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National Waste & Recycling Association™

First Responder Guide - Waste Collection

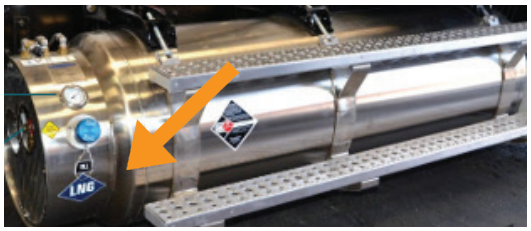
LNG VEHICLE FUEL SYSTEMS

INTRODUCTION

This brief guide is for public safety personnel and first responders who encounter emergencies regarding waste collection vehicles powered by Liquefied Natural Gas (LNG) fuel systems.

IDENTIFICATION OF LIQUIFIED NATURAL GAS VEHICLES (LNG)

Before responding to a vehicle fire, ask dispatch for information on the fuel type so you can prepare accordingly, otherwise you will need to gain this information on the scene. The United States Department of Transportation (USDOT) requires vehicles equipped with natural gas fuel systems to have a blue diamond shaped decal affixed on the back of the vehicle identifying the vehicle as powered by LNG. Additional LNG decals may be affixed to the front and sides of the vehicle, on the fuel storage cabinet or LNG fuel management module.



LNG CHARACTERISTICS

- LNG is stored at cryogenic temperatures [-259°F (-161°C) or cooler] and is odorless, if spilled, it will vaporize and dissipate into the air. LNG cannot be odorized because of its very cold temperature; therefore, **methane detection systems are mandatory**. LNG sensors are located in the engine compartment and inside the cab.

LIQUID NATURAL GAS (LNG) EMERGENCY RESPONSE FOR FIREFIGHTERS

PERSONAL PROTECTIVE EQUIPMENT

- LNG is stored at temperatures below -260°F (-162°C) and can cause first degree burns and frostbite if it contacts skin. PPE should include gloves and face shields to prevent frostbite, a methane/flammable gas detector and self-contained breathing apparatus (SCBA).

CYLINDAR AND MOUNTING

- Large, cylindrical, double-insulated stainless-steel tanks are affixed to one or both vehicle chassis side rails. LNG fuel tanks are considerably larger in length and diameter than typical cylindrical diesel tanks.
- Refuse trucks (left) and Class 8 semi-tractors (right) are the most common LNG vehicles with tanks (1) mounted to one or both vehicle chassis side rails.

PRESSURE RELIEF VALVE (PRVs)

- PRVs vent excess pressure at 230 psi, excessive venting may indicate a problem.
- LNG pressure relief valves are not thermally activated, so there is no danger of compromising pressure relief valve function with the application of water.
- LNG PRV vent tube runs from LNG fuel tank to above the vehicle roof to vent gaseous fuel.

EMERGENCY RESPONSE

1. Gas Leak

- Always refer to the latest version of USDOT Emergency Response Guide (ERG) Section 115.
- Establish a 330-ft perimeter.
- Allow gas to vaporize and disperse; DO NOT apply water, regular or alcohol-resistant foam directly on spill. Use a high expansion foam if available to reduce vapors.
- Remove sources of ignition and allow leaking LNG fuel to vaporize and disperse into the atmosphere. Pay particular attention to any sources of ignition overhead because natural gas will rise to the ceiling.
- Use a combustible gas meter to monitor for potential fuel leaks.
- Small LNG leaks may be observed as vapor escaping from the leak, usually at fittings. Large liquid leaks may spill but will vaporize and rise almost immediately.
- Verify the ignition switch is turned OFF (this closes the supply solenoid valve), the parking brake is set, and if it is safe to do so, turn OFF the main battery switch. If it is safe to do so, close the red manual shutoff valve and check the fuel system near the damaged area for frost, ice, or condensation.
- If the tank is damaged or there is frost on the tank or the sound of fuel escaping can be heard, the gas will vaporize and rise into the air. Be aware the pressure gauges may indicate zero, but some residual liquid may remain in the tank.
- Open vehicle doors to introduce fresh air and prevent gas accumulation.
- Advise towing and wreckage storage operators the vehicle is fueled with LNG.

2. Fire Emergency

- **Apply water to keep tanks cool** and prevent BLEVE (boiling liquid expansion vapor explosion).
- Establish a 330-ft perimeter and allow fire to burn if tanks are involved.
- If the LNG tanks are not involved in the fire, the fire on the vehicle can be extinguished with normal response tactics. WARNING Fire exposure may not always be apparent. Apply copious amounts of water to the LNG tanks. If a sufficient water supply is not available, suspend water application and evacuate to a safe distance.
- If fire is impinging on the LNG tanks, or if the fire is fueled by an active leak, allow the fire to burn while watching for secondary hazards.
- If it is safe to approach the vehicle, always approach at a 45-degree angle.
- If it is safe to do so, immediately chock vehicle wheels to prevent accidental movement.
- The LNG pressure relief valve (PRV) will open causing CNG to vent. The LNG pressure relief valve is self-resetting; the valve resets when pressure is approximately below 230 psi (16 bar).
- If it is safe to do so, turn off the main battery switch.
- Advise towing and wreckage storage operators the vehicle is fueled with LNG.

TRAINING AND REFERENCES

- Hexagon Agility offers training courses for first responders. https://hexagonagility.com/fleetcare/customer-care-training
- Refer to USDOT Emergency Response Guide
- Always consult the National Fire Protection Association (NFPA) "Alternative Fuel Vehicles Training Program for Emergency Responders"