



From: NGV America Technology & Development Committee

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Natural gas normally consists of over 90% methane with smaller amounts of ethane, propane, butane, carbon dioxide and other trace gases. The high methane content gives natural gas its high octane rating (120-130) and clean-burning characteristics, allowing high engine efficiency and low emissions.

All motor vehicle fuels present certain hazards if not handled properly. Fuels contain energy, which must be released by burning. Gasoline is a potentially dangerous fuel, but, over time, we have learned to use it safely. The same is true of natural gas. Natural gas safely generates our electricity, heats our homes and cooks our meals. But, like gasoline, natural gas must be understood and respected in order to be used safely.

Natural gas is used as a motor fuel for approximately 150,000 vehicles in the United States, 20 million worldwide. As with all vehicle fuels, natural gas can be used safely if simple, common sense procedures are followed. In fact, natural gas has safety advantages compared to gasoline and diesel: it is non-toxic and has no potential for ground or water contamination in the event of a fuel release. Natural gas is lighter than air and dissipates rapidly when released. An odorant is added to provide a distinctive and intentionally disagreeable smell that is easy to recognize. The odor is detectable at one-fifth of the gas' lower flammability limit.

Natural gas vehicles have an excellent safety record for two primary reasons: the properties of the fuel itself and the integrity of the natural gas vehicle and its fuel delivery system (i.e., storage containers or fuel tanks, fuel lines, valves, and pressure relief devices).

Natural gas has a very limited range of flammability – it will not burn in concentrations below about 5% or above about 15% when mixed with air. Gasoline and diesel burn at much lower concentrations and ignite at lower temperatures. Although it takes very little energy to ignite a flammable mixture of air and natural gas, gasoline, or diesel, natural gas burns at a somewhat lower temperature.

Compressed natural gas fuel systems store natural gas at levels of 3,000 – 4,000 pounds per square inch (psi). Although the use of high storage pressures might appear dangerous, compression, storage and fueling of natural gas vehicles meet stringent industry and government safety standards. The use of high pressure systems is not unique to natural gas vehicles. High-pressure gases are used safely every day in industrial and medical applications. Hydrogen fueled vehicles although currently not in widespread use, store hydrogen at pressures of 5,000 – 10,000 psi.

Natural gas powered vehicles are designed and built to be safe both in normal operation and in accidents. Natural gas fuel containers are required to meet rigorous test requirements, including a bonfire test, a bullet penetration test, and hydraulic burst, among others. These assessments are part of industry standards to test the CNG containers far beyond normal environmental and service damage risks.

All vehicle fuel systems require regular monitoring and maintenance, and natural gas fuel systems are no different. CNG fuel systems require regular inspection to ensure that the safety of the vehicle is not compromised. Fuel system inspections should always be conducted by qualified personnel.

Technical data, safety regulations and years of experience show natural gas vehicles to be as safe as, or safer than, conventionally fueled vehicles. To learn more about natural gas vehicles, including codes and standards, visit www.NGVAmerica.org.

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