Tulsa Gas Technologies, Inc.
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09-14-23

OPERATION MANUAL
for a MODEL TGT-20DOT10KS S/N 22121348
TGT 20DOT10K 3AA CNG Tube Trailer
LIBERTY UTILITIES

TRAILER SPECIFICATIONS
V.I.N.#: 4T9T1UE27PT298012

Trailer Length:	17'
Trailer Deck Width:	77"
Trailer Overall Width:	96"
GVWR:	4535 KG (10,000 lb)
Capacity:	7669 SCF (Approximate) @ 3,000 psi
Empty Weight:	10,400 lbs.

4 wheel Electric Brakes (Rear)
Screw Jack to stablilize trailer when not connected to vehicle

20 DOT 3AA CNG 3600, 3600PSI 10X60 reconditioned cylinders with individual hand valves on every bottle, all tanks manifolded together to discharge through regulators. The regulators have separate isolation valves for services and to control flow rate to the discharge header. Trailer has one NGV-1 receptacle on the trailer to allow refilling of the trailer at a CNG refueling station. The 1" discharge header has an isolation valve to stop pressure from leaving the header. ASME relief valve protects the down stream piping from the regulators. These vessels are DOT rated so they will have to be recertified every 5 years by a DOT registered cylinder test facility. Tulsa Gas Technologies can provide this service.

The 20 DOT 3AA CNG trailer is designed to only support CNG natural gas supplied by the Local Distribution Company (LDC) **NOT untreated well gas**. Natural gas from the LDC will have an odorant to detect the presence of natural gas. Natural gas is flammable when mixed with oxygen to the right mixture. Any time you smell natural gas, stop using the trailer. Take the trailer out of service and locate the source of the leak and make the necessary repair to the trailer before returning to service.

DOT 3AA CNG cylinder **SHALL** be retested no longer than 5 years from the stamped date on cylinder in compliance with MasterReg 49 CFR Parts 100-185 current addition.

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STORAGE

The 20 DOT 3AA CNG trailer should NEVER be stored inside of a building within 10 feet of any combustible material or any potential ignition source whether heat or electrical. Consider this trailer Class 1 Div. 2 area by the NFPA 52, NFPA 70 NEC.

Inspect PRD vent caps. They should be covered at all times with the cover. If the cover is missing, inspect system for a relief valve release, take corrective action and replace cover. The cover is a visual indicator of the relief valve relief of pressure as well as a weather protector.

All cylinder valves should be closed.

A minimum of one tire should be chocked in both forward and reverse direction.

TRANSPORTING AND TOWING

This trailer should never be operated outside the guidelines of the current version of MasterRegs 49 CFR Parts 100-185.

This trailer must be transported by a driver with a current CDL Drivers License with a Hazmat rating.
This trailer is considered Hazardous Material per MasterRegs 49 CFR Parts 100-185 UN 1971 FLAMABLE GAS METHANE for commerce.
The truck must be capable of towing a 7,000 GVW load.
The enclosure covering the valves is not a storage enclosure. Do not store loose, unsecure or flammables items in this enclosure.

When connecting trailer to tow vehicle:

Ensure pental hitch lock is operating on tow vehicle and can lock when connected to trailer.
After attaching trailer to pental hitch raise tongue jack to highest elevation possible.
Connect trailer break pull away cable to a secure place on tow vehicle.
Inspect electrical connector then attach it to tow vehicle receptacle.
Connect safety chains.
Remove and stow wheel chocks.
Turn on trailer lights and check operation.
Before entering roadway, manually check trailer breaks for operation and adjustment.

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Before trailer is moved the driver must do the following:

Ensure all valves are closed on the cylinders and control panel.
De-pressurize all tubing downstream of tank valves.
Check tire pressure and condition.
Check lug nuts for proper installation.
Ensure fill hose has been disconnected.
Ensure enclosure doors are shut and latched.
Check placards on trailer and tow vehicle for proper markings. UN 1971 FLAMABLE GAS METHANE, compressed or Natural gas, compressed (with high methane content)
Remove or secure any loose items on deck of trailer.
Locate PRD vent stacks and make sure cap is covering vent stack. This cap will blow off if PRD discharges.
Make a final walk around inspecting lights, fenders or any other safety marker for proper installation.

OPERATION OF TRAILER

Fueling

1. Observe CNG refueling station for any unsafe situations before starting to fuel trailer.
2. NO SMOKING IN REFUELING AREA OR AROUND TRAILER.
3. Tow vehicle must be parked with parking break set and trailer tire chocked in forward and reverse direction.
4. If required, ground trailer using the retractable grounding clamp to a suitable earth ground such as an 8' long conducting rod in accordance with NEMA GRI-2007.
5. Locate PRD vent stack on top of trailer. Make sure vent stack cover is still on. If it is off, it is possible that a PRD has relieved and blew the cap off. Inspect all cylinders and try to isolate if a PRD has relieved. If all PRD valves are still seated then proceed with fueling the cylinders.
6. Close the isolation valves to the regulators to prevent any discharge of gas during refueling.
7. Open the desired cylinders you need to refuel.
8. Connect CNG dispenser hose to trailer and begin refueling.

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TGT supplied the trailer with a NGV-1 P30 (3000 psi) receptacle. Maximum pressure is 3600 psi at any temperature. Most CNG fill stations compensate the fill pressure of the gas to 3600 psi at 70 degrees F. DOT will not allow DOT 3AA CNG cylinders to be filled above the rated pressure which is 3600 psi. Operator may need to manually stop the fueling to prevent overfilling of DOT 3AA CNG cylinders used on this trailer. This trailer should be attended during the filling process unless the CNG fill station is set up to control pressure to 3600 psi max at any pressure. We recommend only using a station that is set up for 3000 psi fill unless you can manually close the fill valve and control gas pressure manually.

09. After desired pressure is reached disconnect the CNG dispenser hose from the trailer then close all of the cylinder valves on the trailer. Trailer must not be transported with any valves open.
10. Use safety glasses and ear protection as needed.
11. Replace fueling receptacle dust cover after disconnecting nozzle.

Notes:

During the filling of the trailer, ice may form on tubing to the cylinders. This is normal. The Joule-Thompson (JT) effect of pressure drop will cause this. During refueling in cold weather, rain or high humidity it may be required to spray a de-icer on the nozzle to disconnect or wait until nozzles comes back to ambient temperature before nozzle will release. Any off-the-shelf windshield de-icer will work. It is important to replace the dust cover on the fueling receptacle when not in use to prevent contaminants from getting in the receptacle.

If trailer is disconnected from the tow vehicle during refueling, the operator must lower tongue jack and chalk the tires on both sides of the trailer. The system must be set so it will not fuel the trailer above the rated pressure of the DOT 3AA CNG cylinders which is 3600 psi.

Discharging Gas:

The tube trailer is set up to discharge gas through a set of regulators that are set to 100 psi. These three regulators are set in parallel so gas will be moving through one or all three of these regulators at the same time. If one regulator tries to slow down flow from icing, the other two regulators will pick up the flow, and the pressure drop across the first regulator will decrease and then it will begin to warm back up and flow will begin through that regulator.

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To start the flow of gas from the trailer, close the isolation valves that are upstream of the three high pressure regulators. Each high pressure regulator has a separate isolation valve. Open the desired amount of DOT 3AA CNG vessels that you need. After the system is loaded to pressure, slowly open one of the ball valves so that gas starts to flow through the regulator. After the system in loaded to set pressure down stream of the high pressure regulator (100 psi), you can then slowly open the other two regulators. Never quickly open any ball valve in a manner that would send a pressure shock across the system. The pressure can be adjusted on the high pressure regulator as needed. The range is from 85 to 125 psi.

After you have loaded the regulator panel you can open the discharge valve on the trailer and start letting gas leave the trailer. Your discharge hose should be rated for Natural Gas and be pressure rated to handle 100 psi. Additional pressure cuts may be required for your process.

During the discharge of gas from the trailer ICE may form on the tubing and around the regulators. This is normal. Ice on the outside of the tubing will not prevent the flow of gas through the system. Only moisture in the gas and the temperature drop from the drop in pressure of gas flowing through the system will cause ice to stop flow from the trailer (JT). In most cases the other regulators will pick up the flow and keep the system flowing.

In some cases gas heaters may need to be installed down stream of the trailer to prevent super cooled gas from being dumped into a system that can not handle cold gas. Some plastic gas lines will not handle super cooled gases without changing the pressure rating on the plastic gas line.

Before the trailer is used for the first time or any time the gas shall be 100% discharged from the cylinders. The trailer should be purged of oxygen by filling the trailer will a small amount of gas then releasing it. This process should be repeated until the trailer is purged of oxygen and the trailer is ready to take larger quantities of natural gas without the gas reaching the flammable mixture point of the gas in the cylinders. Natural gas is flammable when the ratio of Natural Gas and Oxygen is between 5 to 1 and 15 to 1. Outside of that mixture Natural Gas is too lean or rich to burn. It is hard to measure the mixture of the gas on the fly so it is important to not put the trailer in the situation that would have a mixture of flammable gas when under pressure.

Any modification to the piping or tubing system should be performed by qualified personnel.