U.S. Department of Transportation

National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION

NHTSA

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Investigation: PE 13-019
Date Opened: 06/06/2013
Investigator: Kyle Bowker **Reviewer:** Bruce York-B
Approver: Frank Borris
Subject: CNG Fuel Container Manual Valve

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: AGILITY FUEL SYSTEMS
Products: Agility CNG Fuel Containers with Youngdo Manual Valves
Population: 1,000 (Estimated)

Problem Description: The manual valve may become stuck in the "closed" position due to the valve seat becoming detached from the valve stem. The stuck valve seat can block fuel flow from the affected compressed natural gas (CNG) fuel container.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	0	TBD	TBD
Crashes/Fires:	0	TBD	TBD
Injury Incidents:	0	TBD	TBD
Number of Injuries:	0	TBD	TBD
Fatality Incidents:	0	TBD	TBD
Number of Fatalities:	0	TBD	TBD
Other*:	0	1	1

***Description of Other:** Agility Technical Service Bulletin ENP-047 (ODI TSB #10052123)

ACTION / SUMMARY INFORMATION

Action: A Preliminary Evaluation has been opened.

Summary:

The Office of Defects Investigation (ODI) received a Technical Service Bulletin (TSB) from Agility Fuel Systems, Inc. (Agility), as required by 49CFR579.5, titled "ENP-047 Rail Mount Periodic Maintenance And Inspection Schedule". In the subject TSB, Agility describes a revised periodic maintenance and inspection schedule that applies four specific checks and actions related to the subject CNG fuel system container(s) and their installation: (1) fuel container mounting bracket torque; (2) fuel container rotational movement; (3) fuel container mounting bracket rubber isolator displacement; and (4) fuel container manual valve stuck in the closed position.

According to Agility, as the fuel container expands and contracts during fuelling and routine use, it may be possible for the fuel container to become loose within the bracket system, which may lead to rotational movement of the fuel container Additionally, in some frame rail mounted applications, the brackets used to secure the fuel container are equipped with supports for a step tread to assist vehicle occupant ingress and egress. Over time, the force applied to the step tread may contribute to the rotational movement of the fuel container. Such rotational movement may result in: (1) abrasion to the hoop wrap, that may compromise the structural integrity of the fuel container, depending on the depth of the abrasion; (2) damage to high-pressure fuel lines, which may result in a fuel leak or a disruption of fuel flow to the engine; (3) the pressure relief device (PRD) becoming oriented in such a way that the PRD exit and associated vent line (if equipped) may accumulate foreign debris or fluids or otherwise disrupt the fuel flow. Also, rubber isolator displacement may expose the fuel container to increased risk of abrasion damage.

The subject TSB also informs readers that certain manual tank valves supplied by Youngdo Industrial Co., Ltd. (Youngdo) used in some frame rail mounted CNG applications may stick in the "closed" position due to the seat becoming detached from the stem. This detached seat may block fuel flow from the affected fuel container. In some cases, the valve may stick in the "closed" position even though the handle can be turned to the "open" position. According to Agility, the valve retains the ability to stop fuel from flowing from the tank when turned to the "closed" position. However, if the valve should become stuck in the "closed" position, the total available fuel will be reduced and the vehicle's effective operating range will be severely limited. Because they will not have an accurate reading of the fuel pressure in the affected fuel container, this condition may pose risk of injury to service personnel in the event the affected container must be depressurized, such as when a fuel system component has failed or when a fuel container has sustained Level 2 or Level 3 damage and must be removed from the vehicle for repair or replacement. In some cases the need to depressurize the vehicle is urgent and must be accomplished quickly to reduce risk of catastrophic container failure and/or fire. By letter dated November 8, 2012, Youngdo notified Agility that "All valves should be updated with a new stem and seat assembly."

A Preliminary Evaluation has been opened to further analyze the scope, frequency, and consequence of the four conditions detailed in the subject TSB.

Agility fuel systems™



Technical Service Bulletin:

Rail Mount Periodic Maintenance

And Inspection Schedule

ENP-047 Rev: 3 December 20, 2012

Authored By: Y. Coy **Approved By**: C. Forsberg **Revision**: 3 Dec. 20, 2012 **Date Issued**: Dec. 20, 2012

1 INTRODUCTION

Agility rail mount systems require additional inspection and maintenance procedures to help ensure continued reliability in the field. This bulletin covers inspection and maintenance requirements specific to Agility rail mount systems. This bulletin should be treated as an addendum to the regular maintenance and inspection requirements specified in the Agility System Operation Manual.

Four (4) additional checks and customer actions are recommended by Agility and summarized in Table 1. Additional details are provided in section 2 of this document.

Table 1 - Periodic Maintenance and Inspection of Agility Rail Mount Systems

Item to Check	Description Of The Inspection	Frequency	Customer Action If Required
Bracket Torque	Visually Check For Loose Tank Brackets	3-Months	Contact Agility for Re-Torque Procedure
Tank Spin or Movement	Without Removing The Cover, Visually Inspect For Tank Rotation And/Or Damaged Fuel And PRD Lines	Weekly	Notify Agility For Field Support
Isolator Displacement	Check for Isolators That Are Displaced Or Missing	3-Months	Notify Agility, Install Isolator Update Kit
Manual Tank Valve	Check If Valve Is Stuck In The Closed Position	If Range Is Reduced	Refer To Manufacturers TSB (Attached)

Note: Please refer to the illustrations on the following pages for details.

2 INSPECTION AND CUSTOMER ACTION DETAIL

Bracket Torque – As the fuel tank expands and contracts during fuelling and regular use, it is possible for the tank to become loose within the bracket system, which may lead to rotational movement of the tank. At the interval specified in Table 1, perform a visual inspection of the tank attachments bands to verify that the bracket systems are tight. If the bracket system has become loose, contact Agility for the re- torque procedure.



Figure 1: Bracket Torque

Tank Rotational Movement ("Spin") – In some applications rail mounted fuel tanks have evidenced some rotation or movement within the mounting system if the bracket system has become loose. A visual inspection should be completed to determine if the tank has rotated or moved by observing the positioning of the manual tank valve and the condition of the fuel lines connected to the manual tank valve, see Figure 2 for details. The tank shown in Figure 2 has rotated approximately 180 degrees from the initial installation configuration, in which the red handle is located at the uppermost, vertical-valve position. The rotation shown is considered severe. If fuel lines rotate by more than 5 degrees from vertical they may be prone to bending. In such a case Agility should be contacted for immediate repair/resolution. The tank in Figure 2 is shown with the shields removed for clarity, but the inspection should be performed without removing the shields by observing the tank valve through the valve access port as seen in Figure 3.



Figure 2: Tank Spin

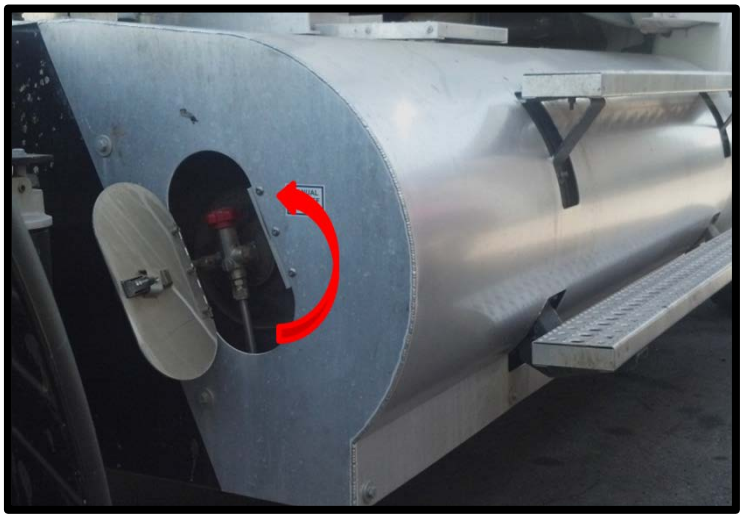


Figure 3: Valve Access Port

Isolator Displacement – If the bracket system has become loose, it is possible for the rubber isolator that is normally installed between the tank and the bracket strap to be damaged or displaced. Check for missing or damaged isolators. The isolator should be positioned directly between the attachment strap and the tank with the ears of the isolator securely fastened to the attachment strap. If isolators are missing or damaged as shown in Figure 4, contact Agility for an isolator update kit and installation instructions.



Figure 4: Isolator Displacement

Manual Tank Valve Stuck in The Closed Position - The manual tank valve used in some Agility Fuel Systems' Rail Mounted Compressed Natural Gas (CNG) applications may stick in the 'closed' position, thus preventing fuel from flowing from the affected tank to the main fuel system. In some cases, the valve may stick in the 'closed' position even though the handle can be turned to the 'open' position. However the ability of the valve to stop fuel from flowing from the tank will remain intact. If this should occur, the total available fuel will be reduced and the vehicle's effective operating range will be severely hindered. If this condition is observed, please contact Agility and refer to the valve manufacturer's technical service bulletin. The valve can be identified by its' physical appearance, as shown in Figures 5 and 6.



Figure 5: Tank Valve



Figure 6: Tank Valve in Assembly

3 TANK VALVE WARNING

CAUTION: Always follow appropriate safety precautions and assume that the system is pressurized. If the tank valve becomes stuck in the 'closed' position while the handle is turned to the 'open' position, the subsequent lack of gas flow may lead to the false assumption that the tank is depressurized when it is not. If you suspect that this issue applies to your system please contact Agility for assistance.

CAUTION: Failure to follow appropriate system pressurization checks and depressurization procedures can lead to serious injury or death.

4 AFFECTED UNITS

The inspection procedures and guidelines listed in this document apply to all rail mount systems manufactured by Agility Fuel Systems.

5 CORRECTIVE ACTION

Don't hesitate to contact Agility Fuel Systems at +1 949-236-5520 or support@agilityfs.com for all inquiries and questions regarding the information contained in this bulletin.





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LEADER OF GAS CYLINDER VALVES

TECHNICAL SERVICE BULLETIN

Date: Nov. 8th, 2012
Revision: YDTSB1108-01

Title: Stem Assembly Replacement

Potential problem: Youngdo manual CNG valves (model no. YNC-2802-1) may block the gas flow from the tank due to a possibility of seat being detached from stem under a high pressure condition.

Solution: 1. All valves should be updated with a new stem and seat assembly.

2. Please contact your system provider for coordination of repair.

If the valve is found not to allow gas flow from the tank please carefully check for the remaining pressure in the tank and make sure that you will depressurize the tank before attempting any repair.

Please refer to the manufacturer's replacement instructions.

Best Regards,

YOUNG DO IND. CO., LTD.
Kwang - Ho, Lee

Kwangho, Lee
Chairman & CEO
YOUNGDO IND. CO. LTD.