U.S. Department of Transportation

National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION

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Investigation: PE 12-030
Date Opened: 10/11/2012 **Date Closed:** 05/22/2013
Investigator: Nate Seymour **Reviewer:** Bruce York-B
Approver: Frank Borris
Subject: Fuel Pressure Regulator Leak

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: PRESTOLITE PERFORMANCE
Products: Mr. Gasket Fuel Regulator Model 9710
Population: 201,823

Problem Description: The regulator may leak fuel, increasing the risk of a vehicle fire, engine stall and environmental hazard.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	3	20	20**
Crashes/Fires:	0	4	4
Injury Incidents:	0	0	0
Fatality Incidents:	0	0	0

** Total eliminates duplicates received by ODI and manufacturer.

ACTION / SUMMARY INFORMATION

Action: This PE is closed.

Summary:

ODI directed the Vehicle Research and Test Center (VRTC) to purchase and test 30 subject regulators. The regulators were marked 2011 and 2012 and were purchased from three separate sources.

Externally, the regulators looked similar. Internally, there were distinct differences. The 2011 regulators had a burr on the upper gasket seat edge and a casting flaw that formed a sharp edge on the lower seat. Both of these cut into the diaphragm gasket. The plating on the inside surface had a dull finish with loose, flaky particles that stuck to the diaphragm when it was removed. The 2012 regulators were the same design but the plating was of a higher quality. There were no loose particles and the seating surface was smooth.

VRTC found about half of the 30 units had at least one loose housing screw when received. The first 10 regulators were tested with water at the recommended maximum inlet pressure of 8 psig. Pressure was gradually increased to 100 psig. This resulted in two regulators exhibiting a slow drip at the flanges; one at 70 psi and another at 76 psi. To test the effect of loose screws on a regulator, screws were slowly loosened with the regulator at 80 psig. The screws were completely removed and no water leaked. The modulating valve had closed from the inlet pressure and no water could flow to the outlet side. Additional tests with loose screws indicated the modulating valve would close at about 40 psig inlet pressure with the adjusting knob set at 5.5, and close at about 20 psig with the knob at 0.5.

After finding that higher pressures reduced the chance of major leaks, VRTC changed the test strategy to use lower pressures. A diaphragm was punctured in one regulator. This resulted in water flowing out below the adjusting knob. In two consumer videos posted on the internet, fuel sprayed out forcefully between the flanges. This meant the diaphragm was intact and fuel was leaking below the diaphragm gasket and between the flanges. Tests were conducted with grooves cut in the lower side of the gasket. This produced a slow drip. The modulating valve reduced flow and pressure too much to produce a spray pattern. VRTC tested regulators with a foreign object on the

modulating valve O-ring. This didn't open the valve enough to produce the spray. The modulating valve had to fail fully open.

VRTC tested a regulator with the retaining ring for the modulating valve pulled loose. With 15 psig inlet pressure and loose screws at the 6 and 12 o'clock positions, it produced the spray pattern seen in the consumer videos. VRTC concluded that a loose retaining ring was the most likely failure mode for those two failures. The retaining ring is a press-fit assembly. It fits in an unmachined cylinder in the cast-aluminum regulator body. The regulator was plated and the cylinder walls were coated in the plating process, which can leave an irregular surface thickness. It is not a precision manufacturing process and some retaining rings may be pushed out if inlet pressures exceed the manufacturer's maximum recommendation.

Prestolite reported low failure rates and claimed there was no reason for concern. ODI doesn't agree that there is no reason for concern as Prestolite did receive four reports where the owner's concern was fire related. Prestolite doesn't maintain ownership records or have a means to track production. Prestolite did not seek further event details and no parts were available for ODI to inspect. It is unclear whether the claims reported an actual fire or a potential fire.

Unable to contact the owners or inspect the failed parts, ODI must rely on available data. No vehicle fires have been reported with eight years of exposure. Prestolite reported a claim rate of 0.008%. And the subject components do not appear to leak when exposed to foreseeable usage. Therefore this Preliminary Evaluation is closed. The closing of this investigation is not a determination that no defect exists.