Service Letter

SL-MD02-007

1 Technical Details

1.A Engines affected

All

1.B Subject

Diesel Bug prevention

1.C Reason

Diesel bug is a well-known hazard in aviation wherever diesel sits in a tank for extended periods. Under certain circumstances, Diesel bug (also Diesel Plague) can develop in the fuel system of the TJ42 jet engine and compromise the engine performance

1.D Information

What Is It?
Diesel bug refers to the growth of microorganisms (bacteria, fungi, and yeast) inside diesel fuel tanks and fuel systems. Diesel fuel itself is not sterile. It contains trace amounts of water, either dissolved or as free water settling at the bottom of the tank. This water-fuel interface is where microorganisms thrive. The microbes don't actually "eat" the diesel — they live at the boundary between the fuel and the water layer, using hydrocarbons from the diesel as a carbon source and the water for metabolism. Over time, they form a dark, slimy biomass often described as a black or brown sludge.

How and Where Does It Form?
Diesel bug needs three things: **fuel, water, and warmth.**

- **Water ingress** is the primary enabler — condensation inside tanks (especially from temperature cycling), rain contamination, poor seals, or water already present in the fuel supply chain
- **Stagnant conditions** — fuel sitting unused for weeks or months gives colonies time to establish
- **Moderate temperatures** — roughly 10–40 °C is the sweet spot for microbial growth
- **Modern low-sulphur diesel** (ULSD) is particularly susceptible because sulphur previously acted as a natural biocide
- **Biodiesel blends** (FAME content) are even more hygroscopic, absorbing more water from the atmosphere and providing additional nutrients for microbes
- **Common locations**: the bottom of storage tanks, the water-fuel interface layer, fuel lines, and filter housings

Effects on the Fuel System

The main threat for the jet system is rapid clogging of fuel filters from biomass and sludge which can subsequently result in failure to start or power loss.
Several other long-term effects can appear:

Component	Effect
Metal fuel tanks	Internal corrosion as microbial metabolic byproducts (acids, H_2S) attack metal walls
Fuel lines	Biofilm buildup restricts flow; particles break off and travel downstream
Injectors	Deposits and particulates cause wear, sticking, and poor atomisation
Fuel pumps	Abrasive particles and corrosive acids accelerate wear
Sensors	Contamination can affect fuel level and quality sensors

Effects on the Engine

- **Power loss and rough running** from restricted or inconsistent fuel delivery
- **Hard starting or failure to start** when filters are fully blocked
- **Increased fuel consumption** due to poor combustion from degraded fuel quality
- **Injector damage** from abrasive contamination or deposits, leading to poor spray patterns
- **Engine stalling**
- **Long-term wear** on fuel pump and injection system components

Prevention and treatment

- Whenever the aircraft shall be stowed for a longer period (6 months or longer), it is recommended to completely de-fuel and drain the fuel to leave no diesel in the system.
- If the aircraft had been stored for a longer period, always check fuel filters for contamination
- Keep tanks full where possible (not in long term storage) to reduce the air/condensation surface
- Do the fuel related inspections as stated in the Operation and Maintenance Manual and the respective Aircraft Flight Manual Supplement and check for water contamination.
- Once contamination is established, tank cleaning is required.

1.E References

MD02-OMM-70-001 – MD-TJ42 Operation and Maintenance Manual

1.F Appendices

none