



CASE STUDY

Rapid Identification of Fuel Nozzle Leak on CFM International LEAP Using the UL101 Aviation Troubleshooter (p/n B00033; Boeing Tool Tag SPL-1473)

Scenario

A 737 MAX aircraft returned a recurring fuel-nozzle leak fault code (80-44-005). This code indicates the FADEC does not detect adequate “trapped” fuel pressure within the manifold during engine start, suggesting that one or more fuel nozzles are leaking.



Historically, technicians diagnosed this fault by pressurizing each of the three manifolds on the engine using a MIL-BAR pump, performing a pressure decay test to identify the leaking manifold, then using a borescope inspection to visually identify the dripping nozzle. This process is labor-intensive, messy, and often requires extended troubleshooting time.

Some operators avoid the time investment entirely—replacing all three manifolds and the corresponding 18 fuel nozzles, which is extremely expensive and often unnecessary. A faster, cleaner, more definitive method can now be used: by pressurizing each fuel manifold with nitrogen and using the UL101 ultrasonic listening device to quickly listen to each nozzle, the technician can pinpoint the exact leaking nozzle.

Method

- (1) Pressurize each of the primary, secondary, and primary-enriched fuel manifolds to 40–50 psi with nitrogen.
- (2) Shut off the supply valve and monitor the manifold pressure gauge. Stable pressure indicates no leakage in the manifold under test; pressure decay indicates at least one leaking fuel nozzle.
- (3) If/when a manifold indicates pressure decay, use the a UL101 with a contact probe to listen to each of the nozzles on the manifold.
- (4) The leaking nozzle will produce a distinct ultrasonic signature with a higher amplitude than any adjacent nozzles on the same manifold.
- (5) Replace only the suspect nozzle.
- (6) To confirm repairs, first listen to all nozzles again to confirm absence of high amplitude ultrasound, then re-pressurize the manifold to confirm no further pressure decay.

Findings

The UL101 enabled techs to locate the leaking fuel nozzle in under 60 minutes. No borescope was required, eliminating contamination risk and significantly reducing workload. **Rather than replacing all 18 nozzles (or all six nozzles on a single manifold), only the failing nozzle was replaced, preventing unnecessary parts cost and labor.** The process required no special certification; only attention to the differing amplitude of the ultrasonic signatures.

The information in this case use was supplied by Ahmad Hassan and Dan Amos of Southwest Airlines. CTRL thanks Southwest Airlines for partnering with us to promote the benefits of ultrasound detection technology to the aircraft maintenance community. To see (and hear) the UL101 in action on the application, please visit <https://youtu.be/keeHwCcht-A> .



INDUSTRY

Commercial Aviation



CTRL EQUIPMENT

UL101 Aviation Troubleshooter (p/n B00033)



PART NUMBER

CTRL Part No. B00033 / Boeing Tool Tag SPL-1473



Barfield, Inc. 4101 NW 29th Street, Miami, FL33142
www.barfieldinc.com | gsesales@barfieldinc.com | +1 (305) 894.5400