

Emer[™] PRD Replacement for ElDorado National Bus CNG Fuel Systems ENP-736 REV A June 25, 2020

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1. Introduction

Agility Fuel Solutions LLC (Agility[®]) has determined that pressure relief devices (PRDs) manufactured by Emer[™] may fail to operate as designed. This issue has been reported to the National Highway Traffic and Safety Administration (NHSTSA Recall No. 20E-019). Impacted parts include Emer[™] p/n PRD2302T-004 (Agility® p/n 10306997) used in Agility[®] compressed natural gas (CNG) fuel systems produced from October 6, 2016, to April 1, 2020.

PRDs are essential for safe vehicle operation and must be replaced if non-compliant. Agility[®] personnel have identified fuel system top level part numbers supplied for ElDorado National -California buses containing recalled Emer[™] PRDs as original equipment manufacturer (OEM) equipment.

Agility[®] created this instructional document to guide trained CNG fuel system service technicians in the removal, replacement, and reporting of affected Emer™ PRDs.

1.1. Warning Messages and Symbols used in this document

DANGER

Will cause death or severe injuries if procedures are not followed.

WARNING

Could cause death or severe injuries if procedures are not followed.

Could cause minor or moderate injuries if procedures are not followed.

NOTICE

Practices not related to physical injury. Includes procedures to prevent vehicle damage as well as hints to help an operation or procedure go smoothly.



Critical Characteristic

Procedure directly affects safety of vehicle users, people nearby and maintenance personnel, or regulatory compliance.

Manufacturing Characteristic

- A product feature solely used to improve manufacturability or maintain process control ·
- A process parameter or step that has a significant effect on achieving a Critical Characteristic or Significant Characteristic, or maintaining material identification/traceability.



2. Affected Units

Agility® top level system part numbers as follows:

240329-01 - Roofpack, Front	240329-02 - Roofpack, Rear
240329-03 - Roofpack, Front	240329-04 - Roofpack, Rear
240329-05 - Roofpack, Rear	240329-06 - Roofpack, Rear
240329-08 - Roofpack, Rear	240329-11 - Roofpack, Rear

3. Tools and Supplies Required

Fall protection equipment	Safety glasses		
Safety ladder	Defueling hose with nozzle**		
NGV1 fuel receptacle adapter*	Microfiber towels		
Swagelok [®] preswage tool	7/8-in. combination wrench		
1-in. combination wrench, short†	1 1/8-in. combination wrench, short†		
Camera / phone camera	Flashlight		
Parker [®] O-lube O-ring lube	Foam mat or tarp		
Socket wrenches	Swagelok [®] Snoop [®] leak detection solution		
Permanent marker	Agility [®] reporting form FT.0313		
Torque Seal marker	Agility go-nogo gauge, p/n TD 400394		
Heat gun	Zip lock bag (NOTE: supplied by Agility with		
Blue paint marker	PRD return)		

*may be required for defueling on some FMMs

**If not provided at CNG fueling facility

†If short wrenches are unavailable, cut the open end of wrenches down to 6-in. long.



3.1. PRD retrofit kits



Before beginning work, verify proper quantity of correct Agility® PRDs are on hand.

Agility[®] PRD p/n 10306997 and corresponding fuel system quantities are as follows:

Agility [®] fuel system p/n	PRD QTY required
240329-01	4
240329-02	4
240329-03	4
240329-04	4
240329-05	4
240329-06	4
240329-08	2
240329-11	2

4. Parts Location Identification

Refer to the appropriate fuel system illustration to locate the affected Emer[™] PRDs in fuel system plumbing. *Figures 1, 2 and 3*



Figure 1. Locations of Emer™ PRDs (1) in front pod fuel system cylinder plumbing. NOTE: Roof pack doors omitted for clarity.





Figure 3. Locations of Emer™ PRDs (1) in rear fuel system plumbing – two cylinder pods. NOTE: Cylinders not shown for clarity.



5. Corrective Action / Procedure

5.1. Preliminary Safety Preparation

1		-	2		
	1. Confirm all workers			Attach a lock and tag (not	
	present are wearing			shown) to block vehicle	
	appropriate personal			ignition.	
L	(PPE) including but not		L		
Ĭ₹	limited to eye protection,		-AH		
\geq	gloves, high visibility		N		
	2. Set parking brake and				
	secure vehicle with				
	wheel chocks (not				
	Worker safety			Prevent vehicle start during	
Η	worker salety.		ΉΥ	repair procedure.	
<			\$	· ·	
3					
	Secure a safety ladder in				
L	either of the following				
- AH					
≥	A. Inside bus natch				
	B. Rear of bus exterior				
<u> </u>	Worker acfety	4			
ΗΥ	worker safety.				
3					









5.2. Prior to defueling

1 TAHW	WARNING Verify all cylinder valves are open.
γHγ	Ensure cylinders can be properly defueled.
WHAT 2	Check fuel system high pressure gauge to verify amount of fuel in the system. <i>Refer to vehicle OEM</i> <i>operations manual.</i>
	has no fuel onboard, proceed to Step 4.
ΥНУ	
WHAT 8	If not already defueled: Defuel bus according to local facility regulations and procedure. If required: Use defuel hose kit. MARNING Only trained CNG fuel systems technicians may perform defueling.
γHγ	PRD supply tubes to be removed are pressurized "live" lines.



5.3. Remove Emer™ PRDs

















5	5. Use a short 1-in wrench	
	on Emer™ PRD (1) at flat and a short 7/8-in. wrench to loosen PRD from tee fitting (a).	
VHAT	 Use a short 1-in wrench on Emer[™] PRD (1) at flat (d) and a short 7/8- in. wrench (b) to loosen fitting nut (e) from lower PRD fitting (b). 	
>	7. Use a pair of short 7/8- in. wrenches (b) to loosen nut fitting (i) from lower tee fitting (h).	
	8. Remove PRD vent tube (4).	
	9. Remove PRD (1).	
γHγ		





WHAT 9	 Use a 1-in. wrench to remove straight fittings (c) from all Emer[™] PRDs (1). Use Swagelok Snoop® and a microfiber towel to remove previously applied Torque Seal (circles) from all fittings. NOTICE Retain straight fittings (c). Inspect each fitting O- ring (not visible) for damage. Replace O-rings as necessary. 	WHAT 2	Place all removed Emer™ PRDs (1) in zip lock bag provided with bulk retrofit kit shipment. NOTICE Place only PRDs from one vehicle in each zip lock bag. Bag must be labeled with the following: 1. Fleet 2. VIN 3. Fuel system s/n	
ΥΗΥ	PRD straight O-ring fittings will be reused.	ΥΗΥ	 Bag helps prevent PRD contamination. Agility is collecting all PRDs removed; return material authorization (RMA) instructions appear below. 	



5.4. Install replacement Emer™ PRDs





















8	Repeat Steps 1 through 7
F	until all Emer™ PRDs
¥	have been replaced.
≯	·
_	
~	
Η	
<	
-	



5.5. System Leak Check Procedure







2	Monitor fuel system high	3		
2	pressure gauge to verify when system pressure reaches 500 psi to 510 psi (3.45MPa to 3.52MPa) and stop pressurization.	5	Leak test all fuel and PRD tubes and fitting connections using Swagelok Snoop [®] leak detection solution or equivalent.	
	Refer to vehicle OEM operations manual.			AL
WHAT	 AWARNING 1. If a hissing sound is heard coming from fuel system fittings during filling, stop the fill immediately. 2. Try to isolate the sound and spray Swagelok Snoop[®] on the suspected 	WHAT		
	bubble formation.			
WHΥ	Subjects fuel system to partial operating pressure.	МΗΥ	Approved leak detection solution for visual inspection of system leaks.	



4 TAHW	 Begin at one end the of the fuel system and work methodically to spray all fuel line fittings with Swagelok[®] Snoop[®] or equivalent. Allow at least 10 minutes to elapse before checking the integrity of fitting connections. 	10 min	WHAT	If a leak is audible or icing, condensation, foam, or bubbles appear at a fitting connection the fitting connection must be inspected. WARNING Fuel system must be defueled prior to investigating any leak. Refer to OEM procedure to defuel system.	
WHΥ			WHΥ		
6	Re-tighten leaking		7	Repeat Steps 1 and 2 to	
WHAT	 1. For JIC fittings, refer to instructions for torque values. 2. For compression fittings, tighten fitting according to Appendix A. 		WHAT	repressunze the system.	
WHΥ	System specification		МΗΥ		



WHAT [©]	Spray leaking fitting again with Swagelok [®] Snoop [®] or equivalent and allow at least 10 minutes to elapse before checking for bubble formation.	10 min	wHAT 6	<i>If leaking fitting is fixed,</i> proceed to test any remaining fitting connections.	
МΗΥ		·····································	МΗУ		
WHAT 0	If leak is not fixed, the fuel system must be defueled to replace the fitting. Perform OEM defuel procedure.		TAHW 1	Inspect tubing, fittings, ferrules, and nuts at the site of the leak for perforations, cracks, assembly defects, or other damage.	
VHΥ			WHΥ		



12	Replace any related components at the fitting	_	13	Repressurize fuel system by repeating Step 1 and Step 2.	
	junction as required.				
WHAT	1. For JIC fittings, refer to p/n specific tightening		WHAT		
	2. For compression fittings, tighten fitting according to Appendix A.				
γHγ			WHΥ		
14	C		15	Turn fuel system 1/4-turn	
WHAT	Spray new fitting junction with Swagelok [®] Snoop [®] or equivalent to retest for leaks.		WHAT	manual shut off valve counter- clockwise to the OPEN position.	
WHΥ			WHΥ	Allow fuel into system.	



16		17	c	
WHAT	Repeat pressure test procedure stopping the fill when fuel system pressure reaches 2000 psi to 2100 psi (13.79MPa to 14.48MPa).	WHAT	Repeat pressure test procedure stopping the fill when fuel system pressure reaches 3600 psi to 3700 psi (24.8MPa to 25.5MPa) and repeat leak checking all connections until the entire fuel system is confirmed leak free.	
МΗΥ	Subjects fuel system to partial operating pressure.	WHΥ	Subjects fuel system to full operating pressure.	
18	С	19	Replace dust cap on fuel fill	
WHAT	If fuel system is leak free or if defueling is required, close flow valve on CNG dispenser nozzle (not shown) and carefully disconnect fill nozzle (not shown) from fuel fill receptacle.	WHAT	receptacle.	
WHΥ		WHΥ	Vehicle will not start if dust cap is not in place.	



20 TAHW	If not open, turn fuel system 1/4-turn manual shut off valve counter- clockwise to the OPEN position. NOTICE Refer to vehicle OEM operations manual.		21	Clean Swagelok [®] Snoop [®] or equivalent from the fuel system.	
МΗΥ	Allow gas to flow throughout fuel system.		МΗΥ	Customer satisfaction.	
22 TAHW	When the pressure test is completed successfully, use form FT.0313 (c) to record the result and the date on which the fuel system passed the 3600 psi test.		23	Apply Torque Seal (a) to all fitting junctions (b).	b a
МΗΥ	Verify safe and proper fuel system pressure specification.	Note: Logical (a), core for concentrative concentration for times) Image: Concentration (a), core for concentrative concentration (b), core for concentrative concente concentrative concentrative co		System quality specification.	











5.6. Reporting and Return Procedure





2	Repeat Section 5.		3	c	
	Corrective Action /				
WHAT	Procedure for all vehicles subject to the Emer™ PRD recall on hand until all repairs are complete.	WHAT	WHAT	 1. Pack all removed PRDs (still bagged by VIN), in one box. If the quantity of PRDs is too large for a single box, use additional boxes but ship them all using the same RMA. <i>If possible:</i> reuse the box in which the replacement PRDs were shipped 	
				2. Apply RMA label obtained from Agility [®] to the box.	
				3. Use a permanent marker to write RMA number on exterior of each shipping box.	
ΥНУ			WHΥ	Required for repair return tracking and, if applicable, installer reimbursement.	



Appendix A. WI.0441 Tightening of tube fittings*

Tightening of Tub Scope: Tightening of connectors and por Note: "Substitute fr			n gs Swag ors. .0198	elok fittings, port ″	Standard Work Instruction
THAT 1	Install swaged tube into fitting. Verify that both nut and fitting have same manufacturer markings.		WHAT N	Tighten nut (by hand or with wrench) until top of nut is aligned with the bottom of the DMT mark.	C
ΥΗΥ	Swagelok/Parker fittings and nuts are NOT interchangeable.	and we have	γHγ	This line shows the nut's correct starting location prior to tightening.	
WHAT ⁶⁰	Mark across nut and fitting with blue paint pen		4 WHAT 4	Put a "backing wrench" on the adjacent fitting. Note: some products require holding a different component - this will be noted in the product-specific work instructions.	M
WΗΥ	The marks are needed for step 5 and inspection.		WHΥ	The backing wrench prevents the fitting from rotating. This ensures that the nut is NOT under-tightened.	
WHAT G	Using the blue marks as a visual reference, turn nut between 1/2 and 5/8 of a turn		WHAT 0	Check gap between nut and fitting with the GO-NOGO gap gage. If the GO section fits AND the NOGO section does not fit, the part is good. If the NO-GO section fits, then tighten the fitting and recheck. If the GO section does not fit, the tube must be removed and scrapped.	
МНУ	If the nut is turned less than 1/2 turn, it may pass a leak test, but leak later in the field.	Sta 1/2	WHΥ	The gap indicates how tightly the ferrules are seated against the fitting. Too much gap will allow a leak. Not enough gap indicates too much swaging or tightening.	
WI.	WI.0441, rev.1.0 Printed copy is uncontrolled Agility Fuel Solutions proprietary. Page 1 of 2				

*Swagelok[®] compression fittings should not be disturbed in performing the PRD replacement procedure; WI.0441 tightening instructions are provided if a leak is discovered in another part of the fuel system.



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	Tightening of Tube Fittings Scope: Tightening of 1/2" Swagelok fittings, port connectors and port adaptors. Note: "Substitute from WI.0198"	Standard Work Instruction				
7 Add torque seal between nut and fitting (only when specifically required by customer). EVEN	× MHAT ∞					
HM	HW HW					
Equipment List:						
Description	Manufacturer	Manufacturer's Part Number				
1/4" gap inspection gage	Agility Fuel Solutions	TBD				
3/8" gap inspection gage	Agility Fuel Solutions	TBD				
1/2" gap inspection gage	Agility Fuel Solutions	TD 400394				
Blue paint pen	Dykem	84001				
Ultra-fine tip permanent black marker	Sharpie	37001				
Yellow torque seal	Dykem	83317				
Open-ended wrenches	Any					
Vise	Any					
Job Breakdown:						

Important Steps	Key Points	Reasons Why			
1. Tube into fitting	1. Same manufacturers	Swagelok and Parker fittings are not interchangeable.			
	2. Tube bottomed out in fitting	d out in fitting The tube must be fully inserted into the fitting.			
	 DMT line fully showing Provides correct starting point. 				
Mark parts	1. Across nut and fitting	Provides visual aid to start tightening.			
3. Turn nut 2. Use backing wrench		Holds everything in place to prevent leaks.	Holds everything in place to prevent leaks.		
	3. 1/2 turn	Incorrect turns could cause a leak.			
	4. Marks on opposite sides	Provides visual aid to finish tightening.			
	5. Verify gap	Verify tightening is complete, but not too much.			
4. Torque seal	1. Across nut and fitting	Shows if fitting was loosened.			
WI.0441, rev.1.0 Printed copy is uncontrolled Agility Fuel Solutions proprietary. Page 2					



6. Warranty Information

This procedure is covered under warranty. Standard repair time (SRT) is 6.0 hours. Please refer to Warranty Manual, ENP-067, for warranty reimbursement procedures.

For parts and support, contact Agility Fuel Solutions Customer Care:

+1 949 267 7745

+1 855 500 2445 toll free

parts@agilityfs.com

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Revision	Description	Author	Approved By	Date
	Initial Release	C. Grasso	CCG Team	05/28/2020
A	REVISED: PRD removal technique; ADDED: Note to replace ElDorado vent cap.	C.Grasso	CCG Team	06/25/2020