



## Memorandum For Record

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**Date: April 11, 2022**  
**NTSB Accident Number: ERA20LA202**

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The Bendix Servo Fuel Injector (Fuel Injector), Model – RSA-5AD1, Parts List 2524213-10, Serial Number (S/N) 75083, was examined with NTSB oversight at a facility that designs, manufactures, and overhauls fuel systems for general aviation customers worldwide.

Visual inspection of the fuel injector revealed dried salt on the throttle plate. It was also noted that the nylon throttle stop was missing. The helical extension spring P/N 2525165 was not installed. The thumb wheel was slightly towards the rich side but in-range; the cotter pins that secured both clevises were in-place and secured. No aluminum seal was noted at the hex plug P/N 1383493 or at the regulator cover P/N 2523501, but the hex plug and cover were safety wired. The fuel strainer assembly was removed and it was oxidized and contained material that appeared to be sand. Sand was also noted in the plug of the fuel inlet fitting. The venturi assembly was removed to check for contamination and oil admixed with blue dye was found when the venturi was partially removed.

Close inspection of the venturi revealed no contamination (oil admixed with blue dye contamination) on the low or high pressure sides of the venturi. The venturi was re-installed for operational testing, and the Fuel Servo was placed on the test bench for operational testing. The exiting fluid was directed to a tray lined with clean white paper to avoid contamination of the test bench. As first flowed the test fluid was relatively clean, but there was some contaminant consistent with sand. The debris was placed in a clean small zip top type bag. The technician indicated that although the unit was a -10, the latest flow sheet was for a -11 unit.<sup>1</sup> He explained that there was no difference related to the test points or flows, rather, it was due to replacement of the brass mixture valve to an aluminum valve. The unit was flowed and air was removed from it.

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<sup>1</sup> Form 15-381G used for testing the Fuel Servo.

At Test Point 4 (wide open throttle, full rich mixture and metering suction of 26.15 inches of water, the unit flowed 81 pounds-per-hour (PPH), while the specification at that test point was 117 to 132.8 PPH. The technician reported that based on his experience a contaminated idle valve would cause the high-end flow to decrease. The idle valve was removed for inspection, and a large piece of black colored substance was noted between the mixture valve and idle valve (figure 1). The debris was removed but during the inspection of it, it broke into numerous pieces. The idle valve was then air checked on a test bench and tested 695 cc per minute (specification is 680 to 690 cc per minute). The idle valve was re-installed after the air check and at Test Point 4, the fuel servo flowed 117.5 PPH (specification is 117 to 132.8 PPH). The regulator travel check was good, but the unit failed the pressure sensitivity and hysteresis checks. During the hysteresis check the regulator was hanging up.

Because the nylon stop of the throttle stop was not in-place, the throttle plate went fully closed. The technician noted that was the likely reason why the engine quit at idle power. The throttle plate was shimmed open to specification 0.006 inch to simulate proper adjustment of the throttle plate. At that setting the unit flowed 8 PPH (specification is 6 to 7 PPH). With the throttle plate shimmed open 0.006 inch, there was a gap greater than 0.006 inch between the adjusting screw and the metal stop, indicating that maintenance had not made any adjustment for the missing nylon stop.

At Test Point 1 (No airflow, throttle wide open, and mixture rich) the unit flowed 29 PPH (specification was 22.0 to 28.0 PPH). The technician reported the possible imbalance of fuel flow at the low and high ends was due to internal contamination. The unit was removed from the test bench and the regulator was removed. It was noted that the hex plug was marked with "G" indicating compliance with a Service Bulletin. Salt and corrosion was noted on the low pressure side of the air diaphragm. The technician reported he had seen the same condition before on aircraft operated in saltwater environments. The nut was installed on the fuel diaphragm stem (it did not come loose), Some corrosion was noted on the fuel and air diaphragms. Corrosion was noted on the high pressure or impact side of the air diaphragm. The fuel diaphragm stem was intact. Sand was noted in the fuel diaphragm in the area of the unmetered fuel side. The fuel diaphragm was intact. Some sand was also noted on the metered side of the fuel diaphragm that feeds the manifold valve.

The bore path of the low pressure air to the regulator was nearly completely blocked. The high and low pressure sides of the regulator and diaphragms were contaminated throughout. The mixture control lever, and mixture control valve were removed and slight contamination was noted on the spring of the mixture control valve. No oxidation was noted to the mixture or idle valves. An oxidation pit was noted on the mixture housing area.

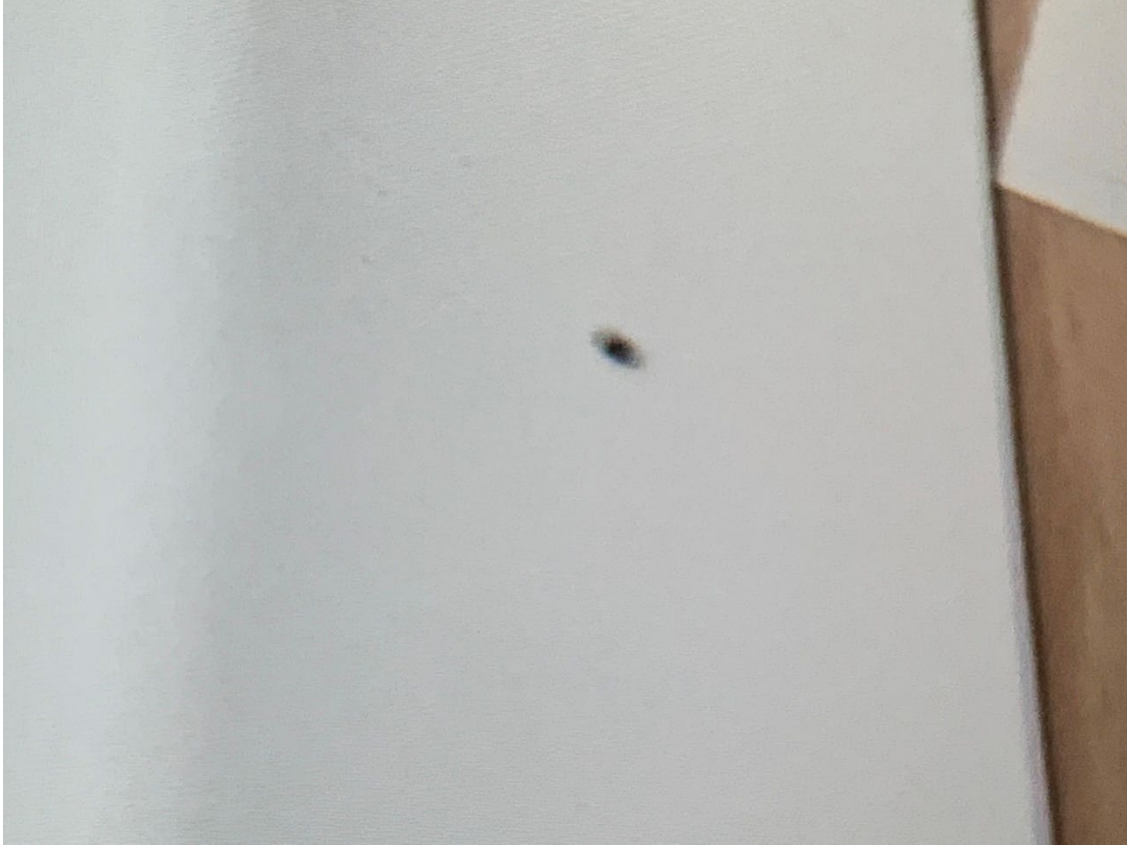


Figure 1: NTSB out of Focus Picture of Debris Found Between Mixture and Idle Valves. A Better Picture was not Available.