

Test – Effects of disconnecting mixture control from float chamber vent

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Test Aircraft: 2010 Aerotrek A220, Total Time (engine and airframe)1550.4 hours.
Engine - Rotax 912 ULS with Aeropro airbox and Aircraft Service mixture control.
Engine Instrument – Grand Rapids EIS with 4 EGT readout.

Conditions: Temperature: 81°F, Dew Point: 59°F, Pressure: 29.80 inHg, Altitude: sea level.

Test required: Question – What would be the effect of a disconnected mixture control hose from #1-3 carburetor float chamber vent during a full power climb with the mixture control knob turned one full turn towards lean?

Preparation: The mixture control hose was disconnected from #1-3 carburetor float bowl vent. The aircraft tail was tied to an aircraft tie down hard point. The engine was started and warmed up to the 120°F take off temperature.

Test: The mixture control turned to lean 1 turn and the throttle advanced to full throttle position. The aircraft tail lifted a little as the tied down rope tautened, probably representing the full power climb attitude of the average Rotax 912 powered aircraft. The RPM settled at 4950, the engine felt and sounded normal, the cylinder head temperature (#3 cylinder) remained in the green. The EGT readings were: 1)1256 2)1331 3)1189 4)1260 (max limit 1616°F). After 2 minutes where the EGTs remained within a couple of degrees of these figures, the mixture control was turned several turns to full lean and the EGT readings settled at 1)1258 2)1337 3)1191 4)1259. The mixture control was taken to full rich and back to full lean again, during which the EGT readings moved around a little. The engine was run for a few minutes at full power during the test, where the only control changes were to the mixture. During this entire time the hottest EGT seen was to #2 cylinder at 1411°F, the RPM remained steady at 4950. At the end of the test the engine was brought back to idle and allowed to run for around 30 seconds, a hot mag check carried out and the engine shut down.

Photos & Video:

- 1) The disconnected mixture control hose
- 2) The aircraft tied down
- 3) EIS showing RPM, temps, pressures at full throttle, 1 turn mixture, hottest EGT 1245°F
- 4) Video started after the initial test at full power with varying mixture.

Notes: On this particular aircraft I would expect to see 5150 RPM during the initial climb full rich mixture, rising to 5210 with 1 full turn of normal mixture control (not normal practice), and a hottest EGT of 1450°F. The effect of the aircraft being at a standstill reduced the RPM to 4950.

Conclusion: There is negligible effect of running the engine through a simulated 5-minute climb with the mixture control hose disconnected from the #1-3 carburetor vent bowl. Operating the mixture control knob through its full travel has an insignificant effect on operation of the engine, which felt and sounded normal throughout the test.

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