

EMERGENCY FIRST RESPONDER GUIDE

NATURAL GAS VEHICLES & STATIONS

GoWithNaturalGas.ca



This product is made possible by a financial contribution from Natural Resources Canada.

1. Natural Gas Properties

Natural gas is primarily made up of methane.

Natural gas is colourless, odourless, tasteless, and non-toxic.

Natural gas is a simple asphyxiate that does not cause any other physiological effects.

Natural gas is 40% lighter than air.

By comparison, propane is 1.5 times heavier than air and gasoline vapour is 3.5 times heavier than air.

Natural gas has a higher ignition temperature compared to propane and gasoline.

NATURAL GAS COMPARED WITH OTHER GASES

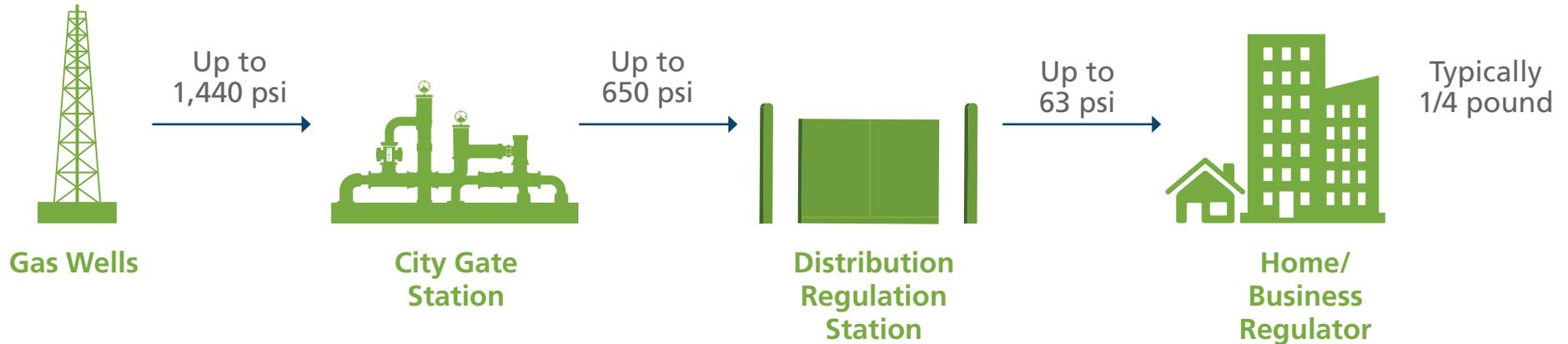
PROPERTY	NATURAL GAS	PROPANE	GASOLINE VAPOUR	CARBON MONOXIDE
Toxic	no	no	yes	yes
Flammable	yes	yes	yes	yes
Flammable range in air by % volume	4.3% - 15.4%	2.3% - 9.5%	1.3% - 7.1%	12% - 74%
Ignition temperature (°F)	1,100 - 1,200	898 – 986	536 - 853	1,202 – 1,211
Ignition temperature (°C)	593 - 649	481 – 530	280 – 456	650 - 655
Relative density (vapour)	0.60	1.50	3.50	0.97

2. CNG

Natural gas must be compressed (CNG) or liquefied (LNG) for use as a vehicle fuel. CNG has odourant added which gives it a rotten egg smell. If released, CNG will rise to atmosphere and will not pool on the ground.

CNG is stored on vehicles at a high pressure at 3,000 psi or 3,600 psi.

By comparison, natural gas moved through transmission pipelines or in local distribution systems will range from an estimated 1,440 psi to < 1 psi.



CNG is commonly used as a fuel for passenger vehicles, transit buses, and refuse trucks. It is also possible to have CNG highway tractors.

CNG is stored on vehicles in cylinders made of durable materials. CNG will not vent from a cylinder unless the pressure relief device (PRD) is activated. PRDs are activated by extreme heat or by accidental overpressuring.

3. LNG

LNG is natural gas that has been cooled to its liquid state at -162 degrees Celsius.

Unlike CNG, LNG does not have odourant added as it interferes with liquefaction.

As LNG warms up, it will change from a liquid to a gas vapour.

If released, a small amount of LNG will evaporate and rise to atmosphere.

A larger spill of LNG may run to ground or pool in low points.

LNG is stored on vehicles in insulated, thermos-like, double-walled tanks.

LNG is lighter than water, so a large spill of LNG will float on water.

LNG leaks will appear as a vapour "fog"

The hazards of LNG and LNG vapour are:

- Respiratory hazard

- LNG vapours are extremely cold
- Wear breathing apparatus in the event of an LNG spill

- Frozen flesh

- LNG is a cryogenic liquid
- Low temperature of LNG can cause frostbite to exposed skin or eye tissue
- Delicate eye tissue can be damaged even when contact is too brief to affect skin

- Flammable vapours

- Low temperature effects on equipment causing embrittlement and breakage



4. NGV Accidents

Check for a blue diamond on the back of the truck cab or on the rear bumper:



For a CNG vehicle, the diamond will say, "CNG"



For a LNG vehicle, the diamond will say, "LNG"

- LNG vehicles may have both a CNG and LNG blue diamond depending on the vehicle fuel system

Remember that LNG is not odourized, so just because you don't smell natural gas, that does not mean that it is not present.

If there is a natural gas vehicle fire:

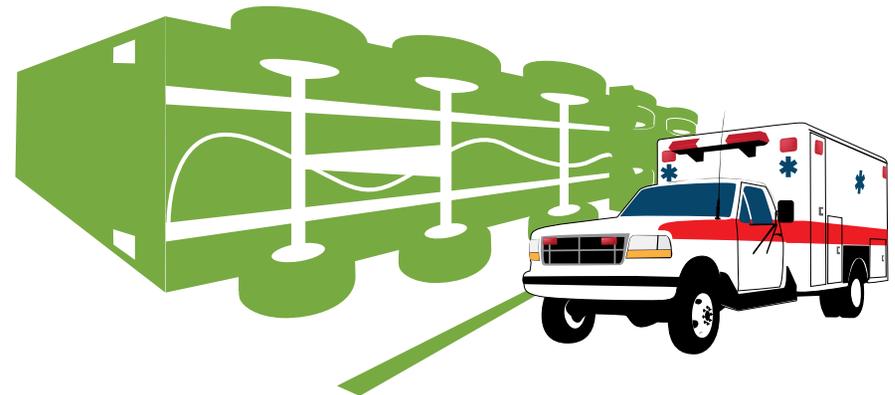
- Let it burn unless there is an immediate threat to life or property
- A natural gas fire will produce high radiant heat and little smoke

Restrict access to the area:

- Keep the public away
- Keep all equipment and people upwind
- Ensure there are no sources of ignition
 - Shut off vehicles
 - Don't use electrical devices, cell phones, two-way radios or pagers
- Constantly monitor and assess the situation

If there is a natural gas vehicle fire where there is threat to life or property:

- Use a dry powder type of fire extinguisher
- After the fire is extinguished, locate the shut-off valve and turn off the flow of natural gas from the fuel cylinder or fuel tank



5. CNG Station Incidents

CNG Stations

In the event of a fire, explosion, vehicle accident at the station or a site emergency involving any other fuels:

- **Activate the Emergency Shut Down system (ESD):**
 - ESD buttons are located at the compressor and on the dispensers
 - When the ESD is pushed, it cuts off power to the station and closes all valves so as to isolate the major components of the system including:
 - Shutting off gas supply to the station
 - Shutting down the compressor motor
 - Closing the valves at the storage cylinders, so that no gas flows to the dispensers
- Activating the ESD minimizes the release of natural gas from the station
- The motor control centre for the station is equipped with high voltage wiring and is secured via locked doors which are only accessible to trained station service personnel

- After using the ESD, trained service personnel will need to re-set the station equipment before it can be restarted

Call the local natural gas utility if there is:

- An audible gas leak
- A strong odour of natural gas
- A fire or explosion



DISCLAIMER

This Guide outlines the properties and hazards of natural gas when used as a vehicle fuel in either compressed (CNG) or liquefied (LNG) form. As natural gas vehicle usage is increasing across Canada, it is important that Emergency First Responders be familiar with the characteristics of natural gas including knowing how to recognize a natural gas vehicle and how to approach an emergency situation involving a natural gas vehicle or a natural gas refueling station.

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