Memorandum

Miami-Dade County Office of the Inspector General
A State of Florida Commission on Law Enforcement Accredited Agency
601 NW 1st Court ◆ South Tower, 22nd Floor ◆ Miami, Florida 33136
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Visit our website at: www.miamidadeig.org

To: The Honorable Carlos A. Gimenez, Mayor, Miami-Dade County
The Honorable Audrey M. Edmonson, Chairwoman
and Members, Board of County Commissioners, Miami-Dade County

From: Mary T. Cagle, Inspector General

Date: February 26, 2020

Subject: Status Update on the OIG's Review of CNG Buses, Ref: IG 19-0015-O

Attached please find an Office of Inspector General (OIG) memorandum addressed to the Department of Transportation and Public Works (DTPW) Director concerning the department's implementation of the safety recommendations contained in our final report that was issued on November 13, 2019.[1] (Attachment 1) As you may recall, the OIG's report addressed the perceived leaking of compressed natural gas (CNG) in our new buses, as well as other alleged mechanical deficiencies. The report also addressed procurement issues related to later acquisitions of additional CNG buses.

As to the safety issues, the OIG review debunked claims that the County's new CNG buses were not safe and were leaking natural gas. Even so, our report contained four specific safety-related recommendations that were embraced by DTPW when it responded to the draft report. In the final report, the OIG requested that DTPW provide a status report in 90-days to demonstrate its actual implementation of our recommendations. We received that report (Attachment 2) and are quite satisfied with the actions taken by DTPW, which includes significant enhancements to its natural gas cylinder inspection procedures and the forms used to document the inspection process.

Since issuing our final report in November, the OIG has been engaged in various follow-up activities including:

1. Attending the Compressed Natural Gas (CNG) Training and Certification Program conducted by the Natural Gas Vehicle Institute (NGVI), alongside DTPW bus inspectors, technicians, and supervisory personnel.
2. Identifying a potential life-safety issue concerning DTPW's use of wraparound advertising on its CNG buses and then working with DTPW to correct the issue.
3. Monitoring the arrival and post-delivery inspection of Gillig CNG buses.

[1] The OIG Final Report on CNG Buses issued November 13, 2019.
http://miamidadeig.org/Reports2019/OIGFinalReportReCNGBusesIG19-0015-O.pdf

4. Monitoring DTPW's allocation of CNG buses to its three depots, which now stand at (as of February 14, 2020):

	Northeast	Central	Coral Way	Total
New Flyer	10	209	81	300
Gillig	35	0	40	75*
Total	**45**	**209**	**121**	**375**

* 75 of the 120 purchased buses have arrived; the remaining 45 buses should be delivered by early May 2020.

We note that the permanent CNG fueling facility at the Coral Way Bus Depot is now fully operational and the Central Bus Depot's new CNG fueling facility should be operational by the end of March 2020.

The OIG has thoroughly reviewed DTPW's status report and we are satisfied that our safety recommendations have been addressed. We are also pleased that DTPW, in its status report, responded to our questioning about its current bus depot configurations and how it will accommodate a bus fleet requiring different fuel sources. Accordingly, we believe DTPW's plan to develop a *Bus Yard Master Plan* will address our concerns.

As to the second half of our review—the procurement of additional CNG buses—the OIG observes that Invitation to Bid No. FB-01356, which was an active procurement during the period of our review, has now concluded with a Recommendation to Award, issued by the Administration on January 28, 2020. This recommendation is for the purchase of an additional 140 CNG buses. The OIG will continue to monitor this procurement through to award, as we will also monitor the upcoming procurement for 60-foot electric buses intended to travel on the South Dade Bus Rapid Transit Corridor, the delivery of 40-foot electric buses already purchased in October 2019, and the configuration and construction of electric fueling facilities. As transportation and mobility issues remain a top priority for County government, it too will be oversight priority for the OIG.

Attachments

cc: Edward Marquez, Deputy Mayor
Jennifer Moon, Deputy Mayor
Alice Bravo, Director, Department of Transportation and Public Works
Tara Smith, Director, Internal Services Department
Yinka Majekodunmi, Commission Auditor

ATTACHMENT 1

Memorandum

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Visit our website at: www.miamidadeig.org

To: Alice Bravo, Director, Department of Transportation and Public Works

From: Mary T. Cagle, Inspector General

Date: February 24, 2020

Subject: Receipt of Status Report Pertaining to the OIG's Final Contract Oversight Report, *Review of Safety Concerns and the County's Procurement of Compressed Natural Gas Buses for the Department of Transportation and Public Works,* Ref: IG 19-0015-O

On November 13, 2019, the Office of the Inspector General (OIG) issued its Final Contract Oversight Report (Report) regarding the above-captioned matter. In that Report, the OIG requested that the Department of Transportation and Public Works (DTPW) provide a 90-day status report regarding its implementation of the OIG's recommendations. The OIG is in receipt of your status report, dated February 11, 2020 (attached). Thank you.

The OIG has reviewed your status report and we are satisfied that our safety recommendations have been sufficiently addressed. The OIG is encouraged that the additional safety measures implemented by DTPW will ensure that the County continues to deliver safe and efficient bus services to Miami-Dade County residents. Moreover, we are satisfied that DTPW has adopted the 5,000 ppm detection standard utilized by the Federal Motor Carrier Safety Administration (FMCSA), and that this threshold is expressly contained in Procedure 4.7 of the revised Standard Operating Procedure for Natural Gas Vehicle Cylinder Inspection (PR-BS-049 Revised 1/15/2020).

In addition, as you may be aware, the OIG participated in the CNG Training and Certification Program conducted at the Central Bus Depot by Natural Gas Vehicle Institute (NGVi) for DTPW technicians and supervisors. This training held in mid-November 2019 gave us a unique insight into future inspection and maintenance operations of the County's CNG bus fleet. It also helped us to identify a potential life-safety issue regarding DTPW's use of wraparound advertising on its CNG buses that obstructed the CNG safety decals located near the bus roof where the CNG vent line exits are located. We thank DTPW for its prompt corrective action in responding to our concerns by either modifying the wraparound advertising so that it no longer covers the CNG safety decals or, in the alternative, by reapplying the decals on top of the wrapping. In either case, it is vitally important that the CNG safety decals be readily visible to identify the location of the vent line exits.

The OIG considers the safety review portion of this contract oversight engagement completed. The remaining oversight monitoring involves the currently outstanding *Invitation to Bid* for 140 new CNG buses (FB-01356). Further, the OIG will continue to be engaged in DTPW's planned purchase of 60-foot electric buses, the development of the South Dade Bus Rapid Transit Corridor, and the department's plans to accommodate the various bus types that it operates at its bus depots. To that end, we request that DTPW provide us with a copy of its *Bus Yard Master Plan* upon its completion.

The OIG would like to thank the staff at DTPW for their cooperation and for the courtesy extended to the OIG throughout this review.

Attachment

cc: Jennifer Moon, Deputy Mayor/Budget Director

ATTACHMENT 2

Memorandum

MIAMI-DADE COUNTY

Date: February 11, 2020

To: Mary T. Cagle, Inspector General
Office of the Inspector General

From: Alice N. Bravo, P.E., Director
Department of Transportation and Public Works

Subject: Status Report to OIG Final Contract Oversight Report- Review of Safety Concerns and the County's Procurement of Compressed Natural Gas Buses for the Department of Transportation and Public Works – IG19-0015-0

This is to provide a status to the report related to the review of safety concerns and the County's procurement of compressed natural gas buses (CNG) for the Department of Transportation and Public Works (DTPW). DTPW has reviewed the final report, and incorporated processes and procedures to address the recommendations and suggestions.

The Final Contract Oversight Report makes safety recommendations and asks questions regarding the safety inspection and procurement of CNG buses. The following is the status on DTPW's action plans to address the four (4) safety recommendations:

OIG Recommendation No. 1 - *Even though the allegation of new buses arriving with leaks is unfounded, DTPW should consider including utilizing the hand-held CNG detector, as part of its CNG post-delivery inspection protocol. The OIG Notes that additional time to perform the "wanding" would be de minimis, as this would be performed simultaneously with the visual inspection. Upon a positive detection of CNG, the remaining inspections protocols utilized in the 36,000 mile inspection should be followed.*

- **DTPW Action Plan to OIG Safety Recommendation No. 1:** The DTPW Post-Delivery Inspection Plan for the CNG Buses has been revised to include using the handheld electronic methane detector to inspect CNG cylinders (attachment 1). The plan also includes the "Natural Gas Vehicle Cylinder Inspection Record and associated diagrams.

OIG Recommendation No. 2- *SOP PR-BS-049 should be revised again to clearly state at what PPM level additional exploratory measures (such as the soapy water test) and remediation, such as replacement of valves, PRDs, and tanks is warranted. DTPW should make this determination after consulting with other Transit agencies experienced in operation and maintaining CNG buses, the FMCSA and the FTA [Federal Transit Administration], and both New Flyer and Gillig.*

- **DTPW Action Plan to OIG Safety Recommendation No. 2**: The DTPW Natural Gas Vehicle Cylinder Inspection Standard Operating Procedure (SOP) PR-BS-049 has been revised (attachment 2) to clearly identify the ppm levels and actions taken to address ppm readings that are beyond identified levels.

OIG Recommendation No. 3- *The inspection form used by DTPW inspectors needs to match the inspection form contained in the SOP, as will be revised. The form should 1) have a place to*

record the location of the leak, if applicable, and 2) the ppm record reading. The inspection form should also be revised in order to accommodate an inspection of a 6-fuel cylinder bus (New Flyer) and an 8-fuel cylinder bus (Gillig). Cylinder identifiers such as "rear middle curbside" may not work with the 8-cylinder configuration. The inspection forms may want to incorporate diagrams of the tank layouts and gas lines so inspectors can clearly mark location of any leaks found.

- **DTPW Action Plan to OIG Safety Recommendation No. 3:** As part of the revision to the DTPW Natural Gas Vehicle Cylinder Inspection SOP - PR-BS-049, the inspection form has been revised to include the requirement to document the ppm levels. The revised SOP also includes diagrams identifying both the six (6) and eight (8) CNG cylinder configurations. These forms and diagrams are included in the revised SOP.

OIG Recommendation No. 4- *DTPW should consider affixing a "Do Not Operate" or "Lock Out" tag to a critical components such as the steering wheels, door handles, gas/fuel connections, etc. at the beginning of a repair job by the technician performing the repairs, which can only be removed by the technician after the completion of the repair. The tag should be affixed in a manner that it cannot "fall off."*

- **DTPW Action Plan to OIG Safety Recommendation No. 4:** DTPW has identified and is in the process of procuring warning signs (attachment 3) that will be secured to the bus steering wheel. This is to inform the technician that the repairs have not been completed and to avoid dispatching a bus that is pending repairs.

The final OIG report makes recommendations and provides comments regarding the configuration of DTPW bus garages as it relates to bus fleet fueling mix. DTPW is working to evaluate all three existing bus yards to develop a "Bus Yard Master Plan." This plan will include a thorough review of our existing facilities, along with a determination of their optimal pedestrian, bus and vehicle circulation to implement safe and efficient traffic flow. Before adding infrastructure for battery electric buses, such as charging stations, DTPW seeks to delineate the safest and most advantageous yard layout through the creation of a Bus Yard Master Plan.

Once again, I thank you for the opportunity to address the report and would also like to thank your staff for their thoroughness exhibited throughout the review. If you have any questions, please contact me at 786-469-5406.

Attachments

c: Abigail Price-Williams, County Attorney
Edward Marquez, Deputy Mayor
Jennifer Moon, Deputy Mayor/Budget Director
Tara C. Smith, Director, Internal Services Department
Yinka Majekodunmi, Commission Auditor

INFRASTRUCTURE & ENGINEERING

DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS (DTPW)

POST DELIVERY INSPECTION PLAN

GILLIG 40-FOOT LOW FLOOR CNG BUSES

Prepared by: _____ 1/31/2020
Carlos M. Delgado, P.E. — Date
Field Test Engineer

Concur: _____ 1/31/2020
Lazaro Palenzuela — Date
Chief, DTPW Quality Assurance

Approved: _____ 1/31/2020
Colin Armorer — Date
Chief, Field and System Engineering

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1.0 Inspection Scope

A thorough inspection of the buses will be conducted to determine compliance with specification requirements and workmanship standards. The inspector will monitor critical areas during the Post-Delivery stage as specified in the DTPW Post Delivery Inspection Check-Sheet.

During this inspection stage, the inspectors will perform visual inspections, servicing, and functional tests of every onboard system, before the bus is released for service. This will also include the inspections of the Compressed Natural Gas (CNG) cylinders, performed by a certified CNG tank inspector, using the electronic methane detector. Electronic detectors used for CNG/Methane detection shall meet the requirements of UL 913 Class 1, Division 1, Groups C and D. The results of the inspections will be recorded in the Natural Gas Vehicle Cylinder Inspection Record (inspection record and diagrams are referenced in Attachment 3).

Buses that are nonconforming, improperly functioning, or contain defects in workmanship will be unacceptable and will be brought to the attention of the contractor for correction before the bus is released. When this is completed and the buses are officially accepted, they are ready to be put into revenue service.

Bus Post Delivery Inspection is scheduled to begin in August 2019 and be completed by April 2020.

2.0 Identification and Qualifications of Inspection Personnel

Inspections will be performed by Miami-Dade Department of Transportation and Public Works personnel, who are qualified, have a good working knowledge of transit buses, and have experience in inspection and acceptance of new coaches. Inspection personnel will be selected from DTPW Bus Maintenance and Support Services. Each individual assigned has the expertise needed to adequately evaluate the coaches to ensure that they comply with DTPW specifications and will meet service requirements.

DTPW inspectors will receive orientation covering their duties, responsibilities and authority while engaged in inspection activities. Inspectors will complete training sessions on FTA Quality Management System Guidelines (FTA-PA-27-5194-12.1) and Quality Control Training presented by DTPW Quality Assurance Division.

3.0 Duties and Responsibilities of Inspection Personnel

It will be the responsibility of DTPW inspection personnel to verify that the buses are constructed is in accordance with the DTPW specifications and the current revisions of the contractor's controlled drawings and procedures. Duties include the visual inspection of bus components and assemblies; evaluation of fit, finish, and function; road testing; servicing; and acceptance of completed bus.

Inspection will take place five days per week, Monday through Friday, from 6:00 am until 2:00 pm. and any additional time required on extra shifts or weekends. Inspection will be performed on many units simultaneously at the DTPW Support Services facility.

DTPW inspectors are to communicate with DTPW Infrastructure & Engineering on a regular daily basis to report progress and status of any engineering issues.

DTPW Inspectors will keep accurate and current records of inspection activities and completed all required forms to document the inspection process.

4.0 Inspection Documentation

The form to be used for tracking and documenting inspection activities is the "DTPW Post Delivery Inspection Check Sheet — Gillig 40-Foot Low Floor CNG Buses, Revision 0" (See Attached). This form will be used to provide a complete record of inspection, testing, and acceptability based on the current specifications for 40-Foot Low Floor CNG Buses. The DTPW Inspection Check Sheet will be used by the inspector to record the pass/fail status of each inspected item and will remain in the possession of the inspector.

DTPW inspectors will track Post Delivery Inspection progress by recording the date of each completed inspection or installation/service action on the Inspection Control Sheet – Post Delivery Inspection.

At the final inspection stage, after all non-conformances have been corrected; transmission, engine, and HVAC have been checked out by the factory representatives; the communications equipment and farebox have been installed and checked out by Systems Maintenance Technicians; and all documentation reviewed for completion, the bus will be released for revenue service.

DTPW inspectors will complete inspection and quality forms using pen, ink, or other permanent markings. Any errors will be lined-through (not erased or obliterated) and initialed and dated by the inspector.

Copies of all written correspondence between DTPW and Gillig will be maintained with DTPW inspection files. Completed inspection files will be kept by Bus Maintenance Control for a period of time no less than 12 years from the date of acceptance or that required by applicable laws, rules, regulations and best practices.

The DPTW Quality Assurance Division will perform an audit of the post-delivery inspection records. The audit scope will include a random sampling of the completed inspection records to ensure compliance to the requirements set forth in this DTPW Post-Delivery Inspection Plan.

5.0 Approval Authority

DTPW inspectors have authority to approve work performed in accordance with DTPW specifications and Gillig manufacturing drawings/procedures. DTPW inspectors do not have authority to approve changes to the design or specifications. Changes must be approved by DTPW Infrastructure & Engineering.

DTPW inspectors have authority to allow a bus to move to the following inspection stage with uncorrected non-conformances or missing items provided the non-conformances or missing items are recoded, tracked, corrected and inspected at a later stage of inspection.

DTPW inspectors have the authority to require re-testing when the results of tests are inconclusive. DTPW Infrastructure & Engineering will have the authority to require additional tests or engineering analysis to ensure conformance with specifications.

6.0 Non-conformance Identification and Disposition

DTPW inspectors shall identify and record non-conformances on the DTPW Inspection Check Sheet under the "Fail" column and details of non-conformances are to be explained in the "Notes" section.

Authority for disposition of non-conforming items are as follows:

Use As Is	DTPW Infrastructure & Engineering
Repair	DTPW Infrastructure & Engineering
Rework (to specifications)	DTPW Inspector
Scrap	No DTPW Authorization Required

Re-inspection approvals of corrected non-conformance items are to be recorded by the inspector placing his initials in the re-inspect column and initialing the details describing the corrective action in the "Notes" section.

An Inspector's Signature/Initials sheet will be maintained to identify each inspector's signature and initials. (See Attached)

7.0 Attachments

Attachment 1 – DTPW Post Delivery Inspection Check Sheet

Attachment 2 – DTPW Inspector's Signature / Initials Sheet

Attachment 3 – Natural Gas Vehicle Cylinder Inspection Record and Diagrams

Attachment 4 – Function Test Form

Bus No. _____

Date_____

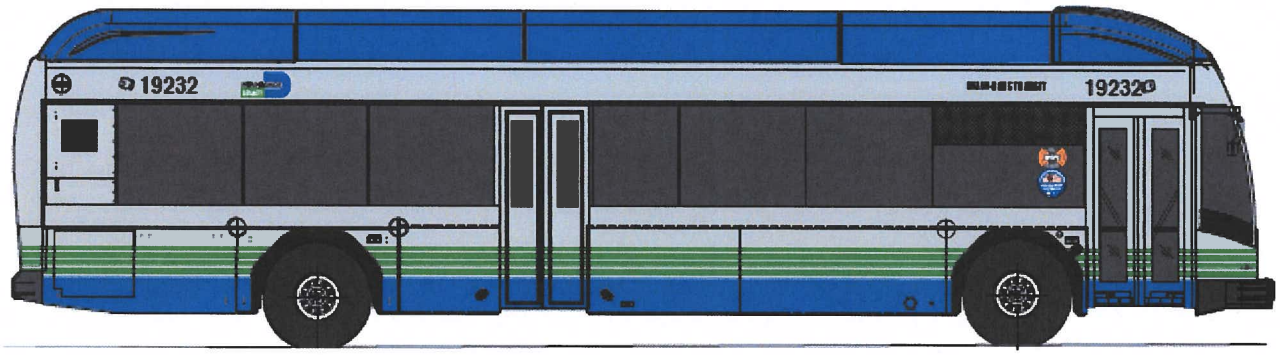
Inspector_____

DTPW

POST DELIVERY INSPECTION CHECK SHEET

GILLIG 40-FOOT LOW FLOOR CNG BUSES

Miami, Florida



Bus No. _____

Date_____

Inspector_____

GILLIG 40-FOOT LOW FLOOR CNG BUSES

Miami, Florida

INSTRUCTIONS FOR COMPLETING INSPECTION CHECK-SHEET

1. WRITE BUS NUMBER ON ALL PAGES.
2. COMPLETE "BUS DATA" SECTION AND PERFORM "DAMAGE INSPECTION".
3. SERVICE BUS.
4. PERFORM POST DELIVERY INSPECTION. CHECK EACH ITEM "PASS" OR "FAIL". USE DTPW SPECIFICATIONS, BUS MAINTENANCE MANUAL, OPERATOR MANUAL, AND THE CURRENT REVISION OF THE GILLIG MANUFACTURING DRAWINGS AND PROCEDURES AS REFERENCE.
5. INITIAL "RE-INSPECT" WHEN FAILED ITEMS ARE CORRECTED.
6. RECORD ANY NONCONFORMANCES THAT REMAIN UNCORRECTED, IN "NOTES" SECTION.
7. INITIAL ALL NOTES OR COMMENTS
8. RECORD DRAWING REVISION LEVELS AND INSTRUMENT NUMBERS USED FOR MEASUREMENT.
9. SIGN AND DATE APPROVAL FOR EACH SECTION OF INSPECTION CHECK-SHEET.
10. RECORD DATES OF COMPLETION OF WORK/INSPECTIONS PERFORMED BY FACTORY REPRESENTATIVES AND DTPW.

DRAWINGS SHOWN IN INSPECTION CHECK-SHEETS ARE UN-CONTROLLED AND FOR REFERENCE ONLY.

Bus No. _____

Date_____

Inspector_____

BUS DATA

DATE OF DELIVERY_____
VIN NO._____
ODOMETER MILEAGE_____
ENGINE SERIAL NO._____
TRANSMISSION SERIAL NO._____
A/C UNIT SERIAL NO._____

DAMAGE INSPECTION

EXTERIOR "WALKAROUND" INSPECTION

CHECK FOR DAMAGE TO PAINT & BODY, LIGHTS, WINDOWS, WINDSHIELDS, DOORS, RUBBER TRIM, WHEELS, ETC.
(NOTE ANY OIL & WATER LEAKS)
REPORT ANY DAMAGE ON THIS FORM AND THE BODY DIAGRAM FORM.

DAMAGE_____

INTERIOR "WALKAROUND" INSPECTION

CHECK COACH CERTIFICATION LABEL, LIGHTS, A/C GRILLS, DOORS, WINDOWS, PANELS, SEATS, FLOORS, SEAT BELTS, FIRE EXTINGUISHER, TRIANGLE, ETC.
REPORT ANY DAMAGE, MISSING ITEMS, OR PROBLEMS ON THIS FORM.

DAMAGE_____

DRIVER AREA INSPECTION

CHECK DRIVER SEAT, SIDE WINDOW, VISORS, INSTRUMENT PANEL, SWITCHES, GAUGES, LIGHTS, CONTROLS, PARKING BRAKE, DRIVE SHIFT SELECTOR, STEERING WHEEL, DESTINATION SIGN, ETC.
REPORT ANY DAMAGE, MISSING ITEMS, OR PROBLEMS ON THIS FORM.

DAMAGE_____

Bus No. _____

Date_____

Inspector_____

BODY DIAGRAM

BUS DATA AND DAMAGE INSPECTION COMPLETE

INSPECTOR: _____ DATE: _____

Bus No. _____

Date_____

Inspector_____

SERVICING

(REFER TO GILLIG MAINTENANCE MANUAL; LUBRICATION SECTION FOR DETAILS)

-CHANGE ENGINE OIL AND OIL FILTER

-CHECK ALL FLUID LEVELS

-TRANSMISSION FLUID (USE TRANSYND OR TES 295 EQUIVALENT THAT COMPLY WITH TES 468 TRANSMISSION FLUID SPECIFICATIONS AS NEEDED)

-HYDRAULIC SYSTEM OIL (USE TRANSYND OR TES 295 EQUIVALENT THAT COMPLY WITH TES 468 TRANSMISSION FLUID SPECIFICATIONS AS NEEDED)

-A/C UNIT COOLANT LEVEL

-REAR AXLE OIL (USE SYNTHETIC REAR AXLE OIL AS NEEDED)

NOTES_____

SERVICING COMPLETE

INSPECTOR_____ DATE_____

Bus No. _____

Date_____

Inspector_____

INSPECTION

ENGINE COMPARTMENT	PASS	FAIL	RE-INSPECT
ENGINE COMPARTMENT LIGHTS			
REAR ENGINE START AND SHUTDOWN SWITCH (CHECK OPERATION)			
ENGINE COMPARTMENT PROPERLY INSULATED			
ENGINE DRIVE COMPONENTS, SYSTEMS AND ACCESSORIES (CHECK FOR INSTALLATION AND OPERATION)			
GAUGES AND SWITCHES (CHECK FOR MOUNTING AND OPERATION)			
LINES, PIPES, HOSES, AND WIRING HARNESS (CHECK FOR PROPERLY LOCATED AND SECURED)			
DECALS (MAKE SURE ALL SAFETY AND INSTRUCTIONAL DECALS ARE IN PLACE AND READABLE)			
FLUID LEVELS (WITH THE ENGINE OFF AT OPERATING TEMPERATURE CHECK THE FLUID LEVELS-ENGINE OIL, TRANSMISSION OIL, HYDRAULIC OIL, AND RADIATOR COOLANT)			
CHECK AIR FILTER INSTALLATION & RESTRICTION INDICATOR & CONSTANT TORQUE CLAMPS			
ENGINE COOLING SYSTEM (CHECK SURGE TANK, SIGHT GLASS, COOLANT FILTER, MARINE PUMP, RELIEF VALVES, & SAFETY CAP) (PRESSURE CHECK SYSTEM)			
ENGINE COMPARTMENT DOOR (CHECK FOR INSTALLATION)			
CHECK BELTS (ALIGNMENT, TENSION, AND BELT CONDITION) AND BUS NUMBER ON BELT GUARD			
EXHAUST SYSTEM (CHECK FOR INSTALLATION)			
BATTERY EQUALIZER BATTERY EQUALIZER AND ELECTRICAL CONNECTORS (CHECK FOR INSTALLATION)			
FIRE SUPPRESSION SYSTEM (CHECK LINES, NOZZLES, AND CAPS)			

NOTES_____

Bus No. _____

Date_____

Inspector_____

UNDERSTRUCTURE	PASS	FAIL	RE-INSPECT
TOW EYES			
STEERING AND SUSPENSION COMPONENTS (AIR BELLOWS, LEVELING VALVES, SHOCK ABSORBERS, TIE ROD, TIE ROD ENDS, DRAG LINK, STEERING BOX, HYDRAULIC LINES, AND AIR LINES)			
FRONT AXLE (CHECK TORQUE AND TORQUE PASTE)			
DRIVE AXLE (CHECK FLUID LEVEL, TORQUE, AND TORQUE PASTE)			
DRIVE SHAFT (CHECK UNIVERSAL JOINTS AND DRIVESHAFT ALIGNMENT)			
AIR SYSTEM COMPONENTS (AIR RESERVOIRS, DRAIN COCKS, AIR DRYER, AIR VALVES, AND AIR LINES			
ENGINE/TRANSMISSION			
LINES, HOSES, AND WIRING HARNESS (SECURED, PROTECTED WITH WIRE LOOM AND ROUTED PROPERLY)			
BRAKE SYSTEM (BRAKE PADS, HOSES ROUTING AND CONNECTIONS, BRAKE CHAMBERS, AND BRAKE CALIPERS)			
BRAKE MONITORING SYSTEM (CHECK FOR PROPER INSTALLATION AND ROUTING AND SUPPORT OF WIRES)			
UNDERCOATING /CORROSION PROTECTION/TUBING DRAIN HOLES OPEN			
WHEELCHAIR RAMP (CHECK FOR DUST SHIELDS, SECURED AND PROTECTED ELECTRICAL WIRES, HYDRULIC LINES AND BUS NUMBER ON DUST SHIELD)			

NOTES_____

Bus No. _____

Date_____

Inspector_____

EXTERIOR	PASS	FAIL	RE-INSPECT
LIGHTS (CHECK FOR INSTALLATION AND OPERATION)			
MIRRORS (INSPECT ALL MIRRORS AND BRACKETS FOR INSTALLATION AND OPERATION)			
WINDOWS (CHECK FOR OPERATION AND SEALING)			
WINDSHIELD (CHECK FOR SEALING)			
DESTINATION SIGNS (CHECK FOR PROPER OPERATION AND INSTALLATION)			
ACCESS DOORS (CHECK FOR INSTALLATION AND IDENTIFICATION DECALS)			
BUMPER, RAIN GUTTERS, WHEEL FENDERS, AND MISCELANEOUS RUBBER TRIM AND CLOSEOUTS (CHECK FOR INSTALLATION)			
TIRES (CHECK CONDITION AND PRESSURE)			
WHEELS (VERIFY TORQUE)			
ROOF (CHECK FOR SEALING AND FINISH. CHECK HATCHES, ANTENNAS, AND ROOFTOP HVAC UNITS)			

NOTES_____

INTERIOR	PASS	FAIL	RE-INSPECT
FRONT DOOR (CHECK FOR PROPER FIT, ALIGNMENT, AND OPERATION. VERIFY DOOR OPENING TIME AND CHECK FOR AIR LINES AND WIRING HARNESS PROPERLY LOCATED AND SECURED IN THE DOOR MOTOR COMPARMENT)			
REAR DOOR (CHECK FOR PROPER FIT, ALIGNMENT, AND OPERATION. VERIFY DOOR OPENING TIME AND CHECK FOR AIR LINES AND WIRING HARNESS PROPERLY LOCATED AND SECURED IN THE DOOR MOTOR COMPARMENT. CHECK SENSITIVE EDGES)			
DRIVER'S AREA (ENSURE ALL INSTRUMENT PANEL/MASTER SWITCH OPERATIONS ARE LIGHTED AND OPERATING PROPERLY. CHECK SUN VISORS, MIRRORS, DRIVER'S COAT HOOK, DRIVER SEAT, FIRE EXTINGUISHER AND SAFETY TRIANGLES)			

Bus No. _____

Date_____

Inspector_____

HVAC (INSPECT HEATING, A/C SYSTEMS FOR PROPER OPERATION. INSPECT GRILLES AND FILTERS FOR PROPER INSTALLATION. CHECK DRIVER'S AREA HEAT/AIR/DEFROST)			
FAREBOX MOUNTING PLATE AND DCU SWIVEL ARM (CHECK FOR INSTALLATION AND MEASURE THAT THE FAREBOX POWER (12.5 V MINIMUM) AND ALARM WIRING ARE PROVIDED)			
LIGHTING (CHECK ALL LIGHTS AND TELLTALE ALARM TEST PANEL FOR PROPER OPERATION. NOTE THAT ALL LIGHTS ARE ACTIVATED PROPERLY)			
PASSENGER SEATS (CHECK FOR PROPER SEATING ARRANGEMENT. CHECK INSTALLATION, CONDITION AND OPERATION OF ALL SEATS. CHECK WHEELCHAIR RESTRAINT SYSTEM FOR OPERATION)			
RAILING (CHECK ALL MODESTY PANELS, GRAB RAILS, AND STANCHIONS FOR PROPER INSTALLATION)			
DECALS (MAKE SURE ALL SAFETY AND INSTRUCTIONAL DECALS ARE IN PLACE AND READABLE)			
FLOOR COVERING, WALLPANELS, CEILING PANELS, WINDSHIELD, AND WINDOWS (CHECK FOR PROPER INSTALLATION)			
WHEELCHAIR RAMP (CHECK FOR PROPER INSTALLATION)			
INTERIOR ADVERTISING (CHECK DRIVER BARRIER RACK AND "TAKE ONE" BOXES FOR PROPER INSTALLATION)			
STOP REQUEST SIGNAL (CHECK PULL CORDS, DOOR STANCHION SWITCH, TAPE OR PALM SWITCHES, AND DASH INDICATOR LIGHTS FOR INSTALLATION AND PROPER OPERATION)			

NOTES_____

_____

_____

Bus No. _____

Date_____

Inspector_____

WHEELCHAIR RAMP	PASS	FAIL	RE-INSPECT
CHECK WHEELCHAIR RAMP ELECTRICAL WIRES FOR CHAFING AND MANUAL DEPLOY HANDLE OPERATION			
CYCLE RAMP			
CHECK AUDIBLE & VISUAL WARNINGS WHEN RAMP IS IN OPERATION			
UNUSUAL NOISES			

NOTES_____

ELECTRICAL/SYSTEMS COMPARTMENTS	PASS	FAIL	RE-INSPECT
BATTERY COMPARTMENT (CHECK BATTERIES, BATTERY CHARGE LEVEL, BATTERY CABLES, AND DECAL)			
BATTERY CUT OUT SWITCH (CHECK FOR INSTALLATION)			
RELAYS, CIRCUIT BRAKERS, FUSES, AND MISCELANEOUS ELECTRICAL COMPONENTS (CHECK FOR INSTALLATION)			
MULTIPLEX SYSTEM (CHECK INSTALLATION)			
WIRES, AND HARNESS (CHECK FOR ROUTING, SUPPORT, INSULATION, AND PROTECTION)			

NOTES_____

A/C SYSTEM	PASS	FAIL	RE-INSPECT
A/C CONDENSER, CONDENSER FANS, EVAPORATOR, BLOWER MOTORS, AND COMPRESSOR. (CHECK FOR INSTALLATION AND OPERATION)			
ELECTRICAL WIRES AND CABLES (CHECK FOR ROUTING, SUPPORT, INSULATION, AND PROTECTION)			
FREON LINES (CHECK FOR SECURE, CHAFFING, AND LEAKS)			
DISPLAY PANEL (CHECK FOR PROPER OPERATION)			
AIR DUCTS AND CONDENSATION DRAINS (CHECK FOR INSTALLATION)			

Bus No. _____

Date_____

Inspector_____

HOOK A COMPUTER OR SCANNER AND CHECK FOR FAULT CODES AND HIGH AND LOW SIDE SYSTEM PRESSURES			
DECALS (MAKE SURE ALL SAFETY AND INSTRUCTIONAL DECALS ARE IN PLACE AND READABLE)			

NOTES_____

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COMMUNICATIONS SYSTEMS	PASS	FAIL	RE-INSPECT
DESTINATION SIGN SYSTEM (CHECK SYSTEM FOR INSTALLATION AND OPERATION)			
PUBLIC ADDRESS SYSTEM (CHECK SPEAK EASY MICROPHONE AND AUXILIARY JACK FOR HANDHELD MICROPHONE FOR INSTALLATION)			
VOICE ANNUNCIATOR SYSTEM (CHECK ANNUNCIATOR SIGN FOR INSTALLATION AND OPERATION. CHECK AUDIO OPERATION)			
FAREBOX SYSTEM (CHECK MOUNTING PLATE AND BREAKOUT CABLING)			
HELLA APC SYSTEM (CHECK SENSORS, SAMRTBOX AND INTERFRACE CABLING)			

NOTES

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Bus No. _____

Date_____

Inspector_____

CNG FUEL SYSTEM INSPECTION

CNG FUEL SYSTEM INSPECTION	PASS	FAIL	RE-INSPECT
CNG FUEL SYSTEM INSPECTION (SEE ATTACHED NATURAL GAS VEHICLE CYLINDER INSPECTION RECORD AND DIAGRAMS)			

NOTES_____

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CNG FUEL SYSTEM INSPECTION APPROVED BY CERTIFIED INSPECTOR
(INSPECTION ITEMS COMPLETE)

INSPECTOR: _____ DATE: _____

Bus No. _____

Date_____

Inspector_____

ROAD TEST

PRE-ROAD TEST	PASS	FAIL	RE-INSPECT
EXTERIOR WALK AROUND INSPECTION WITH THE ENGINE OFF (CHECK TIRES CONDITIONS AND PRESSURE, LUG NUTS, EXTERIOR LIGHTS, MIRRORS, WINDOWS, COMPARTMENT DOORS, AND CHECK FOR LEAKS)			
INTERIOR WALK AROUND INSPECTION WITH THE ENGINE OFF (CHECK COACH CERTIFICATION LABEL, FIRE EXTINGUISHER, FIRE SUPPRESSION SYSTEM, DOOR MASTER SWITCH, SAFETY REFLECTOR, WHEELCHAIR RESTRAINS, AND CCTV CAMERAS)			
PERFORM MULTIPLEX DIAGNOSIS CHECK, IF ANY MALFUNCTION CODES IS PRESENT WRITE DOWN THE CODE			
CHECK FLUID LEVELS			
CHECK ENGINE (STARTS PROPERLY -NEUTRAL START ONLY, ACCELERATION, EXHAUST, UNUSUAL NOISE OR VIBRATION, AND OVERALL OPERATION)			
WITH THE ENGINE IDLING, TRANSMISSION IN NEUTRAL AND THE PARKING BRAKE APPLIED (CHECK EXTERIOR LIGHTS, DOOR CHIME, STOP REQUEST LIGHT, DOOR OPERATION, KNEELING, WHEELCHAIR RAMP, A/C, WINDSHIELD WIPERS, AND WINDSHIELD WASHERS)			
ENGINE SHUTDOWN (15 MINUTES IDLE SHUTDOWN)			
MILEAGE ODOMETER START_____			
CHECK ENGINE SPEED (RPM) IDLE (~700 RPM) _____ RPM MAXIMUM NO LOAD (<2000 RPM) _____ RPM			
ENGINE COMPARTMENT GAUGE OIL PRESSURE AT IDLE (>10 PSI) _____ PSI OIL PRESSURE AT MAX SPEED (≤65PSI) _____ PSI CHARGING SYSTEM VOLTAGE (28.4 volts) ..... _____V COOLANT TEMPERATURE (160°F - 220°F) _____°F			
BRAKE AND THROTTLE INTERLOCK (CHECK FOR PROPER OPERATION WHEN FRONT DOOR IS OPEN, KNEELING, DRIVE IN NEUTRAL, WHEELCHAIR RAMP DEPLOYMENT, AND FAST IDLE OPERATION)			
SPEED SWITCH (DOOR CANNOT OPEN ABOVE 4 MPH)			

Bus No. _____

Date_____

Inspector_____

PRE-ROAD TEST (Continued)	PASS	FAIL	RE-INSPECT
DOOR MASTER SWITCH (CHECK FOR INSTALLATION AND OPERATION. CHECK THAT PLACING THE SWITCH IN THE OFF POSITION WILL DISABLE THE BRAKE AND THROTTLE INTERLOCK SYSTEM)			
STEERING (CHECK STEERING WHEEL OPERATION AND TURNING EFFORT WITH BUS STOPPED)			
TRANSMISSION (CHECK TRANSMISSION OVERALL OPERATION INCLUDING OIL LEVEL READING DISPLAYED ON THE SHIFT SELECTOR. REFER TO MAINTENANCE MANUAL FOR DETAILS)			
GENERAL (CHECK POWER TRAIN AND ACCESSORIES PERFORMANCE FOR UNUSUAL NOISE OR VIBRATION)			

NOTES_____

Bus No. _____

Date_____

Inspector_____

ROAD TEST	PASS	FAIL	RE-INSPECT
MILEAGE ODOMETER START _____ ODOMETER FINISH _____ ROAD TEST MILES _____ ROAD TEST (ROAD TEST SHALL CONSIST OF SIMULATED TRANSIT TYPE SERVICE THE PASSENGER DOOR SHALL BE OPENED AND CLOSED AT EACH STOP, AND THE BUS SHALL BE KNELT AT EACH STOP. AVERAGE SPEED IS DEFINED AS THE MILES TRAVELED DIVIDED BY THE HOURS OF ENGINE OPERATION)			
OVERALL TEST EVALUATION (ACCELERATION, BRAKING, STEERING, AND ROAD HANDLING)			

NOTES_____

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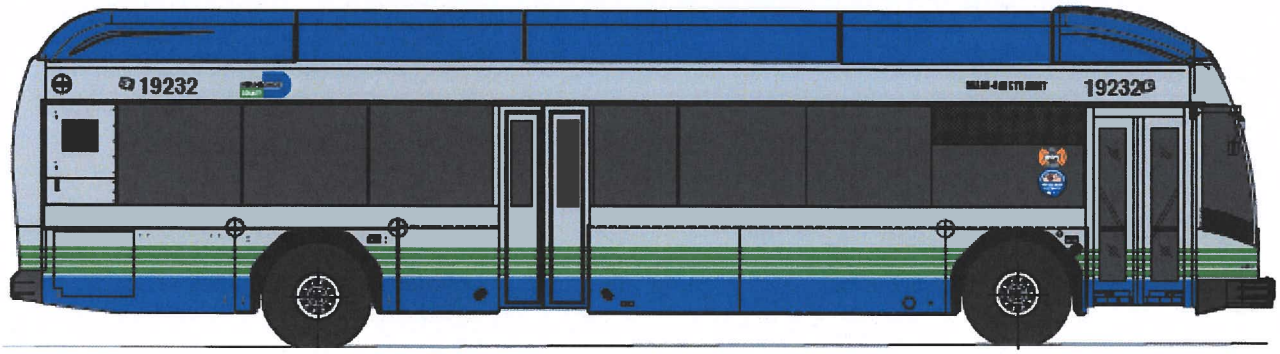
POST-ROAD TEST	PASS	FAIL	RE-INSPECT
WALK AROUND INSPECTION (CHECK FOR HOT WHEELS, UNUSUAL NOISES AND/ OR VIBRATIONS, AND CHECK FOR LEAKS (OIL, WATER, CNG FUEL, AIR, ETC.)) WALK AROUND INSPECTION (CHECK FOR HOT WHEELS, UNUSUAL NOISES AND/ OR VIBRATIONS, AND CHECK FOR LEAKS (OIL, WATER, CNG FUEL, AIR, ETC.))			
GAUGES OIL PRESSURE AT IDLE (>10 PSI) ……..…._____PSI COOLANT TEMPERATURE (160-220 ºF) ……_____ºF			
FLUID LEVELS (CHECK FOR PROPER LEVEL)			
ENGINE COMPARTMENT INSPECTION (CHECK FOR LEAKS)			
UNDERSTRUCTURE INSPECTION (CHECK FOR LEAKS)			
GENERAL (CHECK POWER TRAIN AND ACCESSORIES PERFORMANCE FOR UNUSUAL NOISE OR VIBRATION)			
DAMAGE REPORT (MARK LOCATION OF DAMAGE)			

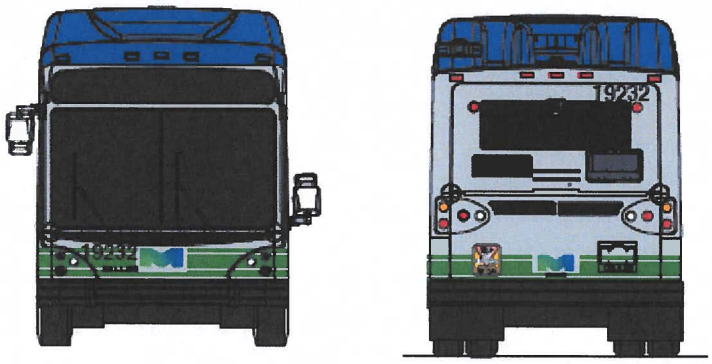
Bus No. _____

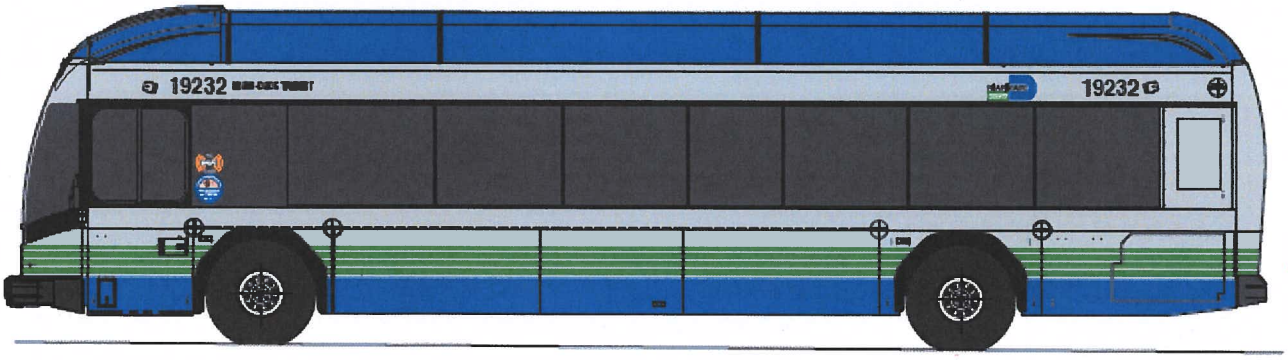
Date_____

Inspector_____

IF DAMAGES ARE FOUND, MARK THE LOCATION OF THE MARK.







NOTES

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ROAD TEST APPROVED
(INSPECTION ITEMS COMPLETE)

INSPECTOR: _____ DATE: _____

Bus No. _____

Date_____

Inspector_____

FUNCTION TEST

FUNCTION TEST	PASS	FAIL	RE-INSPECT
FUNCTION TEST (SEE ATTACHED FUNCTION TEST FORM)			

NOTES_____

FUNCTION TEST APPROVED
(INSPECTION ITEMS COMPLETE)

INSPECTOR: _____ DATE: _____

HVAC CHECKOUT (BY FACTORY REP.) **DATE COMPLETED_____**

OTHER DEFECTS

Bus No. _____

Date_____

Inspector_____

FINAL INSPECTION

No.	ITEMs	PASS	FAIL	RE-INSPECT
1	BUS DATA			
2	DAMAGE INSPECTION			
3	SERVICING			
4	INSPECTION			
5	CNG FUEL SYSTEM INSPECTION			
6	ROAD TEST			
7	FUNCTION TEST			
8	HVAC CHECKOUT (BY FACTORY REP.)			
9	BUS READY FOR SERVICE			

NOTES_____

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FINAL INSPECTION APPROVED
(INSPECTION ITEMS COMPLETE)

INSPECTOR: _____ DATE: _____

SUPERVISOR: _____ DATE: _____

NOTE: SUPERVISOR TO VERIFY THAT THE FORM HAD BEEN COMPLETED.

DTPW INSPECTOR'S SIGNATURE / INITIALS SHEET
GILLIG 40-FOOT LOW FLOOR CNG BUSES

Inspector's First and Last Name (PRINT)	Inspector's Signature	Inspector's Initials

Revision 1
January 30, 2020

CNG FUEL SYSTEM INSPECTION

Natural Gas Vehicle Cylinder Inspection Record

Inspector Name:		**Inspection Type:**	☐Accident/Incident ☐Overhaul ☐Post Delivery ☐Post Repair ☐PMI (3 Years/36000 Mile)
Inspector Cert.#:		**Bus Manufacturer:**	☐New Flyer (6 CNG Cylinders) ☐Gillig (8 CNG Cylinders)
Inspection Date:		**Cylinder Location:**	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8
Bus Number:		**Serial Number:**	
Vehicle Mileage:		**Cylinder Model:**	
EAMS Work Order:		**Expiration Date:**	

Elect. Leak Detector SN	Model:	Cal. Date:	Exp. Date:

Task #	Examination Features	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject
1	Cylinder and brackets cleaned prior to inspection																
2	Cylinder installation																
3	½-inch clearance around cylinder when mounted																
4	Bracket condition																
5	Mounting pads/isolators in good condition																
6	Labels in place																
7	Cylinders not expired																
8	Cylinder service pressure meets/exceeds vehicle service pressure																
9	Valve condition																
10	PRD condition																
11	Plug condition																
12	Fuel lines secure																
13	Vent lines secure																
14	Vent lines free of debris or moisture																
15	Cylinders and Fittings free of leaks (<5000 PPM is acceptable)																
16	Condition of cylinder																
17	Condition of cylinder dome with solenoid valve																
18	Condition of cylinder dome with PRD/Plug																

If any Reject marked or fuel leak observed, complete the section below.

Cylinder Serial #	Location #	Fuel Leak Reading (PPM)	Defect/Damage Details (Use the diagram to mark the location of leak or defect)	Continue in Service (Yes/No)

Inspector's Signature: _____ **Inspector's Emp. ID:** _____ **Date:** _____

Supervisor's Signature: _____ **Supervisor's Emp. ID:** _____ **Date:** _____

MIAMI-DADE COUNTY

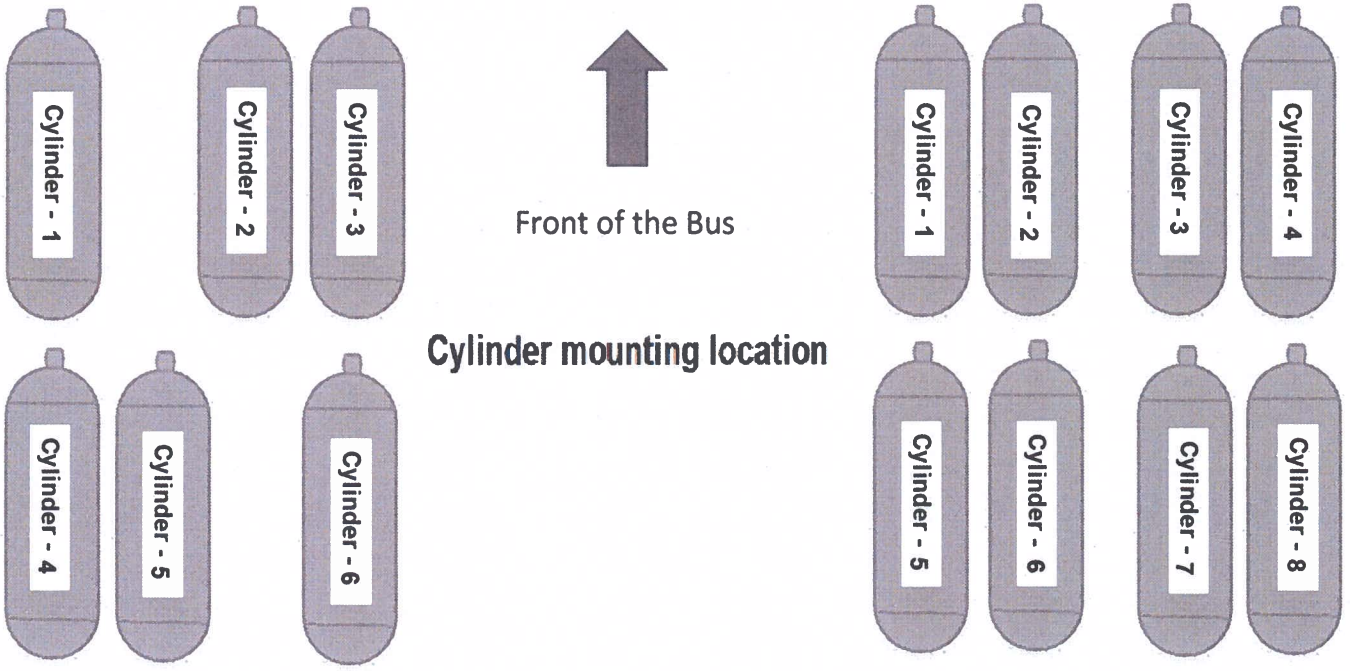
Natural Gas Vehicle Cylinder Inspection Record

CNG FUEL SYSTEM INSPECTION

Description: This inspection form is developed in accordance with ANSI/CSA NGV2 which requires that all Compressed Natural Gas vehicles have periodic visual inspections of the Fuel System every 3 years or 36,000 miles whichever comes first. If the vehicle has been involved in an accident or fire as described in the SOP, the cylinders must be inspected before returning to revenue service. All information in this inspection form is based on specific information found in the Agility Fuel Solutions publication or in most cases, is reproduced word-for-word from that document.

Instructions: All inspections to CNG fuel systems must be carried out by qualified inspectors who are trained and certified by the National Gas Vehicle Institute (NGVi) or other approved institutions. All inspections must be carried out using the guidelines found in the CNG Fuel Cylinder Inspection Manual ENP-558 published by Agility Fuel Solutions. Inspectors must be familiarized with the manual before conducting the inspection. If there is any gas leak found by the electronic leak detector, record the reading on the form and locate/verify the leak with leak detecting solution. This form must be used to record all findings, all defects must be recorded accurately and in detail. If possible, take pictures of all defects that are found during the inspection. Any item that receives a "Reject" rating will automatically put the bus "Out of Service" for a Safety defect. It must be reported to the supervisor and the bus is not to be returned to revenue service until the item has been completely corrected and properly inspected.
Under no circumstances shall a vehicle be released for Service, if there is an unsafe condition found during the inspection.

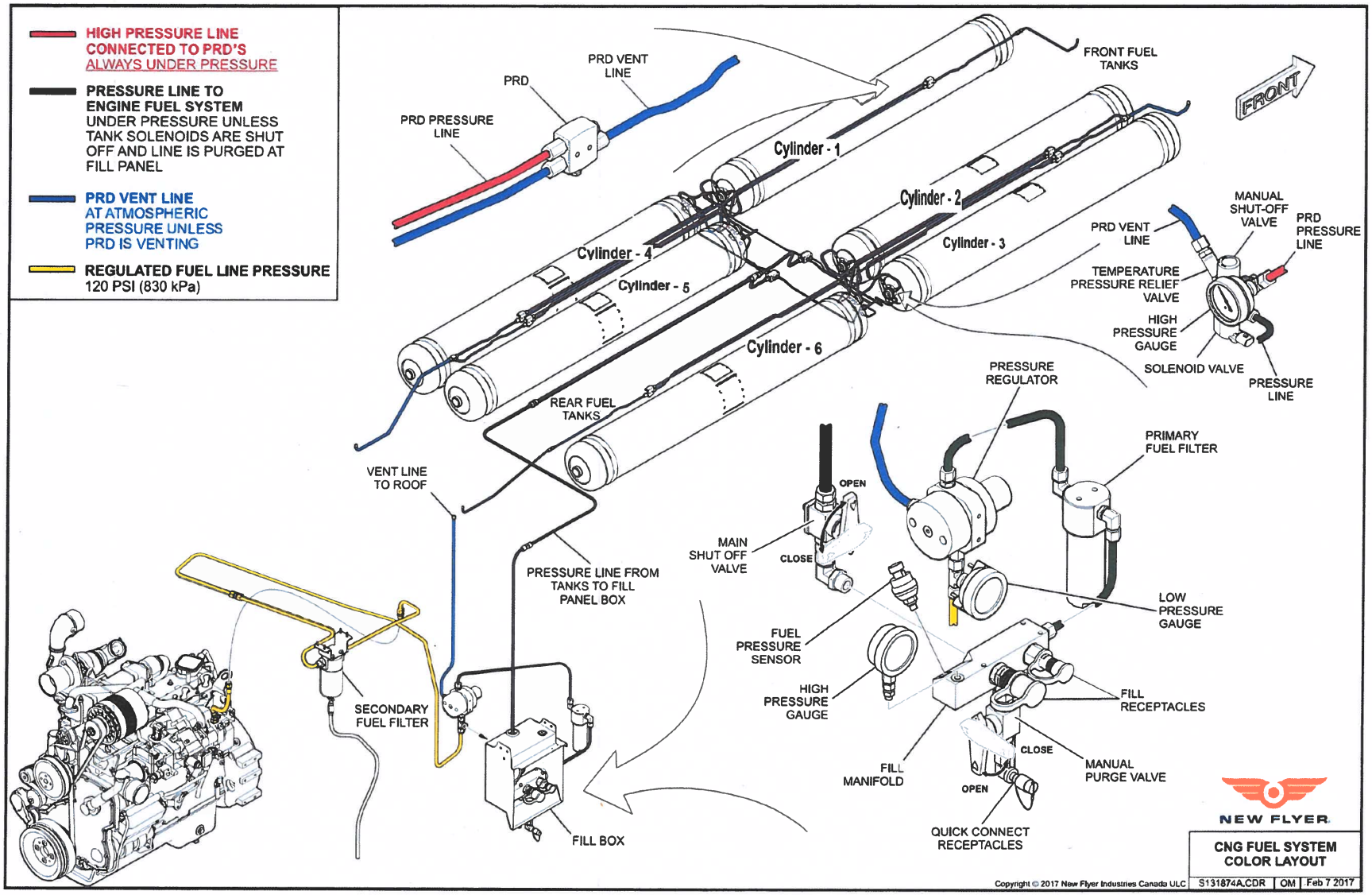
Required Tools & Equipment: Inspection Form and Pen, Electronic Methane Detector, Leak Detection Solution, Depth Gauge/Micrometer, Tape Measure, Inspection Mirror, Flashlight, Borescope, Coin for tap test, Camera, Personal Protective Equipment (PPE) including eye protection, hard hat, Fall Arrest Harness as needed.
Always wear appropriate PPE.



New Flyer 40 FT Buses

GILLIG 40 FT Buses

Appendix B: New Flyer 40 Ft Bus CNG Fuel System Diagram



GILLIG CORPORATION

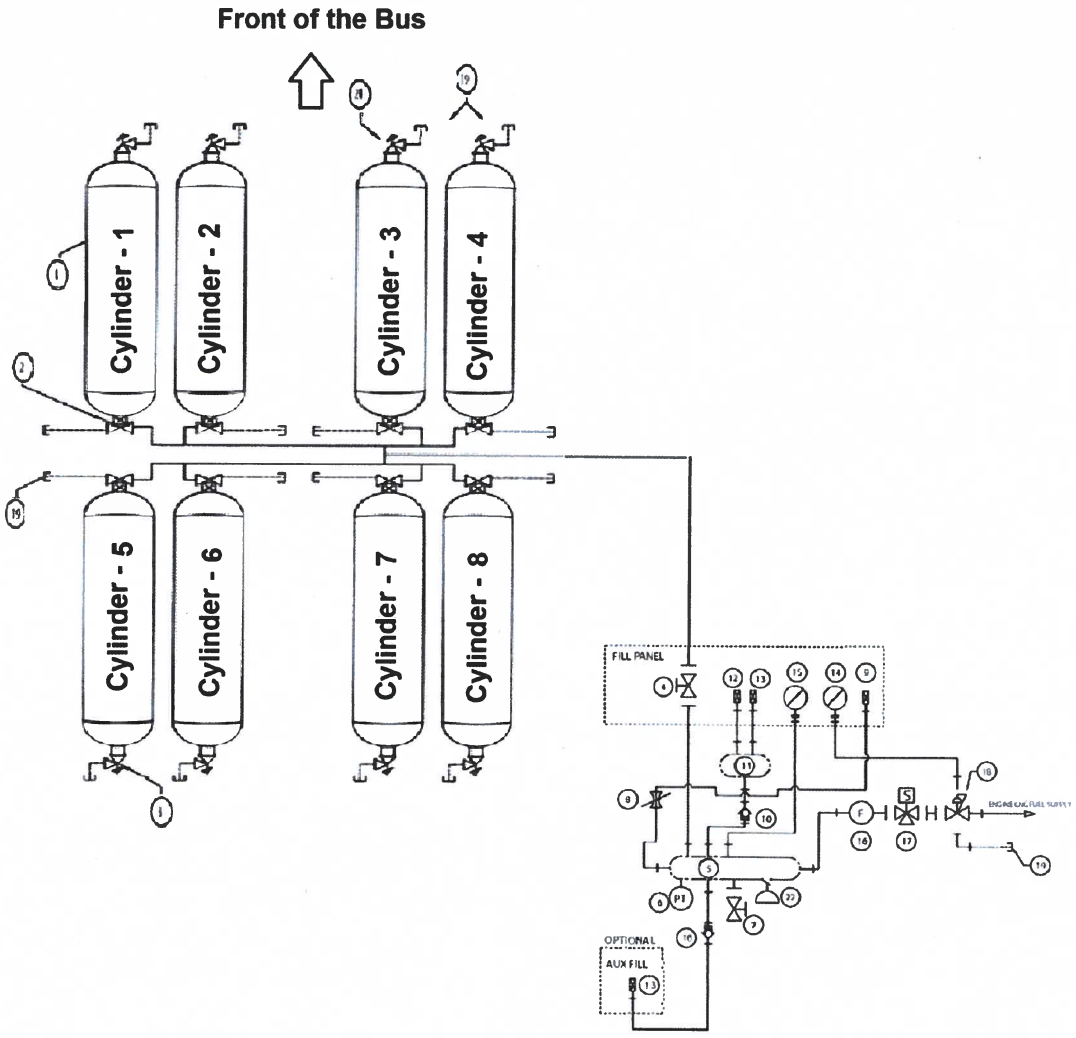
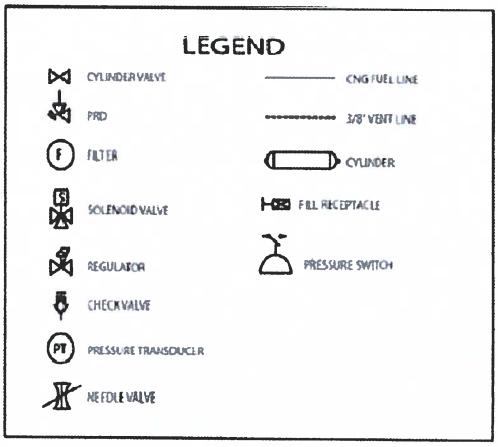


Table 3 CNG System Components

#	Description	#	Description
1	CNG Cylinder	12	Fill Receptacle
2	Cylinder Valve (with Solenoid Valve)	13	Transit Fill Receptacle
3	Pressure Relief Device	14	Low Pressure Gauge
4	1/4-Turn Shut Off Valve	15	High Pressure Gauge
5	Manifold	16	High Pressure Filter
6	Pressure Transducer	17	Solenoid
7	Bleed Valve	18	Regulator
8	Needle Valve	19	UV Protected Cap
9	Defuel Receptacle	20	3/4-in. Stainless Steel Tube
10	Check Valve	21	Pressure Relief Device
11	Fill Manifold	22	Pressure Switch



BUS #_____

40' GILLIG LOW FLOOR CNG BUS FUNCTION TEST

(* INDICATES FDOT 14-90 BUS SAFETY INSPECTIONS)

DRIVERS EFFECTS BOX_____

DRIVERS COAT HOOK_____

CHECK BRAKE WEAR LIGHT_____

J1708/1939 PLUG W/ TETHERED CAP (DRIVER OVERHEAD COMPARTMENT) _____

J1939 PLUG W/ TETHERED CAP FOR ENGINE (UNDER FRONT DASH) _____

* FIRE EXTINGUISHER W/ TAG_____

* SAFETY TRIANGLES_____

FMVSS BUILDERS PLATE_____

* OPERATORS SEAT INSTALLATION_____ FUNCTIONS_____

* PASSENGER SEATS, STANCHIONS & GRAB RAILS_____

* STANDEE LINE & WARNING_____

* STEPWELLS & FLOORING (SLIP RESISTANCE) _____

* STEERING WHEEL TILT_____ TELESCOPIC_____

* HORN_____

* SUNVISOR _____

* CLEVER DEVICES TCH INSTALLATION_____ POWERED_____

* AMEREX FIRE SUPPRESSION PANEL:

* STATUS LIGHT – SYSTEM OK_____ SYSTEM FUNCTION TEST: ALARM_____ BUZZER_____

FIRE SUPPRESSION BOTTLE INDICATOR (GREEN)_____

* HANDSET INSTALLATION_____

* SPEAK EASY P.A. INSIDE_____ BOTH_____ OUTSIDE_____ VOLUME_____

BUS #_____

* WINDSHIELD WIPER HIGH_____ LOW_____ INTERMITTENT_____

* WASHER_____

CNG FUEL GAUGE_____ %

* AIR PRESSURE GAUGE _____ RECORD PSI_____/_____

* SPEEDOMETER_____ RECORD MILEAGE _____

* DASH LIGHT DIMMER SW_____

* KNEEL_____

INTERLOCK_____ DASH LIGHT_____ AMBER FLASHER_____ ALARM_____

* W/C RAMP DEPLOY_____ PARK BRAKE REQUIRED TO DEPLOY_____

INTERLOCKS_____ AMBER FLASHER_____ RAMP LIGHT_____

DOOR WILL NOT CLOSE W/ RAMP OUT_____ TRANS WILL NOT GO ITO GEAR W/ RAMP OUT_____

STOW_____ MANUAL DEPLOY_____

* BLOWER (DEFROSTER/DRIVERS HEATER) LOW_____ MED_____ HIGH_____

WINDSHIELD_____ LEGS _____

HEAT_____ COOL_____

* MIRRORS:

INTERIOR: REARVIEW_____ RELAY_____ REAR DOOR_____

EXTERIOR S/S: INSTALLATION_____ OPERATION_____

EXTERIOR C/S: INSTALLATION _____ OPERATION_____

* DOOR DUMP VALVE_____

* REAR DOOR CONTROL SWITCH DRIVER_____ PASSENGER_____

* DOOR CONTROL HANDLE_____

BUS #_____

CLASS OPERATION_____ HOLD-OPEN SENSOR_____ CANCEL_____

SENSITVE EDGE_____ BUZZER_____ DASH LIGHT_____

CHECK FUEL GAUGES IN THE FUEL FILL BOX: RECORD (HIGH / LOW PSI) _____ /_____

CNG FUEL FILLER BOX:

ENSURE THAT MANUAL SHUTOFF VALVE IS "ON" IN THE CNG FUEL FILL PANEL_____

* CNG FUEL FILL DOOR INTERLOCK:

SHUTS DOWN ENGINE WHEN FUEL DOOR IS OPEN_____ PREVENT ENGINE RESTART_____

* METHANE DETECTION:

NON PASSENGER AREA METHANE DETECTION, ENGINE SHUTS DOWN WITHIN 30 SECONDS OF SIGNIFICANT LEVEL OF MATHANE LEAK DETECTION _____

* DOOR INTERLOCKS - BRAKE/THROTTLE INTERLOCK FRONT_____ REAR_____

CANCELS W/ DOORS CLOSED AFTER BRAKE APPLICATION_____

* REAR DOOR - EMERGENCY RELEASE VALVE (FRONT OF THE REAR DOOR) _____

* FRONT DOOR - EMERGENCY RELEASE VALVE (COMPARTMENT ABOVE ENTRANCE DOOR) _____

* MASTER INTERLOCKS OVERIDE - FOR ALL INTERLOCKS (DRIVER OVERHEAD COMPARTMENT) _____

* PARKING BRAKE_____

ALARM SOUNDS WHEN PARKING RELEASED & MASTER RUN SW. IN "OFF" POSITION_____

* AUTO-NEUTRAL (IMMEDIATELY SHIFTS TO NEUTRAL WHEN TRANSMISSION LEFT IN GEAR AND PARK BRAKE APPLIED) _____

ENGINE WILL NOT START UNLESS PARKING BRAKE IS APPLIED_____

CHECK RETARDER FUNCTION:

1ST STAGE FROM ACCELERATOR (25% RETARDER), 2ND STAGES FROM BRAKE PRESSURE (66% AND 100% RETARDER AT 2 AND 4 PSI) _____

BUS #_____

* MASTER RUN SWITCH_____ DAY RUN_____ NIGHT RUN_____ PARK_____ OFF_____

DAY RUN: DAYLIGHT RUNNING LIGHTS (W/ PARK BRAKE RELEASED) _____

NIGHT RUN: LOW BEAM_____ HIGH BEAM_____ MARKER LIGHTS_____ TAG LIGHT_____

PARK: MARKER LIGHTS_____ TAIL LIGHTS_____

* HAZARD LIGHTS_____ TOGGLE SW. _____ DASH INDICATORS_____

* TURN SIGNALS LEFT_____ RIGHT_____ DASH INDICATORS_____

* BACKUP LIGHTS_____ ALARM_____

* SILENT ALARM (CHECK DESTINATION SIGN MESSAGE) _____

A/C _____ HEAT_____

A/C KEY PAD_____

DRIVERS LIGHT_____

* INTERIOR LIGHTS ON_____ NORMAL_____

FAST IDLE_____

* WARNING LIGHTS_____ BUZZERS_____

STOP ENGINE OVERRIDE W/ GUARD_____

* CCTV EVENT BUTTON_____

* FIRE BUTTON W/ SEAL_____

* PASSENGER SIGNALS PULL CORDS_____ REAR DOOR BUTTON_____ W/C_____ DOOR CANCEL_____

DASH TELL TALE: STOP REQ_____ W/C REQ_____

CHIMES: DING_____ DONG_____

INTERIOR LED SIGNS: STOP REQUESTED_____

VOICE ANNOUNCEMENT: STOP REQUESTED_____

BUS #_____

FAREBOX POWER_____ CHECK VOLTAGE_____ (12VDC)

* EGRESS WINDOWS_____

* ROOF HATCH_____

CHECK POSITIVE BATTERY DISCONNECT SWITCH: _____

ENGINE COMPARTMENT

ENGINE COMPARTMENT LIGHTS _____

FIRE SUPPRESSION SENSOR_____

REAR RUN_____ WAIT TO START LIGHT_____ REAR START_____

* TRANSMISSION WILL NOT GO INTO GEAR_____

* IF SWITCHED TO FRONT RUN - ENGINE STOPS_____

* IF MASTER RUN SWITCH IS TURNED ON – BRAKE INTERLOCK REMAINS ENGAGED_____

* ENGINE STARTED AT FRONT THEN SWITCHED TO REAR RUN – INTERLOCK ON/ TRANS INOP_____

FAN REVERSE (SWITCH ON RADIATOR) OPERATION_____ FAN DIAGNOSTIC LIGHT_____

J1939 PLUG W/ TETHERED CAP (ENGINE REAR RUN BOX) CUMMINS_____ POWERTRAIN_____

CAN MULTI DISPLAY: RECORD OIL PRESSURE (PSI) _____ RECORD COOLANT TEMP (^{0}F) _____

BUS #_____

SHUTDOWN FUNCTIONS

15 MIN IDLE SHUTDOWN_____ W\C DEPLOYED NO SHUTDOWN_____

1 HOUR MULTIPLEX SHUTDOWN_____

FIRE SUPPRESSION REMAINS POWERED_____

MASTER RUN SW. OR HAZARD SW. WAKEUP_____

FUNCTIONS TESTS APPROVED:

INSPECTOR: _____ DATE: _____

SUPERVISOR: _____ DATE: _____

NOTE: SUPERVISOR TO VERIFY THAT THE FORM HAS BEEN COMPLETED.

DTPW — Standard Operating Procedure (SOP)

Title of Procedure:	Natural Gas Vehicle Cylinder Inspection	Procedure Number	Revision Date
		PR-BS-049	1/15/2020
Division	Bus Maintenance	Revision Level	Original Issue Date
		2	4/17/2019

Reference Documents:	Agility CNG Fuel Cylinder Inspection Manual ENP-558, Latest Revision	DTPW Post-Delivery Inspection Plan

References to other documents, standards or local, state or federal mandates that amplify or reinforce requirements stated are listed here. Note: Reference Standards above need to be "met" or "equaled" for SOP compliance.

REVIEW LOG

Title	Print Name	Signature	Date
General Superintendent Bus Maintenance	Kenneth Jones	Kenneth H. Jones	1/30/2020
Chief Office of Safety and Security	Eric Muntan		1/30/2020
Section Chief Bus Maintenance, Central	William Campbell	William Campbell	1/30/2020
Section Chief Bus Maintenance, Northeast	David Marzouca		1/30/2020
Superintendent Bus Maintenance, Coral Way	Larry Walker		1/30/2020
Superintendent Bus Maintenance Support Services	Woodrow Scott		1/29/2020
MDT Maintenance Training Supervisor	Fabio Londono		1/31/2020
Field Test Engineer Field / System Engineering	Carlos Delgado		1/31/2020
Chief Field / System Engineering	Colin Armorer		1/30/2020
Chief MDT Quality Assurance	Lazaro Palenzuela		1/30/2020
Superintendent, Bus Maintenance Reliability	Yeldo Varkey		1/30/2020

Inter-departmental reviews by required personnel are listed here.

SOP APPROVAL SECTION

Title	Print Name	Signature	Approval Date
Assistant Director, Bus Services	**Derrick Gordon**		1-31-2020
Deputy Director	**Steve Feil**		2/3/2020

List of Records:	Natural Gas Vehicle Cylinder Inspection Record	
	EAMS Work Order	

REVISION LOG

Current Rev. No.	Revision Date	Changes	Reason for Change	Initiator
0	4/17/2019	Initial Issue	Initial Issue	William Campbell
1	7/23/2019	Revision	Updated Information	William Campbell
2	01/15/2020	Revision	As per the recommendations in OIG Report IG19-0015-O, 11/13/2019	Yeldo Varkey

Title of Procedure:	Natural Gas Vehicle Cylinder Inspection	Procedure Number	Revision Date
		PR-BS-049	1/15/2020
Division	Bus Maintenance	Revision Level	Original Issue Date
		2	4/17/2019

1.0 Purpose

This procedure outlines the requirements for inspection of Compressed Natural Gas (CNG) Cylinders during Post Delivery Inspection (PDI), following an accident/incident and three years or 36,000 mile cycle inspection in accordance with the Agility Compressed Natural Gas (CNG) Vehicle Cylinder Inspection Manual ENP-558, (Latest Revision).

2.0 Scope

This procedure specifies the responsibilities of all involved with inspecting CNG tanks during post-delivery inspection (PDI), post-accident/incident and during every three years or 36,000 mile CNG tank inspection.

Accident requiring a CNG tank inspection is defined as where one of the following conditions occurred:

1. Collision damage to the bodywork or chassis close to the CNG cylinders.
2. Damage to the cylinder covers.
3. Damage near the fuel lines.
4. Evidence of methane leak
5. Evidence of fire damage near the cylinders.
   a. Cylinders are equipped with special heat-activated relief devices that will empty the cylinder in a severe fire, but each cylinder has its own relief devices. All cylinders may not have to be vented.
6. Damaged battery near the cylinders (whether the battery is in the CNG vehicle or in the colliding vehicle.
   a. Battery acid can damage cylinders.
7. The vehicle is towed due to accident damage.

2.1 Definitions

1. CNG – Compressed Natural Gas.
2. EAMS – Enterprise Asset Management System.
3. PDI – Post Delivery Inspection
4. Out-Gassing – Normal residual gas seepage common to CNG tanks.
5. PPM – Parts per Million
6. PPE – Personal Protective Equipment
7. NFPA – National Fire Protection Association
8. OIG – Office of Inspector General

3.0 Responsibility

Individual	Responsibilities
Division Chief / Superintendent	• Ensures CNG tanks are properly inspected and documented as required by this SOP.
Production Coordinator	• Schedules 3 year or 36,000 mile cycle CNG inspections. • Reviews Natural Gas Vehicle Inspection record. • Records and uploads information into EAMS.
Transit Mechanic Shop Supervisor	• Ensures CNG tanks are properly inspected and documented as required by this SOP. • Opens, reviews and closes work orders in EAMS for CNG Tank Inspections. • Certified Supervisors will Perform CNG tank inspections in the absence of a certified technician. • Completes the Natural Gas Vehicle Cylinder Inspection Record when performing tank inspections. • Signs and dates the Natural Gas Vehicle Cylinder Inspection Record. • Provides the Natural Gas Vehicle Cylinder Inspection Record to the Production Coordinator for review. • Schedules repairs for the CNG tanks if defects are found. • Releases bus for service if no unsafe conditions are found.
CNG Certified Technician	• Must be certified as a CNG tank inspector. • Inspects CNG tanks as outlined in the CNG Fuel Cylinder Inspection Manual ENP – 558. • Completes work orders in EAMS and the Natural Gas Vehicle Cylinder Inspection Record. • Informs supervisor of the condition of the CNG tanks. • Makes repairs as necessary.

4.0 Procedure

1. Schedule CNG tank inspections at the bus post-delivery inspection phase as identified in the DTPW Post-Delivery Inspection Plan. The Post-Delivery Inspection Plan will include the inspection form to be used as part of the inspections (see appendix A).
2. Schedule CNG tank inspections every three (3) years or 36,000 miles and/or following an accident, fire or suspected gas leak.
3. Open work order in EAMS to document inspection.
4. Supervisors or technicians, who are certified CNG tank inspectors, will perform the inspections per guidelines established by the CNG tank manufacturer. (Agility CNG Fuel Cylinder Inspection Manual ENP-558, Latest Revision)
5. Search for leaks using electronic leak detector and approved leak detecting solutions such as Swagelock Snoop.
6. If methane concentration is observed by electronic methane detector, record the readings on inspection form and mark the location on the diagram.
7. If more than 5000 ppm methane level is observed:

   (On Valves and Connections)

   a. Locate the leak and mark the location on the diagram.

   b. Valves or connections need to be repaired or replaced.

   (On Tank)

   a. Locate the damage/leak on cylinder and mark the location on the diagram.

   b. Damaged cylinders need to be repaired or replaced as per cylinder manufacture's specifications.
8. Inform the status of the CNG tanks to the supervisor.

   a. Schedule and / or make necessary repairs.

8. Any task item that receives a "Reject" rating will automatically put the bus "Out of Service" for a Safety defect. The bus is not to be returned to revenue service until the item has been completely corrected and properly inspected.
9. Complete and sign the Natural Gas Vehicle Cylinder Inspection Record.
10. Complete and close EAMS work order.
11. Release the bus for revenue service.
12. The Production Coordinator reviews the Natural Gas Vehicle Cylinder Inspection Record.

    a. Responsible person will make necessary corrections.
13. Upload the Natural Gas Vehicle Cylinder Inspection Record to EAMS.

4.1 Time Standard

- 2.5 hours

5.0 Key Performance Metrics

- Perform inspections during PDI.
- Perform inspections every 3 years or 36,000 miles.
- Perform following an accident, fire or suspected gas leak.

6.0 Special Tools and Equipment (If applicable)

1. Depth Gauge/Micrometer
2. Approved Leak Detection solution
3. Electronic Leak Detector that meets the requirements of UL 913 Class 1, Division 1, Groups C & D.
4. Tape Measure
5. Inspection Mirror
6. Flashlight
7. Borescope
8. Coin for Tap Test
9. Camera
10. Personal Protective Equipment (PPE), including eye protection
11. Bump Hat and Fall Arrest Harness
12. Shop Rags or Towels

7.0 Safety Requirements in the Workplace:

- Do not smoke or allow anyone else to smoke near the vehicle.
- Turn the ignition switch off, set the parking brake and turn off the battery at the main disconnect.
- Insert the Steering wheel "DANGER" Lockout message cover.
- CNG safety signage should be visible at all applicable locations as stipulated by federal, state and municipal law.

- Natural gas rated fire extinguishers should be accessible and visible throughout all servicing and fueling areas. All fire extinguishers must be properly inspected and up to date.
- Areas designated for CNG fueling systems must have adequate lighting that complies with NFPA and other applicable codes.
- Use tools that are in good working order with proper calibration.
- Wear appropriate attire and Personal Protective Equipment (PPE) while servicing or maintaining any CNG system.
- Never use an open flame as a source of illumination near a CNG system.
- CNG servicing and fueling areas must be well ventilated.
- CNG fuel systems are to be serviced in designated areas that comply with federal, state and municipal laws and regulations.
- Do not stand or walk on cylinders. The slippery surface creates a fall hazard and surface damage may occur from debris stuck in shoe treads and soles. Always wear fall arrestment PPE when working on high or tall fuel systems.

8.0 Distribution and Implementation:

- The original approved hard copy of this SOP shall be stored the Bus Maintenance division files.
- The .pdf file shall be posted on the TransitNet within the Department's website.

9.0 Appendix: (See Attachments)

Appendix A: Natural Gas Vehicle Cylinder Inspection Record

Appendix B: New Flyer Fuel System Diagram

Appendix C: Gillig Fuel System Diagram

Attachments

CNG FUEL SYSTEM INSPECTION

MIAMI-DADE COUNTY

Natural Gas Vehicle Cylinder Inspection Record

Inspector Name:		Inspection Type:	☐Accident/Incident ☐Overhaul ☐Post Delivery ☐Post Repair ☐PMI (3 Years/36000 Mile)
Inspector Cert.#:		Bus Manufacturer:	☐New Flyer (6 CNG Cylinders) ☐Gillig (8 CNG Cylinders)
Inspection Date:		Cylinder Location:	1 2 3 4 5 6 7 8
Bus Number:		Serial Number:	
Vehicle Mileage:		Cylinder Model:	
EAMS Work Order:		Expiration Date:	

Elect. Leak Detector SN	Model:	Cal. Date:	Exp. Date:

Tank #	Examination Features	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject
1	Cylinder and brackets cleaned prior to inspection																
2	Cylinder installation																
3	½-inch clearance around cylinder when mounted																
4	Bracket condition																
5	Mounting pads/isolators in good condition																
6	Labels in place																
7	Cylinders not expired																
8	Cylinder service pressure meets/exceeds vehicle service pressure																
9	Valve condition																
10	PRD condition																
11	Plug condition																
12	Fuel lines secure																
13	Vent lines secure																
14	Vent lines free of debris or moisture																
15	Cylinders and Fittings free of leaks (<5000 PPM is acceptable)																
16	Condition of cylinder																
17	Condition of cylinder dome with solenoid valve																
18	Condition of cylinder dome with PRD/Plug																

If any Reject marked or fuel leak observed, complete the section below.

Cylinder Serial #	Location #	Fuel Leak Reading (PPM)	Defect/Damage Details (Use the diagram to mark the location of leak or defect)	Continue in Service (Yes/No)

Inspector's Signature: _____ Inspector's Emp. ID: _____ Date: _____

Supervisor's Signature: _____ Supervisor's Emp. ID: _____ Date: _____

Appendix A

Rev. 12/05/2019

Title of Procedure:	Natural Gas Vehicle Cylinder Inspection	Procedure Number	Revision Date
		PR-BS-049	1/15/2020
Division	Bus Maintenance	Revision Level	Original Issue Date
		2	4/17/2019

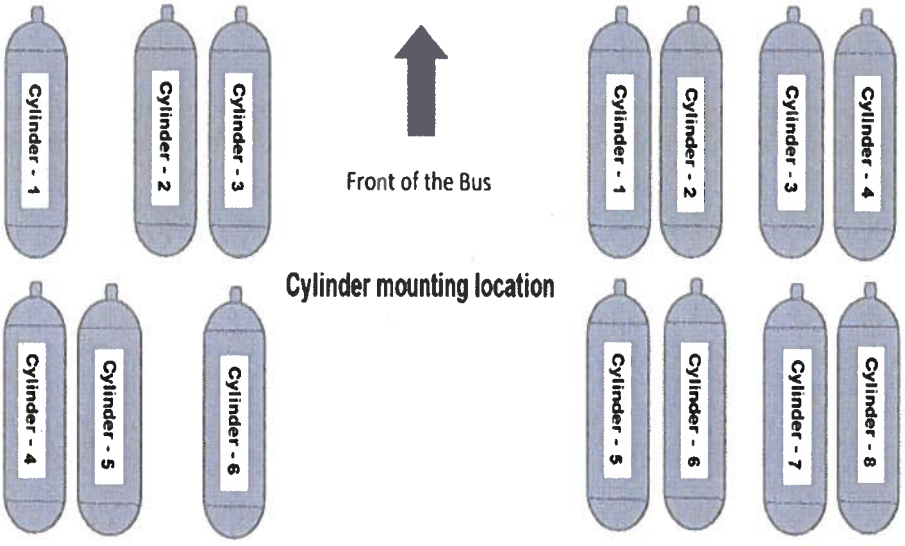
CNG FUEL SYSTEM INSPECTION

Natural Gas Vehicle Cylinder Inspection Record

Description: This inspection form is developed in accordance with ANSI/CSA NGV2 which requires that all Compressed Natural Gas vehicles have periodic visual inspections of the Fuel System every 3 years or 36,000 miles whichever comes first. If the vehicle has been involved in an accident or fire as described in the SOP, the cylinders must be inspected before returning to revenue service. All information in this inspection form is based on specific information found in the Agility Fuel Solutions publication or in most cases, is reproduced word-for-word from that document.

Instructions: All inspections to CNG fuel systems must be carried out by qualified inspectors who are trained and certified by the National Gas Vehicle Institute (NGVi) or other approved institutions. All inspections must be carried out using the guidelines found in the CNG Fuel Cylinder Inspection Manual ENP-558 published by Agility Fuel Solutions. Inspectors must be familiarized with the manual before conducting the inspection. If there is any gas leak found by the electronic leak detector, record the reading on the form and locate/verify the leak with leak detecting solution. This form must be used to record all findings, all defects must be recorded accurately and in detail. If possible, take pictures of all defects that are found during the inspection. Any item that receives a "Reject" rating will automatically put the bus "Out of Service" for a Safety defect. It must be reported to the supervisor and the bus is not to be returned to revenue service until the item has been completely corrected and properly inspected.
Under no circumstances shall a vehicle be released for Service, if there is an unsafe condition found during the inspection.

Required Tools & Equipment: Inspection Form and Pen, Electronic Methane Detector, Leak Detection Solution, Depth Gauge/Micrometer, Tape Measure, Inspection Mirror, Flashlight, Borescope, Coin for tap test, Camera, Personal Protective Equipment (PPE) including eye protection, hard hat, Fall Arrest Harness as needed.
Always wear appropriate PPE.



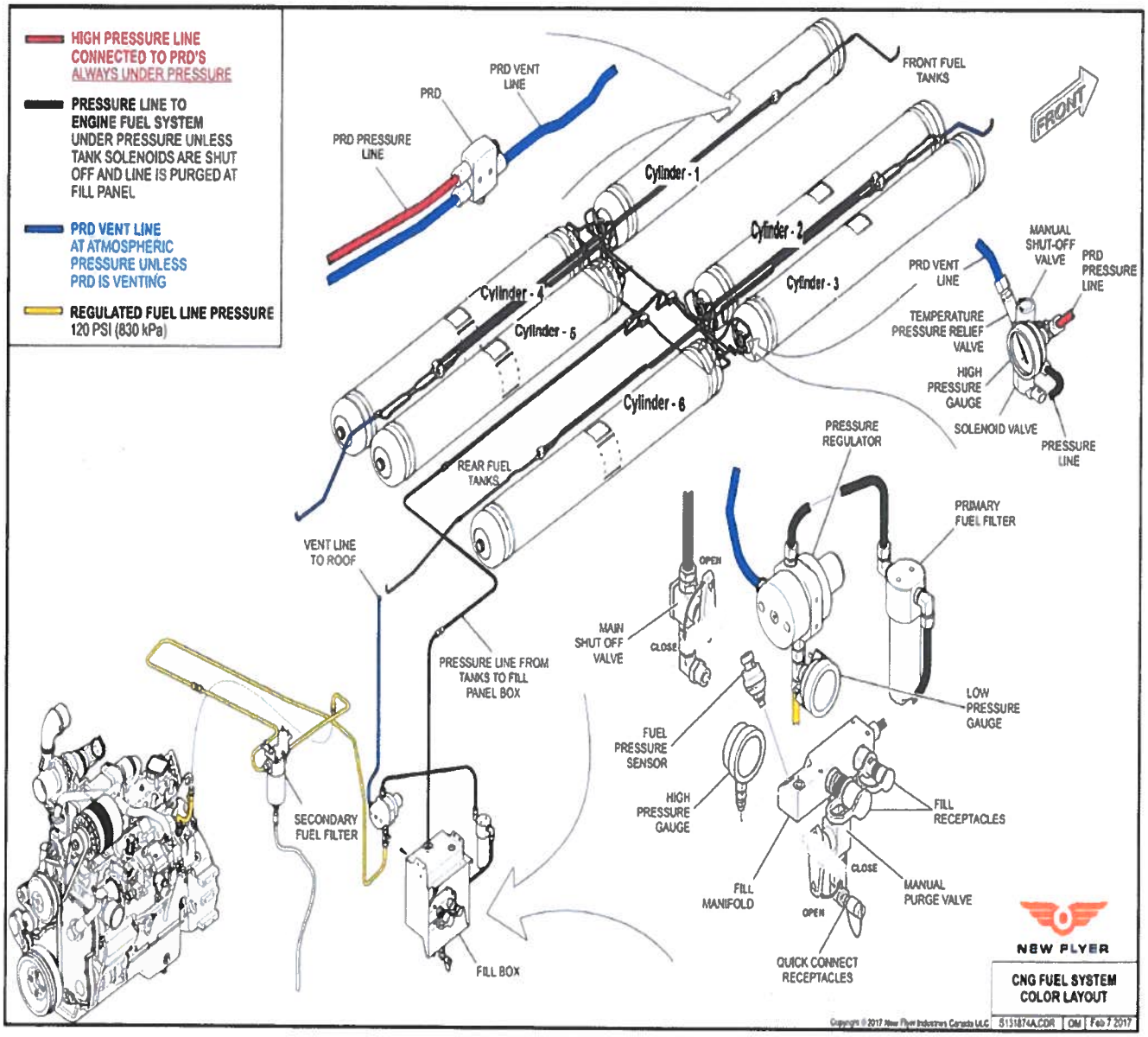
New Flyer 40 FT Buses

GILLIG 40 FT Buses

Appendix A

Rev. 12/05/2019

Appendix B: New Flyer 40 Ft Bus CNG Fuel System Diagram



Appendix C: Gillig 40 Ft Bus CNG Fuel System Diagram

GILLIC CORPORATION

Front of the Bus

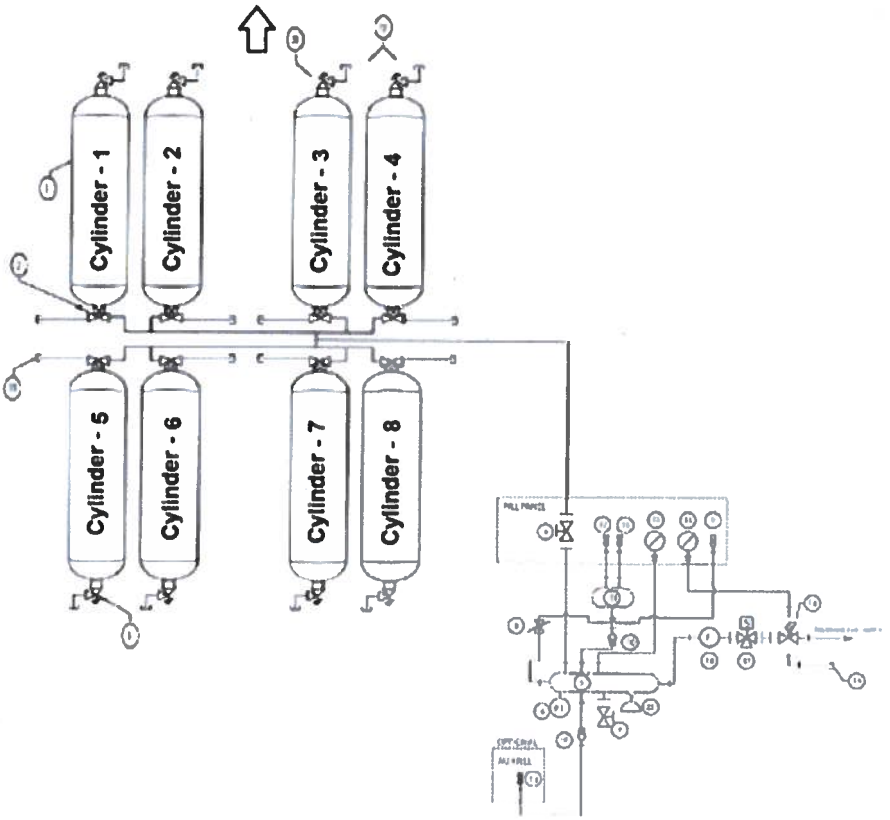
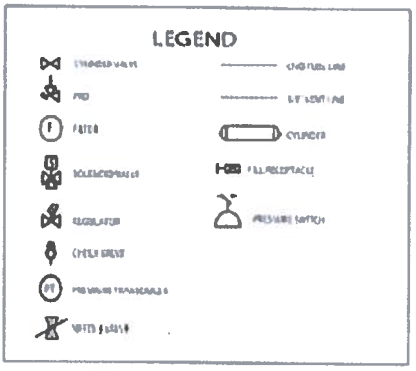


Table 3 CNG System Components

#	Description	#	Description
1	CNG Cylinder	12	Fill Receptacle
2	Cylinder Valve (with Solenoid Valve)	13	Transit Fill Receptacle
3	Pressure Relief Device	14	Low Pressure Gauge
4	1/4-Turn Shut Off Valve	15	High Pressure Gauge
5	Manifold	16	High Pressure Filter
6	Pressure Transducer	17	Solenoid
7	Bleed Valve	18	Regulator
8	Needle Valve	19	UV Protected Cap
9	Defuel Receptacle	20	3/4-in. Stainless Steel Tubo
10	Check Valve	21	Pressure Relief Device
11	Fill Manifold	22	Pressure Switch



Natural Gas Vehicle Cylinder Inspection Record

CNG FUEL SYSTEM INSPECTION

Inspector Name:		Inspection Type:	☐Accident/Incident ☐Overhaul ☐Post Delivery ☐Post Repair ☐PMI (3 Years/36000 Mile)
Inspector Cert.#:		Bus Manufacturer:	☐New Flyer (6 CNG Cylinders) ☐Gillig (8 CNG Cylinders)
Inspection Date:		Cylinder Location:	1 2 3 4 5 6 7 8
Bus Number:		Serial Number:	
Vehicle Mileage:		Cylinder Model:	
EAMS Work Order:		Expiration Date:	

Elect. Leak Detector SN	Model:	Cal. Date:	Exp. Date:

Task #	Examination Features	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject	Accept	Reject
1	Cylinder and brackets cleaned prior to inspection																
2	Cylinder installation																
3	½-inch clearance around cylinder when mounted																
4	Bracket condition																
5	Mounting pads/isolators in good condition																
6	Labels in place																
7	Cylinders not expired																
8	Cylinder service pressure meets/exceeds vehicle service pressure																
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15	Cylinders and Fittings free of leaks (<5000 PPM is acceptable)																
16	Condition of cylinder																
17	Condition of cylinder dome with solenoid valve																
18	Condition of cylinder dome with PRD/Plug																

If any Reject marked or fuel leak observed, complete the section below.

Cylinder Serial #	Location #	Fuel Leak Reading (PPM)	Defect/Damage Details (Use the diagram to mark the location of leak or defect)	Continue in Service (Yes/No)

Inspector's Signature: _____ Inspector's Emp. ID: _____ Date: _____

Supervisor's Signature: _____ Supervisor's Emp. ID: _____ Date: _____

Natural Gas Vehicle Cylinder Inspection Record

CNG FUEL SYSTEM INSPECTION

Description: This inspection form is developed in accordance with ANSI/CSA NGV2 which requires that all Compressed Natural Gas vehicles have periodic visual inspections of the Fuel System every 3 years or 36,000 miles whichever comes first. If the vehicle has been involved in an accident or fire as described in the SOP, the cylinders must be inspected before returning to revenue service. All information in this inspection form is based on specific information found in the Agility Fuel Solutions publication or in most cases, is reproduced word-for-word from that document.

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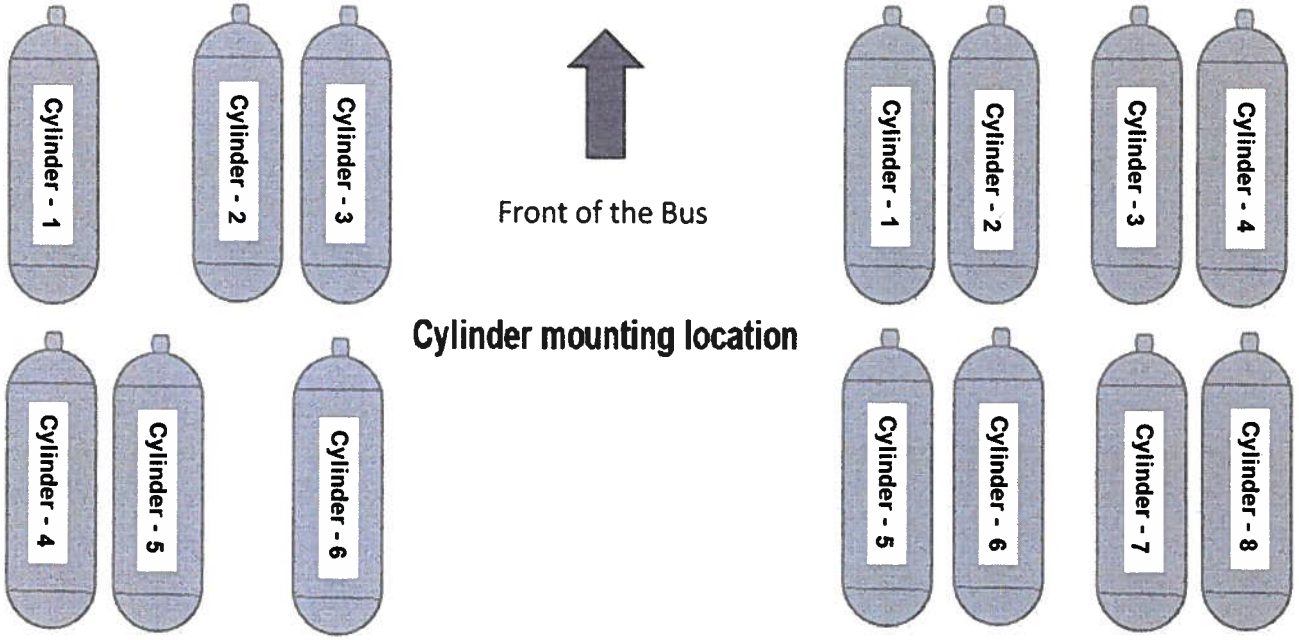
Under no circumstances shall a vehicle be released for Service, if there is an unsafe condition found during the inspection.

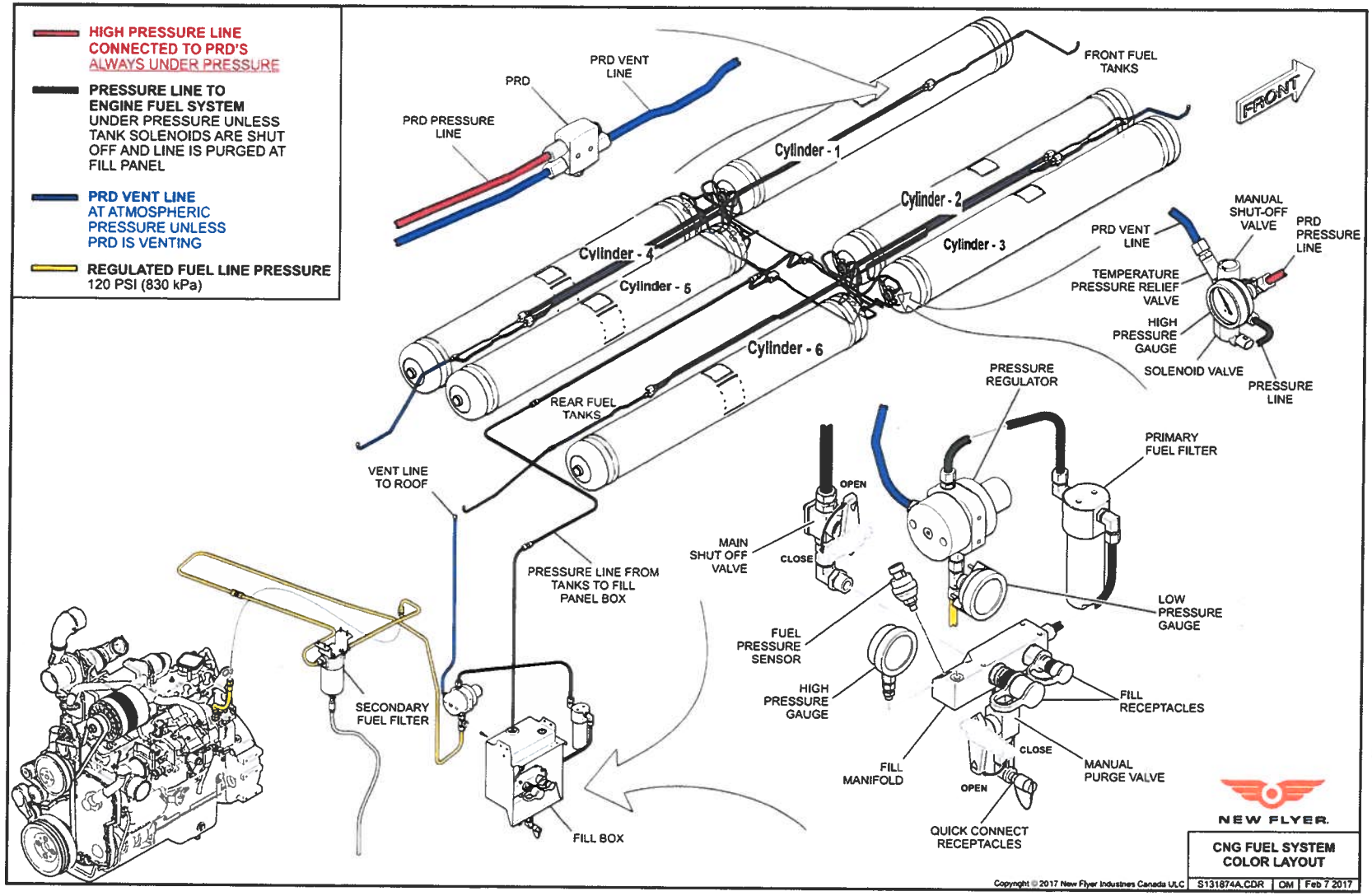
Required Tools & Equipment: Inspection Form and Pen, Electronic Methane Detector, Leak Detection Solution, Depth Gauge/Micrometer, Tape Measure, Inspection Mirror, Flashlight, Borescope, Coin for tap test, Camera, Personal Protective Equipment (PPE) including eye protection, hard hat, Fall Arrest Harness as needed.
Always wear appropriate PPE.

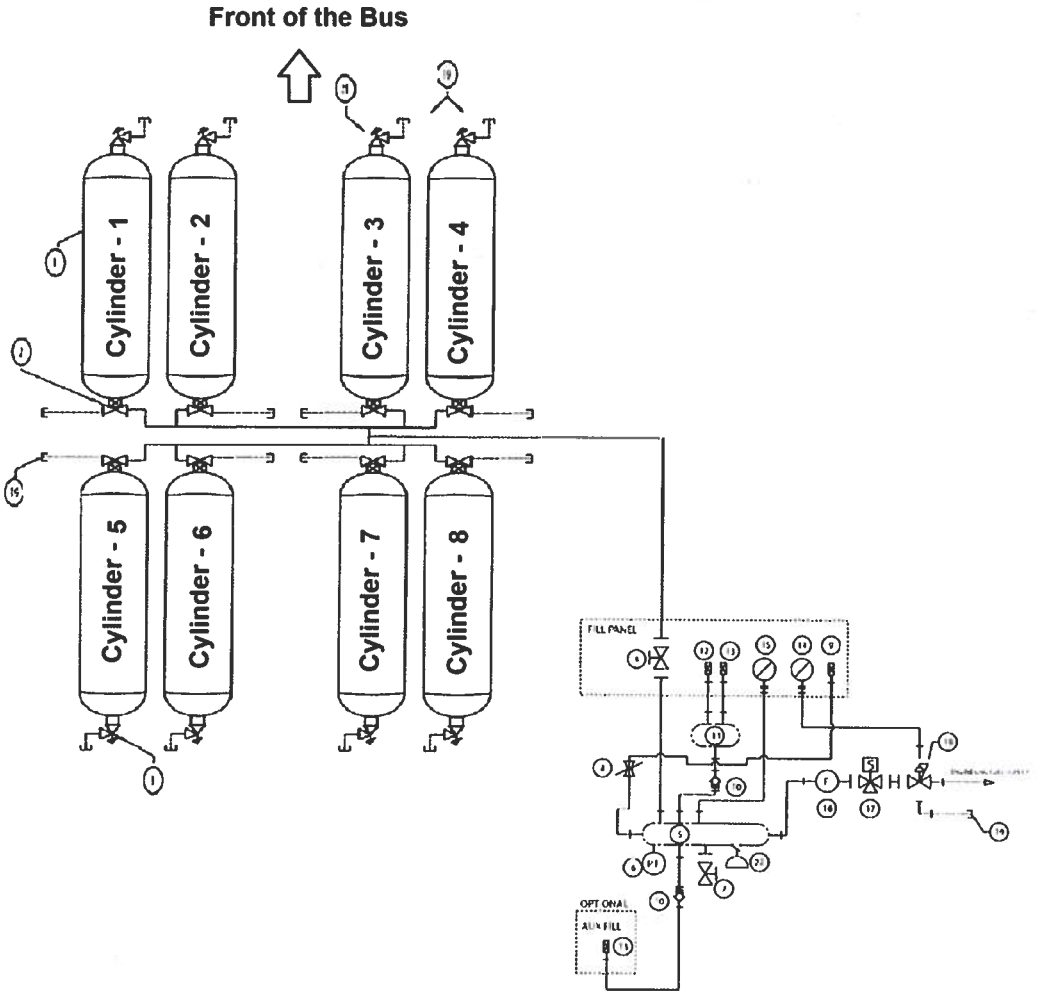


New Flyer 40 FT Buses

GILLIG 40 FT Buses

Appendix B: New Flyer 40 Ft Bus CNG Fuel System Diagram





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8	Needle Valve	19	UV Protected Cap
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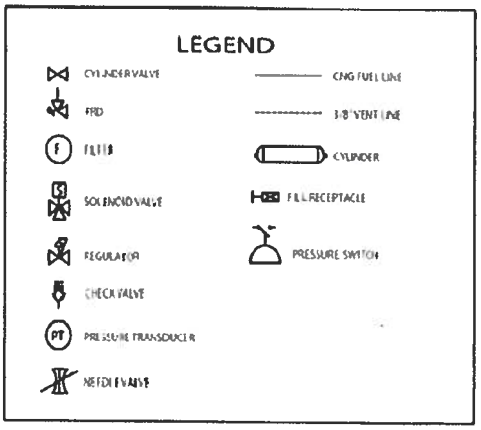
10	Check Valve	21	Pressure Relief Device
11	Fill Manifold	22	Pressure Switch



One option is shown below for procurement.

Date: _____