



SERVICE LETTER

DATE: 01 AUGUST 1979

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OPERATION AND MAINTENANCE GUIDELINES FOR MODEL 250 SERIES ENGINE FUEL SYSTEM

TO: All owners and operators of Hughes Helicopters

MODELS AFFECTED:

All 500 Model 369H Series Helicopters

REFERENCE:

Detroit Diesel Allison Commercial Service Letter CSL-1080, dated 11 May 1979

500 Series - Basic HMI, Issued 1 October 1972; Revision No. 7, 15 December 1976

The attached Allison Commercial Service Letter CSL-1080 lists basic guidelines for maintenance and operation of the Model 250 Series engine fuel system.

It is recommended that these guidelines be used by owners and operators of Hughes Model 500 helicopters to help preclude engine fuel problems and ensure reliable fuel system service.

A handwritten signature in black ink that reads 'Edward Koch'.

Edward Koch, Manager,
Customer Service Department
Hughes Helicopters, Inc.
Product Support Department



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Detroit Diesel Allison Division of General Motors Corporation

Indianapolis, Indiana 46206

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May 11, 1979
FAA-DER Approved

SUBJECT: Model 250 Fuel System - Operational and Maintenance Guidelines

The purpose of this CSL is to provide a summary of operational and maintenance guidelines for the Model 250 engine fuel system. It is advisable that both pilots and maintenance personnel utilize this information to best prevent problems such as flameouts and power losses from occurring and to provide reliable fuel system service. Some of the information in this CSL is NEW. Please read it completely.

1. The engine demands clean, dry fuel. Refer to FAA Advisory Circular No. 00-34, "Aircraft Ground Handling and Servicing", paragraph 8, "Aircraft Fueling" for important tips on fuel handling.
2. The aircraft fuel tanks and related system must be clean. Maintain and clean the fuel tanks and lines according to the instructions in the airframe maintenance manual. Drain the fuel tank sump daily in accordance with the aircraft flight manual.
3. All fuel lines must be properly torqued. It is possible to have a leak in a fuel line, anywhere from the tank to the outlet of the engine fuel nozzle, which will "suck" air but won't leak fuel. A slug of air to the fuel nozzle may cause a flameout.
4. If the aircraft flight manual requires flight with the boost pumps "on", then they must be "on". This will not only ensure a proper head of pressure to the engine pump, but will reduce the probability of "sucking" air thru a tiny fuel line leak.
5. The uncovering of a fuel boost pump or the fuel inlet fitting in the tank, due to a low fuel level and/or flight maneuver, can result in a slug of air entering the engine fuel system.

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6. All pneumatic lines, double check valves, and accumulators must be properly torqued with special care to avoid any twists that may develop cracks later on. A leak in the pneumatic section can cause erratic operation, power loss, or a flameout.
7. If the aircraft has an engine fuel filter differential pressure warning system, it must be checked periodically for proper operation. Depressing the caution light in the cockpit in most installations only confirms that the light bulb is functional, hence, a functional check of the total system is necessary. Refer to the aircraft maintenance manual for instructions.
8. The engine fuel pump filter (low pressure) is not cleanable. Current instructions in the engine maintenance manual require that this filter be replaced only when the engine fuel filter differential pressure warning system indicates filter contamination. If the aircraft is not equipped with a fuel filter differential pressure warning system the filter must be replaced every 300 hours unless operating experience demonstrates that lower time increments are advisable. **DDA NOW RECOMMENDS THAT THE LOW PRESSURE FUEL FILTER BE REPLACED EVERY 300 HOURS** (regardless of whether the aircraft has a differential pressure warning system) or whenever the warning system is activated, whichever comes first.

CAUTION: Some operators have inadvertently installed the old ten micron low pressure fuel filter (P/N AN6235-3A) in place of the recommended five micron filter (P/N 6895177). This is a critical item, especially for those engines utilizing CECO fuel systems. Please inspect your engine and spare stock to ensure the correct filter is installed. The ten micron filter is identifiable by its brown paper element, whereas the five micron element contains a wire mesh surrounding a white element.

9. The engine fuel pump will not pump fuel with a sheared spline. Certain Sundstrand pumps require periodic backlash checks or visual inspections for spline wear. Refer to the engine operation and maintenance manual for instructions.
10. If the low pressure fuel filter has bypassed, the CECO control and governor should be flushed per DDA CSL-1034 and CSL-1035.

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11. DDA CEB-1095 recommends installation of a high pressure fuel filter assembly if the engine is equipped with a CECO system. If you have the CECO system and don't have the high pressure fuel filter, please get one.
12. The high pressure fuel filter has done a tremendous job in reducing the number of incidents resulting from contaminated CECO controls and governors. Now that the filter has been in service for several years, it is evident that additional maintenance is necessary. DDA NOW RECOMMENDS THAT THE HIGH PRESSURE FUEL FILTER ELEMENT BE REPLACED WITH A NEW OR THOROUGHLY CLEAN ELEMENT AND THAT THE BY-PASS VALVE BE INSPECTED FOR WEAR EVERY 100 HOURS. See the 14 November 1978 revision to the C20 Operation and Maintenance Manual for by-pass valve assembly wear inspection.
13. Recent information provided to DDA revealed that ultrasonic cleaning of high pressure filter may not provide the best removal of imbedded contaminates. Therefore, the following procedure is recommended as a primary and/or additional method.
 - a. Fill the inside of the filter with a clean liquid bio-degradable, undiluted, dishwashing detergent, such as Joy, Ivory, Palmolive, Dove, Dawn, Dermassage, Amway L. O. C., etc. Immerse into a container of undiluted detergent.
 - b. Let the detergent soak for a minimum of 5 minutes. Then remove from container.
 - c. Apply filtered shop air to the inside of the filter thru the opening in the end cap, forcing detergent out via convolution/pleats. Repeat application of detergent and water flush.
 - d. Run hot clean water into the inside of the filter thru the hole, until the water runs clear of soap bubbles and contaminates. The more effort expended will result in a cleaner filter element.
 - e. Remove excess moisture.

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14. Quick check for Filter Element cleanliness.
CAUTION: Be aware of the potential fire hazard when using the below procedure.
- a. Fill a flat bottom container with fuel or Stoddard solvent, at approximately room temperature, to $1 \frac{3}{4} \pm \frac{1}{16}$ inch deep. This is a level which will cover the convolutions/pleats; but does not reach the center opening with the element standing upright-open end on top.
 - b. Thoroughly wet the filter element media with fuel or Stoddard solvent to reduce surface tension. This can be accomplished by forcing the liquid through the element utilizing a $\frac{3}{8}$ inch outside diameter tube in the element opening and forcing fuel thru.

Pour out any liquid from the inside and immerse the element in the above container.

Determine the time it takes for the fluid to rise inside the element to the level of the surrounding liquid.

If cleaned sufficiently, the element should fill within 5 seconds.

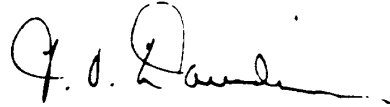
Repeat cleaning procedures if necessary. If unable to meet the 5 second limit, replace the element with one that meets the 5 second limit.

15. The pneumatic (air) circuit of the Bendix System will accumulate dirt during normal operation. The Troubleshooting section of the C20 Operation and Maintenance Manual currently lists troubles that can be corrected by cleaning the Bendix air circuit. The manual also provides instructions for proper cleaning. **DDA NOW RECOMMENDS THAT THE BENDIX AIR CIRCUITS BE CLEANED EVERY 300 HOURS.**

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16. The DDA Operation and Maintenance Manual recommends a postflight deceleration check of the Bendix system. DDA CSL-1047 recommends a daily deceleration check for the CECO system. These deceleration checks are a good method to uncover impending problems. **DDA RECOMMENDS THAT A POSTFLIGHT DECELERATION CHECK BE CONDUCTED ON BOTH THE BENDIX AND CECO SYSTEMS.**
17. Rigging to the fuel control and governor is very important. Don't overlook the aircraft and engine manual requirements. Wear in the linkages can sneak up on you and cause a flameout.
18. Go over the above list again. If there is something you don't understand, please ask questions. The reliable operation of your engine is your responsibility.



L. O. Davidson
Service Manager
Gas Turbine Engines

NJB/bw