



# Propane Autogas Vehicle Technician



National Alternative  
Fuels Training Consortium

A Program of



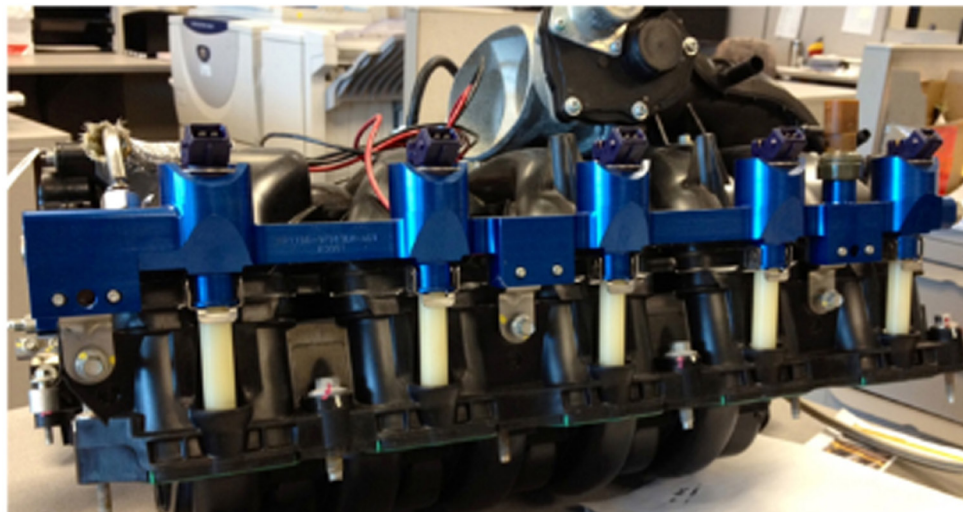


**Figure 3-37:** Vapor fuel-injector rail. Source: Prins.

may need to be mounted on a single rail, on two rails transversely, or in clusters of two or three injectors.

**Fuel Rails for Vapor Fuel-Injection Systems** — The fuel rail may be manufactured specially for the injectors, or the gasoline fuel rail may be modified to receive propane autogas fuel injectors. If a gasoline fuel rail is reused, the fuel inlets may be modified with adapters or other manufacturer-specific fittings to accommodate the low-pressure fuel feed hose from the vaporizer.

In either case, the vehicle’s original computer may be reprogrammed for propane autogas operation, while leaving most of the engine wiring intact. The fuel-system manufacturer may provide a fuel injector support module.



**Figure 3-38:** Liquid fuel-injection rail (6.8L V-10). Source: ROUSH CleanTech.



### Facility Inspections

Even if you install gas detectors, have a qualified service technician who is familiar with the characteristics of propane autogas inspect your facility for possible leaks.

### Carbon Monoxide Detector

Remember that carbon monoxide (CO) is a colorless, odorless, tasteless gas that is a cumulative poison. It is a very dangerous gas produced when any fuel burns. Smoking a cigarette; idling a gasoline engine; and burning fuel oil, wood, kerosene, natural gas, and propane autogas all produce CO. High levels of CO can be produced when fuels are burned incompletely.



Figure 4-6: Portable CO gas detector. Source: Propane Education and Research Council.

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**WARNING:** Symptoms of CO poisoning can include headache, dizziness, fatigue, shortness of breath, and nausea.

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Technicians should use a CO detector when engines are running and be familiar with its calibration, operation, and if portable, keep the batteries fresh. If CO is detected above 50 ppm, ventilate the area. Shut down the engine and leave the site until the air clears. Return and test the air with the detector. If the readings are above 100 ppm, evacuate the area immediately. Make sure all personnel are accounted for. Spend no more than 15 minutes in an area with this concentration. If concentrations are above 200 ppm, only personnel (usually fire fighters) with Self Contained Breathing Apparatus (SCBA) should enter the site. These emergency services personnel need to be called if they are not already on the scene.

CO detectors are designed to sound an alarm when they sense excessive levels of CO in the air. Consider installing a CO detector listed by the Underwriters Laboratories (UL) on each level of the facility. Be sure to follow the manufacturer’s instructions regarding





### Pressure Purge

The American Society of Mechanical Engineers (ASME) tanks are typically purged by pressure. Alternatively, they may be purged by vacuum. Pressure purging involves venting the contents of the tanks to the atmosphere and feeding propane autogas vapor from a fuel source into the tank.

Opening the 80% outage valve will vent only a small amount of gas from the #54-drill-size opening, rendering the outage valve ineffective during purging. The opening is too small to vent a significant volume of gas.

To pressure purge an ASME tank, install an equalizing valve (see



**Figure 13-1:** Vapor equalizing valve. Photo courtesy of Propane Education & Research Council.



**Figure 13-2:** Vapor service valve. Photo courtesy of Propane Education & Research Council.

**Figure 13-1**), some manufacturers call these valves “vapor-return valves”) or a vapor-service valve (see **Figure 13-2**).

Many ASME tanks have an unused vapor opening in the tank that must be closed with a steel plug. This plug is removed and a vapor-equalizing valve or a vapor-service valve is installed after the tank is initially vented to atmospheric pressure. This process allows for purging after the tank

is installed in a vehicle. This vapor-purge valve communicates with a tube that extends to the top-inside of the tank. When a vapor-return coupling is connected to this valve, it depresses an internal plunger that opens the valve, allowing vapor to be withdrawn. After purging, the installed vapor-equalizing valve or service valve remains attached to the vapor opening of the tank, and its outlet sealed with a cap.

