CLEAN FUEL TECHNOLOGIES™

OPERATOR MANUAL – 2.6 DGE PONY TANK

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CLEAN FUEL TECHNOLOGIES

Cummins Clean Fuel Technologies
2.6 DGE PONY TANK
Operators Manual

Revision 1A 01 January 2024

I. Legal Disclaimer

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II. Preface

This manual is for 2.6 DGE Pony Tank Fuel System Service information is available by calling Cummins Clean Fuel Te chnologies at 1-844-CNG-TANK.
DO NOT attempt to fill, defuel, vent, or perform basic maintenance on the system until you have read and fu lly understand the information presented in this manual.

If you have questions about any part of this manual, contact Cummins at 1-844-CNG-TANK.

This manual must always be kept with the Pony Tank so it is accessible to the operator at all times. This manual includes information that is important for the safety of the Operator and First Responders (i.e. police, fire fighters) in the event of an emergency.

The following abbreviations are used throughout this manual:

1. CNG, which means Compressed Natural Gas.
2. FMM, which means Fuel Management Module

III. Warning Statements

Warning statement definitions used in this manual.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The word "DANGER" applies to the most extreme situations.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation or unsafe practice which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates practices not related to personal injury. The safety alert symbol shall not be used with this signal word.

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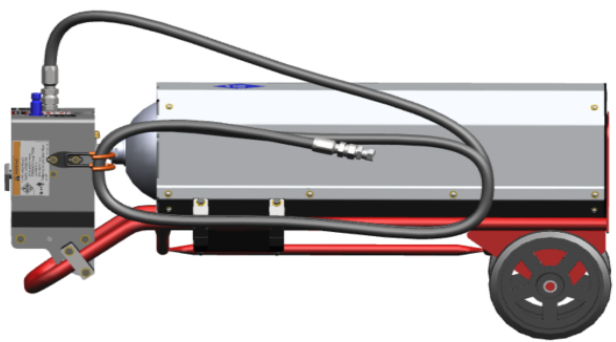
Purpose

Cummins Clean Fuel Technologies (CCFT) 2.6 DGE Pony Tank Fuel System is for Non-DOT vehicle power use.

Cummins Clean Fuel Technologies (CCFT) 2.6 DGE Pony Tank Fuel System is **NOT** approved for use on County, State or Federal highways or roads.

Cummins Clean Fuel Technologies (CCFT) 2.6 DGE Pony Tank Fuel System is designed for stationary vehicle troubleshooting when CNG fuel is not available.

Cummins Clean Fuel Technologies (CCFT) is not responsible for training, instructions, or approval for fuel system attachment to vehicle chassis or trailer transportation.



Specification

General:
Empty Weight 200 lbs
Fuel Weight 220 lbs
Width: 20 inch
Height: 50 inch
Length: 26 inch
Regulated Pressure Hose 20 foot
Hoisting Points: (NO Hoisting Points)
Forklifting Points (NO Forklift Points)
Fuel Capacity 2.6 DGE 35 liter
Maximum Pressure Rating: 4500
Full Pressure Rating: 3600
Minimum Regulator Pressure Rating 250

Gauges:
Supply Pressure Gauge 0-6000 psi YELLLOW
Regulated Pressure Gauge 0-160 psi ORANGE

Valves:
Cylinder Manual Shut Off Valve
Defuel Valve

In Case of Emergency

Natural Gas Vehicles (NGVs) are subject to the requirements of the National Fire Protection Association (NFPA). NFPA 52, the Vehicular Gaseous Fuel Systems Code, details the safety requirements for NGVs and their fueling facilities.

Fuel System Shut Down Procedure

In the event of an emergency or the vehicle requires service, shut down the CNG fuel system using the procedure below.

⚠ WARNING

To control the flow of gas one of two valves MUST be closed. Either the RED Handle Manual Shut Off Valve or the Cylinder Manual Shut Off Valve.

Location of Cylinder Manual Shut-Off Valve (Figure 1)

- RED handle 2 way Manual Shut Off Valve located within the opening on the topside of the fuel system next to the gauges.

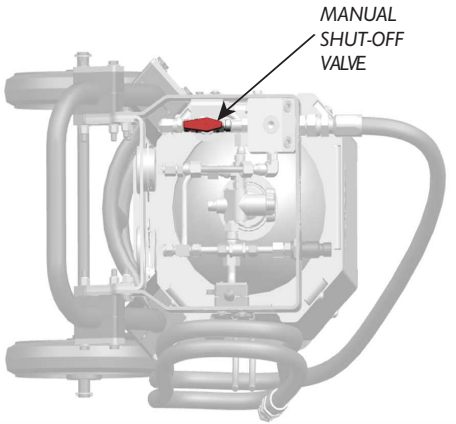


FIGURE *1 – MANUAL SHUT-OFF VALVE*

Step 1 – Turn OFF the Manual Shut-Off Valve

The Manual Shut-Off Valve isolates the fuel storage system from the low pressure fuel hose (black hose) to the engine. The Manual Shut-Off Valve is RED and clearly labeled for easy identification. (Figure 2)
To turn OFF the Manual Shut-Off Valve:
1. Turn the ignition OFF and set the parking brake.
2. Locate the RED Manual Shut-Off Valve.
3. Turn the valve clockwise 1/4 turn to the OFF position.

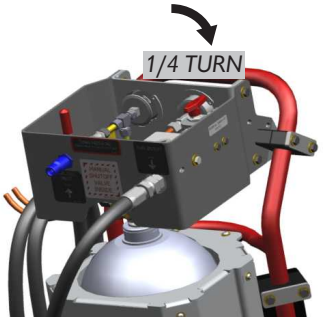


FIGURE 2 – MANUAL SHUT OFF VALVE

Step 2 – Turn OFF the Cylinder Manual Shut-Off Valve

The Cylinder Manual Shut-Off Valve isolates the fuel to the cylinder. The Cylinder Manual Shut-Off Valve is a stem valve and clearly labeled for easy identification. (Figure 3)

To turn OFF the Cylinder Manual Shut-Off Valve: turn clockwise to CLOSE, and counterclockwise to OPEN.

On most Cylinder Shut-Off Valve Stem Valve handle have arrows with an O for OPEN and C for CLOSE.

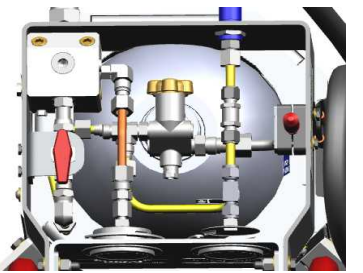


FIGURE 3 – CYLINDER MANUAL SHUT OFF VALVE

If You Suspect a Fuel Leak

⚠ WARNING

Compressed natural gas is flammable and explosive. Serious personal injury can occur if leaking gas is ignited. If you suspect a leak, do not operate the Pony Tank. The Pony Tank must be inspected by a qualified technician before being returned to operation.

If You Smell a "Rotten Egg" Odor

An odorant which smells like rotten eggs is added to compressed natural gas to aid in detection of a leak. If you notice this kind of lingering odor coming from your vehicle, you may have a leak in the CNG fuel system.

NOTE: It is normal to detect this slight odor when the fueling nozzle is being connected or disconnected during the refueling process. The odor should quickly dissipate when fueling has been completed.

Other Signs of a Fuel Leak

If you notice any of the following, you may have a leak in the CNG fuel system:

- Frosting at suspected leak point
- Bubbling in wet area
- Blowing or hissing sound
- Flames, if a leak has ignited

If the Pony Tank is Involved in an Accident

If the Pony Tank is involved in any accident or is leaking fuel, perform the following procedure.

⚠ WARNING

If the Pony Tank is involved in any accident occurring in excess of 5 mph, the fuel system MUST be inspecte d by a CSA-qualified fuel system inspector before bei ng returned to service.

1. Turn the ignition switch OFF, turn the main battery OFF, and set the parking brake.

2. Eliminate all ignition sources such as fire, sparks, electronics, lights, or electrostatic charges. Inform First Responders that the Pony Tank is a CNG tank and its location.

3. Turn Manual Shut-Off Valves (Red Handle) clockwise 1/4 turn to the OFF position.

4. Conduct a visual check of the damaged area of the fuel system for signs of leaks.

5. Keep pedestrians and traffic away from the area.

6. Have a qualified Cummins Service Technician inspect the fuel system and make any necessary repairs. Qualified service support can be found at www.cumminscleanfueltech.com

If the Vehicle is on Fire

1. Turn the ignition switch OFF.
2. Exit the vehicle in the safest manner possible.
3. Call 911.
4. If safe to do so, extinguish the fire using an appropriately-rated fire extinguisher.
5. Establish a safety zone of not less than 100 feet.
6. Report the following to the First Responder (i.e. police, fire fighters) when they arrive on site.
   a. Vehicle is a CNG vehicle
   b. Amount of fuel in the Pony Tank (psi reading if known)
   c. Location of the vent system on to of the Pony Tank.

Note: Have the Pony Tank inspected by a qualified technician to ensure integrity of the CNG fuel system. Qualified service support can be found at www.cumminscleanfueltech.com

First Responder Alerts and Procedures

These procedures are intended for EMERGENCY PERSONNEL ONLY (i.e. police, fire fighters). Emergency First Responders are specially trained to handle emergencies involving alternative fuel vehicles. These instructions are not intended for untrained, unqualified individuals. DO NOT attempt to perform these procedures on your own. Call 911 and follow any preliminary emergency steps listed at the beginning of this section.

First Responder Emergency Procedure

1. Shut down the fuel system per the Fuel System Shut Down Procedure at the beginning of this section.
2. Turn the battery disconnect switch to OFF.
3. Notify additional emergency personnel, if needed.

Fire Response Guidelines

⚠ WARNING

Observe the following warnings when responding to a fire involving a CNG vehicle. Failure to do so can result in serious personal injury or death.

⚠ WARNING

If the fuel cylinders or fuel cylinder housing ARE NOT involved in the fire, use normal response tactics to extinguish the fire.

⚠ WARNING

If fire is impinging on the cylinder housing or the cylinder are on fire, move to a safe distance and let the fuel system burn to protect the public and yourself from the possibility of an explosion hazard.

⚠ WARNING

DO NOT apply water to the cylinder housing or cylinder. Applying water can prevent the PRD from activating, resulting in a catastrophic cylinder failure causing an explosion.

Pressure Relief Device (PRD) on the CNG fuel system will activate at 230°F, releasing pressurized gas through the vent ports. This is to evacuate as much fuel as possible from the fuel cylinders. Pressure Relief Devices is located in the Cylinder Manual Shut Off Valve.

Location of Vent Ports and Vent Caps (Figure 4)

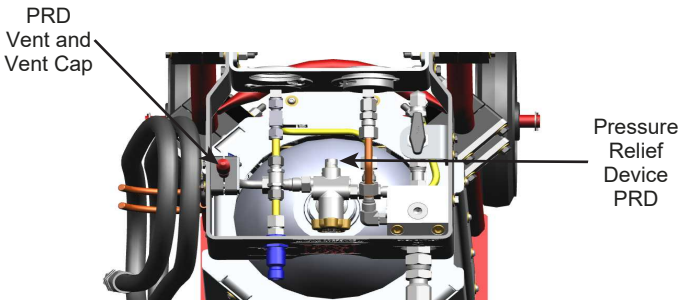


FIGURE 4 – PRD AND VENT CAP

⚠ DANGER

If fire exists and the PRD do not activate, the cylinder pressure can increase to above the rated pressure (5,000 psi) causing a probable hazardous situation. Clear the area as far as possible and let the vehicle burn.

⚠ WARNING

When Pressure Relief Devices (PRD) activate, the result could jet fire. Pressure within the system will determine the duration and distance of the jet fire. The fuel can re-ignite several times. Clear the area as far as possible and let the gas burn off.

NOTICE

The amount of fuel will determine how long it takes for the fuel to be vented. On average, it takes 20 minutes to vent out all the gas through the vent system from PRD activation.

NOTICE

Once PRD have activated and gas has stopped venting, it is safe to put water on the system.

NOTICE

After the fire is out, allow time for the system to cool before approaching the vehicle.

Safety

⚠ DANGER

The CNG fuel system has several significant differences from the typical diesel fuel systems used in heavy trucks. The fuel lines are under high pressure and leaking fuel can ignite. It is important to observe all safety statements in this manual to ensure safe operation of a CNG vehicle. Never disregard a safety directive.

⚠ WARNING

Maintenance, defuelling and depressurizing should be performed by a qualified technician only.

L'entretien, la vidange et la dépressurisation doivent être effectués uniquement par une personne qualifiée.

⚠ DANGER

It is the responsibility of the operator to read and understand all Warnings, Cautions, and guidelines in this manual BEFORE operating the vehicle or performing maintenance. Contact Cummins Clean Fuel Technologies if you do not clearly understand a ny part of the material presented here. Do not attempt to conduct any procedure you do not completely understand. Do not perform any procedure for which you do not have the specified Cummins Clean Fuel Technologies parts or required tools. Failure to do so can result in serious personal injury, or death.

⚠ WARNING

Compressed natural gas is flammable and highly explosive. Serious personal injury can result if leaking natural gas ignites. If a leak is suspected, have the vehicle immediately inspected and repaired before returning it to operation.

⚠ WARNING

One should never detect (smell) gas or hear gas escaping at any other time besides refueling. If the smell of natural gas or a hissing sound is detected at any time besides refueling, the CNG system should be shut down. Refer to the Fuel System Shut Down Procedure.

⚠ WARNING

Only trained and qualified personnel should service this natural gas vehicle. Components in the fuel system are under extreme pressure. Severe injury or death can result from improper service or failure to follow safety precautions.

Safety Tips

1. A portable fire extinguisher having a UL rating not less than 20 B:C should be accessible and visible. Fire extinguishers must always be kept fully charged and up to date.
2. Always wear protective footwear and eyewear when conducting fueling operations.
3. Inspect for leaks using a methane detector or an approved liquid leak detector. Do not use any other method or products to find leaks.
4. Do not attempt to tighten or loosen fittings when the fuel system is under pressure.
5. Always use tools that are in proper working order and properly calibrated.
6. Appropriate work attire must always be worn when servicing or maintaining fuel system. Never wear loose clothes, rings or loose neck chains.
7. All maintenance and service procedures must be conducted in an environment that is free of dust.
8. Perform service only in CNG-approved facilities.
9. For any maintenance that may create a spark or flame, follow the Welding and Hot Work Procedures.

10. In accordance with federal law, any CNG fuel system vehicle must always be labeled to signify it as a CNG vehicle. The vehicle must be marked with a weather-resistant diamond-shaped label located on an exterior vertical or near-vertical surface on the lower right rear of the vehicle (on the trunk lid of a vehicle so equipped, but not on the bumper of any vehicle), inboard from any other markings. The label shall be approximately 4-3/4 inches by 3-1/4 inches. The marking shall consist of a border and the letters “CNG” (one inch minimum height centered in the diamond) of silver or white reflective luminous material on a blue background.

CNG Vehicle Safety Precautions

⚠ WARNING

Following proper safety and handling practices is necessary when operating a compressed natural gas fuel system. Adhere to the following safety precautions when operating compressed natural gas fuel systems. Failure to do so can result in serious personal injury or death.

1. Always have at least one fire extinguisher with a UL rating of 20 B:C or more installed on the vehicle in a place that is easily accessible. The extinguisher must be labeled or marked with that rating. Fire extinguishers must always be kept fully charged and in good mechanical condition. Fire extinguisher mounting brackets must allow visual determination of being fully charged.
2. If a gas leak is detected, do NOT try to use the Pony Tank. Refer to the If You Suspect a Fuel Leak procedure.
3. Never perform service on the system when it is pressurized.
4. Do not allow the system pressure to exceed working pressure.
5. Do not smoke or produce open flame within 50 feet CNG dispensing/filling station

Codes and Compliances

For more information on CNG fuel system requirement in general, refer to following CNG codes and regulations:

- CGA C-6.4 CNG System Inspection Standard (also covers installation)
- FMVSS 304 (DOT) Cylinder Standards
- NFPA 52 Vehicular Gaseous Fuel Systems Code
- ANSI/NGV 2 CNG Vehicle Container requirements
- ANSI/IAS PRD 1 Pressure Relief Devices
- ANSI/IAS NGV 3.1 Valves, Fittings and Brackets
- Canada: CAN/CGA B109, CSA Group
- North America: ANSI/AGA NGV 3.1/CGA 12.3 and NGV 12.3-M95
- Compressed Natural Gas and Liquefied Natural Gas Railroad Commission of Texas January

Introduction

System Overview

The engine in this vehicle is fueled by a compressed natural gas (CNG) system designed by Cummins Clean Fuel Technologies. The system uses the same type of gas used in household appliances such as ovens and dryers.

The main difference is that natural gas vehicle fuel is stored under high pressure (3,600 psi [24,800 kPa]).

Compressed Natural Gas

CNG is a naturally occurring hydrocarbon gas mixture which consists primarily of methane.

It is:

- Colorless
- Odorless
- Non-corrosive
- Non-toxic

This gas is lighter than air, which means if gas were to leak, it would float upwards and quickly dissipate into the atmosphere. CNG will burn only when in an air-to-gas mixture of approximately 5-15% so its range of flammability is limited compared to other fuels. The gas also has an ignition temperature of 1076°F which is significantly higher than diesel. As a fuel, CNG is less expensive and burns cleaner than diesel fuel, producing low emissions. These characteristics make CNG an efficient, safe choice for fueling vehicles

⚠ WARNING

Compressed natural gas is flammable and highly explosive. Serious personal injury or death can result if leaking natural gas ignites. If a leak is suspected, have the vehicle immediately inspected and repaired before returning it to operation.

CNG is odorless and invisible in its natural state. To aid detection, a chemical odorant called mercaptan is added to it which gives it a distinctive, pungent smell, similar to "rotten eggs". If you notice this kind of lingering odor coming from your vehicle, you may have a leak in the CNG fuel system.

⚠ WARNING

One should never detect (smell) gas or hear gas escaping at any other time besides refueling. If the smell of natural gas or a hissing sound is detected at any time besides refueling, the CNG system should be shut down. Refer to the Fuel System Shut Down Procedure.

⚠ WARNING

Only trained and qualified personnel should service this natural gas vehicle. Components in the fuel system are under extreme pressure. Severe injury or death can result from improper service or failure to follow safety precautions.

Fuel Standards

Vehicle must be designed to run on CNG that meets North America standards, NFPA 52, and SAE J1616 for fuel com position.

Components

All components meet requirements found in:

- FMVSS 304 (DOT) Cylinder Standards
- NFPA 52 Vehicular Gaseous Fuel Systems Code
- ANSI/NGV 2 CNG Vehicle Container requirements
- ANSI/IAS PRD 1 Pressure Relief Devices
- ANSI/IAS NGV 3.1 Valves, Fittings and Brackets
- Canada: CAN/CGA B109, CSA Group
- North America: ANSI/AGA NGV 3.1/CGA 12.3 and NGV 12.3-M95

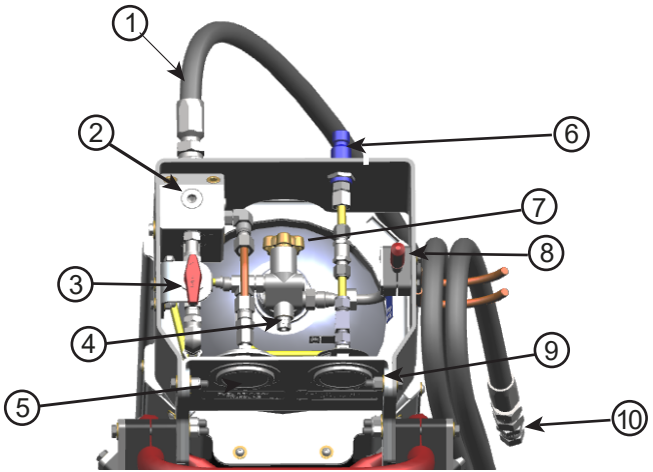


FIGURE 5 – PONY TANK COMPONENTS

1. Engine Fuel Hose
2. Regulator
3. Manual Shut Off Valve
4. PRD
5. Regulated Pressure Gauge
6. Fuel Receptacles NGV1
7. Cylinder Manual Shut Off Valve
8. PRD Vent
9. Supply Pressure Gauge
10. Hose Connection to Engine

Supply Pressure Gauge

The high pressure gauge indicates the fuel pressure in the fuel storage cylinders. The gauge has a range of 0 to 6000 psi. When cylinder(s) are full and the cylinder Manual Shut-Off Valve is open, the pressure reading should read approximately 3600 psi.

Regulated Pressure Gauge

The low pressure gauge indicates the fuel pressure sent to the engine. The gauge has a range 0 to 150 psi. When the r egulator is working properly, the pressure reading should r ead approximately 125 psi.

Manual Shut-Off Valve (Red Handle)

The FMM Manual Shut-Off Valve controls the flow of ga to the engine. It is referred to as a "1/4-turn" valve because it only requires a 1/4 turn to open or close the valve. Turn t he valve 1/4-turn clockwise to close the valve and counter-clockwise to open it.

Cylinder Manual Shut-Off Valve

The Cylinder Manual Shut-Off Valve isolates the fuel to the cylinder. The cylinder Manual Shut-Off Valve is a stem valve and clearly labeled for easy identification. Cylinder Shut-Off Valve Stem Valve turn clockwise to CLOSE, and counterclockwise to OPEN.

Fill Receptacles

Fill receptacles are used to fill the CNG storage cylinders with fuel using a standard NGV1 (slow) fill. The receptacle are equipped with built-in check valves to prevent fuel from escaping when the fuel fill nozzle is connected and dis connected.

Slow Fill/NGV1 Fuel Receptacle

The slow fill/NGV1 fuel receptacle is the filling port for fueling the Pony Tank at slow fueling facility, usually overnight.

Pressure Regulator

The pressure regulator reduces the pressure of fuel in the system from high pressure (3,600 psi) to low pressure (125 psi) for the engine to use.

Fuel Cylinder(s)

The fuel cylinder(s) stores CNG fuel at a service pressure of 3,600 psi. The fuel cylinders used for this Pony Tank is type-2 composite containers, manufactured to meet FMVSS 304, NAI/IAS, or the CSA B51 Part 2 specifications. In accordance with applicable regulations, the cylinders must display permanent labels which provide information necessary for inspection.

Pressure Relief Devices

The Pressure Relief Devices (PRD) are thermally-activated valves that open at a temperature of approximately 230°F. In the event of a fire, they are designed to release the fuel stored in the cylinders to prevent over-pressurizing the fuel cylinders. When activated, the PRD cannot be closed and will vent all gas. PRD is located in the cylinder manual shut off valve.

Inspection and Operation

Inspection

Inspect Pony Tank each day before using on vehicles.

1. Verify the Cylinder Manual Shut-Off Valve is in the ON position.
2. Check the high-pressure gauge on the fuel system to e nsure it is operating The fuel system maximum pressure is 3,600 psi.

NOTE: Pressure of less than 250 psi could make the engine run rough.

3. Check the vent port and vent cap for any signs the PRD have been activated. Verify the vent ports and vent c aps are clear of debris or damage.
4. Check the entire fuel system for any signs of damage or wear. Include checks for:
   a. Gas leaks – Smell for gas, look for frost or ice, and listen for hissing noises at joints and components.
   b. Look for external damage to housings and covers.
5. Attach engine fuel hose (black hose) to the low pressure filters located within the engine compartment.
6. Open the Manual Shut Off Valve (Red Handle) slowly to allow fuel pressure to build up between the engine and Pony Tank.
7. Check Regulated Pressure Gauge low-pressure gauge reading is approximately 80 psi.
8. Turn the ignition key to ON and check that the low-pressure gauge reading is approximately 125 psi.
9. The dashboard fuel gauge will not be functioning properly because it is not connected to the fuel system.
10. Have the fuel system and cylinders inspected by a certified CSA Cylinder and Fuel System Inspector if damage is found on any part of the components or structural parts of the fuel system.
11. Follow all company procedures for attaching fuel system to the vehicle chassis. Verify the fuel system is installed to the chassis to ensure it will not fall off during operation of the vehicle.

Weekly System Inspection

Perform the Weekly System Inspection to ensure the system is operating correctly, safely, and to maximize component performance.

1. Verify the cylinder Manual Shut-Off Valve move freely and are in the ON position.
2. Visually inspect the fuel system for any signs of damage or wear.
3. Check for damage on the cylinder shields and covers.

4. Check to ensure the cylinders are mounted securely. Inspect the mounts, brackets, rubber isolators, and all fasteners.
5. Check for leaks on all CNG fuel plumbing tubes, hoses, and fuel flow components. Check for the odor of rotten eggs. Look for frosting or the sound of hissing at valves and fittings
6. If any system components or structural parts are damaged, the system and cylinders must be inspected by a CSA-certified fuel system inspector. Qualified service support can be found at www.cumminscleanfueltech.com

Starting the Vehicle

1. Follow the vehicle manufacturer's recommended instructions for vehicle start-up.
a. Attached low pressure hose and torque to 80 ft lb.
b. Open the Cylinder Manual Shut-Off Valve by turning the valve clockwise to CLOSE, and counterclockwise to OPEN.
c. Open the Manual Shut Off valve by turning the RED handle counterclockwise to "OPEN" .
2. Turn the ignition switch to ON and allow a few seconds delay for the vehicle to start up.

NOTE: There will be a short 5 to 10 second "delay" for the gas to flow from the storage cylinder through the solenoid valve to the engine.

Fueling

Follow all company's policy's and procedures for fueling CNG fuel systems.

Follow all Fuel Stations instructions when fueling.

⚠ DANGER

Always follow the fuel system manufacturer's instructions on initial filling. Failure to do so may result in serious injury or death.

⚠ WARNING

To reduce the risk of impact and/or fire, which if not controlled, could result in death or serious injury:

1. ***Allow the fuel tank and all mounting hardware to acclimate to ambient temperature prior to initial fueling.***
2. ***Do NOT proceed to fill the cylinder(s) if a leak of CNG is detected or suspected. This includes, but is not limited to, the emission of a natural gas odor, unexpected loss of pressure in the fuel system, rattling, or other indications of loose connections, or unusual hissing or snapping.***

NOTICE

When fueling at public or private fueling areas, check for evidence of oil or other contaminants on the nozzle or on the ground below the nozzle. Oily or dusty conditions may be an indication of poor fuel quality, DO NOT USE. These conditions should be reported to the station maintenance personnel.

NOTICE

If you smell gas (rotten eggs smell) when fueling, turn the station pump OFF. If the vehicle is on a cascade system or time fill system, disconnect the fuel nozzle. Report the presence of the rotten egg smell to the station maintenance personnel.

Fueling the CNG System

⚠ WARNING

Do not fill the CNG system fuel cylinder with any other type of fuel other than CNG (Compressed Natural Gas). No other type of fuel may be used in the cylinder.

⚠ WARNING

Observe the following to reduce the risk of impact and fire. Failure to do so can result in death or serious injury and property damage:

1. Ensure that the fill nozzle at the CNG filling station is compatible with the fill fitting on the system before filling the fuel cylinder with CNG.

2. Verify the pressure rating is compatible with the fuel tank pressure rating.

3. Never fill the CNG system to a pressure that exceeds 4,500 psi at any temperature.

NOTICE

The following are general fueling guidelines. Always check with your fuel station for specific pump operating instructions and procedures.

1. Remove the rubber cap from the fueling receptacle. (Figure 7)

2. Wipe the receptacle with a dry, lint-free cloth.

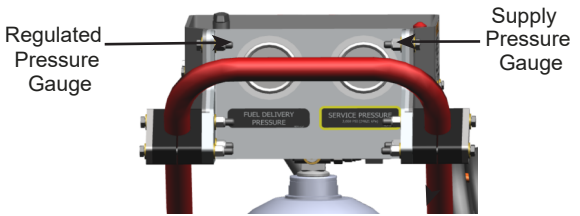


FIGURE 6 – OPERATION

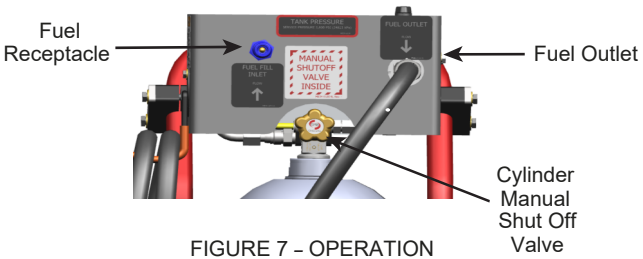


FIGURE 7 – OPERATION

3. Check that the fill nozzle is free from damage an the O-ring is present. If the nozzle is in acceptable condition, connect the nozzle to the fuel receptacle. NOTE: The NGV-1 and HD nozzles are different sizes. If the nozzle does not fit the receptacle, make sure you have selected the correct receptacle for your intended fueling.

NOTICE

If a fill receptacle is damaged, only qualified technicians are permitted to perform mechanical repairs to the receptacles.

4. Turn the nozzle valve to the Fill position, if required. You will hear fuel start to flow.
5. Open the Cylinder Manual Shut Off Valve and the RED Handle Manual Shut Off Valve.
6. Fueling will continue until the cylinder(s) have been filled. The fuel station pump will then shut of automatically.
7. Close the Cylinder Manual Shut Off Valve and the RED Handle Manual Shut Off Valve.

8. Turn the nozzle valve to the Vent position to release it from the receptacle and remove the fueling nozzle.

9. Once the fueling process is complete, replace the capon the receptacle and close the FMM door.

NOTICE

The fuel system is equipped with safety interlocks on the FMM door. The door MUST be closed in order for the engine to start.

NOTICE

The nozzles at fill stations are designed so they will not come off the receptacles when under pressure.

Fast and Slow Fill and Pressure/Temperature Guidelines

NOTICE

Compressed Natural Gas (CNG) can expand and contract significantly depending on temperature. The amount of CNG that can be stored in a vehicle's tank varies based on the following variables:

1. Fueling rate: As the rate of fueling increases, the temperature of the fuel also increases dramatically. As the fuel warms up, it expands and becomes less dense, therefore containing less energy by volume when the fuel system reaches the rated pressure.
2. Ambient temperature: The outside temperature affects the temperature of the CNG. At higher temperatures, CNG is less dense, and therefore does not contain as much energy per unit volume as it would at a lower temperature.
3. Pressure rating: The fuel system service pressure rating is 3,600 psi. Fill pressures are based on a 70°F ambient temperature. The cylinders are designed for up to 125% of their operating service pressure. So, a 3,600 tank can be filled to 4,500 psi.

⚠ DANGER

Failure to follow the procedures below could in explosion, fire, causing death or serious injury.

Defueling and Fuel Transfer Guidelines

⚠ DANGER

Always electrically ground the fuel tank, fuel system, and vehicle whenever a CNG fuel cylinder is being defueled. Failure to do so may result in explosion or fire.

⚠ DANGER

Do NOT attempt to service or remove the fuel cylinder valve or any other fuel system hardware without following depressurization procedures. Failure to do so may result in death or serious injury and property damage.

⚠ WARNING

Do not vent CNG in enclosed spaces. Breathing CNG can cause asphyxiation; a high pressure stream of CNG can penetrate skin, and a nearby source of ignition could spark an explosion.

⚠ WARNING

Gas venting should only take place outdoors or following an alternative method which is in compliance with NFPA 52. This is to avoid the possibilities of asphyxiation or accumulation of an explosive gas mixture.

⚠ CAUTION

Release the fuel slowly to reduce static electricity/ electrostatic discharge and to avoid freezing.

NOTICE

Only a trained individual should conduct defueling operations

NOTICE

Always keep a portable fire extinguisher with a UL rating not less than 20-B:C in the defueling area.

NOTICE

Use signage to mark the venting area stating "NO SMOKING" and "FLAMMABLE GAS."

Fuel System Defueling Procedure

⚠ WARNING

To control the flow of gas one of two of the valves MUST be closed. Either the RED Handle Manual Shut Off Valve or the Cylinder Manual Shut Off Valve.

Fuel System Defueling Procedure

1. Ground Pony Tank with company approved ground cable.
2. Secure the end of the hose that carries the fuel to engine to a elevated fixed point away from all ignition sources.

⚠ WARNING

Fuel will vent from the regulated hose (black hose) at 80 - 125 psi when defueling. Regulated hose MUST be secured in a manner so it will not move during defueling.

3. Open the Cylinder Manual Shut Off Valve.
4. Open the RED Handle Manual Shut Off Valve. Use the RED Handle Manual Shut Off Valve to control the flow of fuel.
5. Fuel will flow through the regulator and vent out the regulated hose (black hose) at 80 - 125 psi.

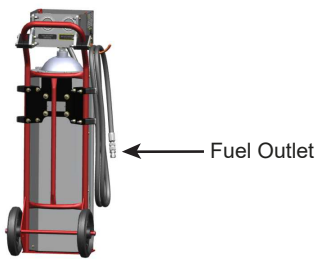


FIGURE 8 – REGULATED HOSE

Scheduled Maintenance

Perform the maintenance tasks provided in this section as scheduled to prolong component life and ensure maximum performance of the CNG fuel system.

Maintenance Schedule

Maintenance Schedule	Frequency
Check Vent Line	Daily
Leak Test with Methane Detector	Annually, or if involved in any accident or fire
Component Inspection	Annually, or if involved in any accident or fire
Cylinder Inspection	Annually, or if involved in any accident or fire

Cylinder and Fuel System Inspections

The Department of Transportation requires this statement on the label of all CNG cylinders used on motor vehicles: "THIS CONTAINER SHOULD be visually inspected for damage and deterioration after a motor vehicle accident or fire, and either (a) at least every 12 months when installed on a vehicle with a GVWR greater than 4,536 kg (10,000 lbs.), or (b) at least every 36 months or 36,000 miles, whichever comes first, when installed on a vehicle with a GVWR less than or equal to 4,536 kg (10,000 lbs.).

Evidence that the cylinders have been inspected can be found in one of the following forms:

1. A readily visible inspection label on the cylinder.
2. An inspection form/report provided by inspector (perhaps kept in glove box with insurance and registration papers).
3. Other: sticker on windshield, doorpost, fueling receptacle area.

Periodic In-Service Inspection Requirements

Cylinders must be reinspected if over pressured, dropped, impacted, reinstalled on a different vehicle, exposed to excessive heat or fire, harsh chemicals, or if vehicle was in an accident of 5 mph or more.

This includes any CNG cylinder on a vehicle that was either in an accident that happened at a speed of 5 miles an hour or greater, or a vehicle involved in any fire, whether it related in damage to the vehicle or not, must undergo a detailed inspection certified CSA cylinder and fuel system inspector.

ANSI/NGV 2 Cylinder Standards

NOTE: If no label is found on the cylinder and you are unable to determine who the specific manufacturer is, you must condemn the cylinder and remove it from service.

If you need a replacement sticker, contact **Cummins Clean Fuel Technologies @ 1-844-CNG-TANK.**

NOTICE

States and local Authority Having Jurisdiction (AHJ) including the local Fire Marshal may have their own requirements. Check for local requirements; states and municipalities may have requirements that vary from these codes.

Welding and Hot Work Procedures

⚠ DANGER

Never weld on any fuel system components. Welding can ignite the fuel, resulting in an explosion or fire causing serious personal injury or death.

NOTICE

If a CNG fuel system component is damaged, do not attempt to repair it. Contact Cummins Clean Fuel Technologies for a replacement part.

If any welding or 'hot work' (i.e., any work that involves burning or use of tools that produce a spark, flame, or source of ignition) is required on a CNG fuel vehicle excluding the CNG Fuel System, you must perform the following procedures:

1. Conduct work in a well-ventilated area.
2. Shut off cylinder manual shut off valve by turning the 1/4-turn valve clockwise to OFF.
3. Start the vehicle and let it run until the engine stops.
4. Turn the ignition key OFF and remove the key.
5. Remove 2.6 DGE Pony Tank from following removal procedures.

NOTICE

If slag or a spark comes in contact with the fuel cylinder, you must take the vehicle out of service and have it inspected by a certified inspector.

CNG Decals

CNG Decals

All vehicles that use compressed natural gas are required to display a blue “CNG” diamond label made of reflective durable material with minimum size of 5.7″ x 4.2″ on a vertical surface on the lower right rear of the vehicle, but not on the bumper. In addition, labels at the fuel fill receptacle and in the engine compartment must provide information as to the system working pressure, tank expiration, and next inspection date. (Figure 8)

The presence of a CNG diamond is an important signal for First Responders (i.e. police, fire fighters) to alert them of a high-pressure gas fuel system. If any of the CNG labels become damaged or lost, contact Cummins to obtain a replacement.

FIGURE 8 – CNG DIAMOND LABEL Part # MB34-1100-N

Warranty

Warranty Procedures

To file a warranty claim, call Cummins Clean Fuel Technologies at 1-888-686-7278.

Warranty Statement

Any alteration of the Cummins CNG fuel system or components will void the warranty. Contact Cummins before performing any modifications to the vehicle's fuel system or pony tank which may affect coverage.

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