities in accordance with all applicable requirements.

Refer to Section 8 for Exposure Controls/Personal Protection.

Section 7: Handling and Storage

While working with natural gas, keep natural gas away from ignition sources, such as heat, sparks, and open flames. Do not smoke in the presence of natural gas. Also, take precautionary measures against static discharge; for example, do not use a cell phone or other electronic equipment in the presence of natural gas unless the equipment is intrinsically safe. Use non-sparking tools to work around natural gas lines and equipment. Gas can accumulate in confined spaces and limit oxygen available for breathing; use only with adequate ventilation. Natural gas may be present in transmission lines, mains, services, fuel lines, or customer's equipment at pressures ranging from less than 1 pound per square inch (psi) to over 600 psi. Open and close gas valves slowly to avoid pressure surges, which might cause personal injury or damage equipment. Ground all equipment and fuel lines used in natural gas service to prevent the buildup of static and possible sparks. Never ground electrical equipment to gas piping. Electrical Equipment used in these areas should be UL listed for Class I, Division I, Group D, Hazardous Locations.

At least 72 hours prior to excavating in an area where gas lines are known or suspected to be, call the Pennsylvania One Call System, Inc. (Underground Line Locating Service) at 800-242-1776 for location and marking at the site. If a gas line is damaged while working in PGW's service territory, IMMEDIATELY report the incident to PGW at (215) 235-1212 as well as local authorities by dialing 911 while evacuating the area. Call the local fire department by dialing 911 and report the gas leak.

If a gas line has been pulled out of alignment in PGW's service territory, report the incident to PGW. Other gas lines in the vicinity may have been damaged even if the pulled line looks intact. If only the gas line's coating has been damaged, it must still be inspected and properly repaired by PGW before reburial to prevent corrosion and possible leakage.

Natural gas must be stored only in approved containers which are properly closed and labeled. Use and store natural gas in a cool, dry, well-ventilated area away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Avoid exposing any part of a compressed gas cylinder to temperatures above 125 degrees Fahrenheit. Protect containers against physical damage and post signs indicating "No Smoking or Open Flame." Store away from incompatible materials identified in Section 10. Empty containers may contain residual natural gas and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, flame, sparks, or other sources of ignition.

Section 8: Exposure Controls/Personal Protection

Component Name and CAS Number	ACGIH TLV	OSHA PEL	NIOSH IDLH	Notes
Methane 74-82-8	TWA: 1,000 ppm	N/A	N/A	Simple Asphyxiant
Ethane 74-84-0	TWA: 1,000 ppm	N/A	N/A	Simple Asphyxiant
Nitrogen 7727-37-9	N/A	N/A	N/A	Simple Asphyxiant
Carbon Dioxide 124-38-9	TWA: 5,000 ppm	TWA: 5,000 ppm	40,000 ppm	Simple Asphyxiant

Notes

- ACGIH: American Conference of Industrial Hygienists
- OSHA: Occupational Safety and Health Administration
- NIOSH: National Institute for Occupational Safety and Health

- TLV: Threshold Limit Value
- PEL: Permissible Exposure Level
- TWA: Time Weighted Average
- IDLH: Immediately Dangerous to Life and Health
- ppm: Parts per million

Engineering Controls: Provide adequate ventilation to keep gas concentrations below occupational exposure and flammability limits (less than 20% of the lower explosive level) and maintain sufficient oxygen levels. In confined spaces, local and general ventilation should be provided. Follow appropriate confined space entry procedures. Use explosion proof general ventilation and lighting in classified/controlled areas. Be sure explosion proof flashlights and equipment are used.

Eye/Face Protection: The use of eye/face protection that meets or exceeds ANSI Z87.1 is recommended when working with pressurized natural gas.

Skin/Hand Protection: The use of skin protection is not normally required, but the use of leather or cotton gloves and flame retardant clothing is recommended in any situation where pressurized natural gas may ignite accidentally.

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant the use of a respirator.

Section 9: Physical and Chemical Properties

- Appearance: Colorless
- State: Compressed gas
- Odor: Pure natural gas is odorless, but mercaptan compounds are added to the gas to impart a rotten egg smell to the gas distributed by PGW.
- Odor Threshold: readily detectable by persons with a normal sense of smell at concentrations of less than 1 percent natural gas in air
- pH: Not applicable
- Melting Point/Freezing Point: No data available
- Boiling Point: -259^{o}F (-162 ^{o}C)
- Flash Point: < -306 ^{o}F (< -188 ^{o}C)
- Evaporation Rate (n-butyl acetate = 1): Not applicable
- Flammability: extremely flammable gas
- Lower Explosive Limit (volume % in air): approximately 5.0%
- Upper Explosive Limit (volume % in air): approximately 15.0%
- Vapor Pressure: gaseous at 60 ^{o}F and 1 atmosphere

- Vapor Density: 0.042 – 0.046 lb/ft^3 at 14.7 psia and 60 ^oF
- Relative Vapor Density: 0.55-0.60 at 14.7 psia and 60 ^oF
- Liquid Density: Not applicable
- Relative Density/Specific Gravity: Not applicable
- Solubility in Water: Slightly soluble in water
- Partition Coefficient (n-octanol/water): 1.81
- Auto-Ignition Temperature: 999^oF (537 ^oC)
- Decomposition Temperature: Not applicable
- Viscosity: Not applicable
- Percent Volatile: 100 percent

Section 10: Stability and Reactivity

Reactivity: When natural gas is mixed with appropriate amounts of oxidizing agents, including air and oxygen, in the presence of an ignition source, an uncontrolled explosive reaction can occur.

Chemical Stability: Natural gas is stable under controlled conditions of use.

Possibility of Hazardous Reactions: Not applicable.

Conditions to Avoid: Natural gas is extremely flammable and explosive; avoid heat, sparks, open flames, and all possible sources of ignition. Heat will increase pressure in containers used to store natural gas.

Materials to Avoid (Incompatible Materials): Natural gas will form explosive mixtures with air or oxygen and will also burn or explode in the presence of strong oxidizing agents such as chlorine, chlorine dioxide, bromine pentafluoride, oxygen difluoride, liquid oxygen, and nitrogen triflouride. Natural gas will spontaneously ignite when mixed with chlorine dioxide. Also avoid contact with acids, aluminum chloride, and halogens.

Hazardous Decomposition Products: Thermal decomposition products may include carbon monoxide, carbon dioxide, sulfur oxides, smoke, and other toxic combustion products.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Inhalation: Natural gas is not toxic; however, if natural gas vapors escape and accumulate in a confined area or if large amounts of natural gas is released, the natural gas may displace air from the area and cause loss of consciousness, serious injury, or death.

Skin Absorption: This product is not expected to cause skin irritation.

Serious Eye Damage/Irritation: Contact with pressurized gas may cause eye damage and swelling. Otherwise, this product is not expected to cause eye irritation.

Skin Corrosion/Irritation: Contact with pressurized gas may cause physical damage to the skin, but otherwise, this product is not expected to cause skin irritation.

Skin Sensitization: Skin contact should be avoided. Sensitization as a result of skin contact is not expected.

Signs and Symptoms: Light hydrocarbon gases are simple asphyxiants and can cause anesthetic effects at high concentrations. Symptoms of overexposure, which are reversible if exposure is stopped, include shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances, and vomiting. Continued exposure can lead to hypoxia (inadequate oxygen), rapid breathing, cyanosis (bluish discoloration of the skin), numbness of the extremities, unconsciousness, and death.

Carcinogenicity: Natural gas is not expected to cause cancer. This substance is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or OSHA.

Section 12: Ecological Information

Ecotoxicity: Petroleum gases are volatile and rapid evaporation is expected from both land and water.

Persistence and Degradability: Not expected to remain on land surface or water for any period.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse Effects: No data available.

Section 13: Disposal Considerations

It is preferable to dispose of product by burning in a properly designed flare. Venting of natural gas directly to the atmosphere is not recommended. Natural gas is not typically managed as a waste, but if cylinders of natural gas are to be disposed, the disposal of this material should comply with all applicable federal, state, and local regulations.

Section 14: Transport Information

Transport in accordance with United States Department of Transportation (DOT) regulations governing the transportation of hazardous materials.

UN Number: UN1972
UN Proper Shipping Name: Natural gas, compressed
Transport Hazard Class: 2.1
Packing Group: Not applicable
Packaging Exceptions: 306
Packaging Non-Bulk: 302
Packaging Bulk: 302
Environmental Hazards: Refer to Section 15 for reportable quantities.
Special Precautions: Refer to Emergency Response Guide 115.

DOT Shipping Label: Flammable Gas
Placard: Flammable Gas/1972

Section 15: Regulatory Information

CERCLA/SARA – Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA – Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	No
Fire Hazard:	Yes
Pressure Hazard:	Yes
Reactive Hazard:	No

CERCLA/SARA – Section 313 and 40 CFR 372:
This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material (refer to CERCLA 101(14)).

California Proposition 65:
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

International Hazard Classification

WHMIS Hazard Class:
A – Compressed Gas
B1 – Flammable Gases

National Chemical Inventories

All components are either listed on the TSCA Inventory, or are not regulated under TSCA.

Abbreviations

- CERCLA: Comprehensive Environmental Response Compensation and Liability Act
- EPA: Environmental Protection Agency
- SARA: Superfund Amendments Reauthorization Act
- TPQ: Threshold Planning Quantity
- TSCA: Toxic Substances Control Act
- WHMIS: Workplace Hazardous Materials Information System

Section 16: Other Information

National Fire Protection Association (NFPA)® 704 Hazard Rating

Health: 1 Flammability: 4 Instability: 0

(0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Hazardous Material Identification System (HMIS)® Hazard Rating

Health: 1 Flammability: 4 Physical Hazard: 3

(0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

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