

[4910-13-U]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39 [65 FR 26121 5/5/2000]**

**[Docket No. 99-NE-46-AD; Amendment 39-11714; AD 2000-09-05]**

**RIN 2120-AA64**

**Airworthiness Directives; Allison Engine Company AE 3007 Series Turbofan Engines**

**AGENCY:** Federal Aviation Administration, DOT.

**ACTION:** Final rule.

**SUMMARY:** This amendment adopts a new airworthiness directive (AD) that is applicable to certain Allison Engine Company AE 3007 series turbofan engines. This AD would require removal of certain cone shafts from service before exceeding new cyclic life limits and replacement with serviceable parts. This amendment is prompted by additional testing and low cycle fatigue (LCF) life analysis that substantiate lower cyclic lives than originally determined. The actions specified by this AD are intended to prevent LCF failure of cone shafts, which could result in an uncontained engine failure and damage to the aircraft.

**DATES:** Effective date July 5, 2000.

**ADDRESSES:** This information may be examined at the Federal Aviation Administration (FAA), New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW, suite 700, Washington, DC.

**FOR FURTHER INFORMATION CONTACT:** John Tallarovic, Aerospace Engineer, Chicago Aircraft Certification Office, FAA, Small Airplane Directorate, 2300 East Devon Avenue, Des Plaines, IL 60018; telephone (847) 294-8180, fax (847) 294-7834.

**SUPPLEMENTARY INFORMATION:** A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include an airworthiness directive (AD) that is applicable to Allison Engine Company AE 3007A, AE 3007A1, AE 3007A1/1, AE 3007A1/2, AE 3007A1/3, AE 3007A1P, and AE 3007C turbofan engines was published in the **Federal Register** on October 12, 1999 (64 FR 55196). That action proposed to require the removal of certain cone shafts, P/Ns 23050728 and 23070729, from service prior to the accumulation of new cyclic life limits, depending on engine model.

**Comments Received**

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

## **Increase Cone Shaft Life Limits for AE 3007A and AE 3007C Engines**

The manufacturer requests that the FAA increase the cone shaft life limits for the AE 3007A and AE 3007C engines from 7,500 cycles each to 9,500 cycles and 14,500 cycles respectively. At the time the NPRM was issued, the cone shaft low cycle fatigue analysis for these engines was not available, and the FAA proposed lower, more conservative shaft life limits. The analysis has since been completed and the manufacturer requests that the life limits be increased.

The FAA agrees. The methodology used to determine the lives for these engine models has been approved by the FAA and is consistent with that used to determine critical part lives for other engines already in service (AE 3007A1, AE 3007A1/1, and AE 3007A1/2). Therefore, the cone shaft life limits for the AE 3007A and AE3007C engines should be increased to 9,500 cycles for the AE 3007A engine and to 14,500 cycles for the AE 3007C engine. Accordingly, new paragraphs (a), (b), and (c) in the final rule are substituted for proposed paragraph (a), and the proposed paragraphs (b) through (g) become paragraphs (d) through (i) in the final rule.

## **Increase Cone Shaft Life Limits for AE 3007A1/3 and AE 3007A1P Engines**

One commenter requests that the FAA increase the cone shaft life limits for the AE 3007A1/3 and AE 3007A1P engines from 3,500 cycles and 2,400 cycles, respectively, to 7,500 cycles each. The commenter suggests that the cone shaft life of the AE 3007A1/3 and AE 3007A1P engines should be increased to match those of the AE 3007A1, AE 3007A1/1, and AE 3007A1/2 engines for two reasons:

- The turbomachinery hardware is the same for all the engine models referenced above. The primary difference between the models is the engine control software.
- A significant operational aspect of this group of engines is the ability to easily maintain fleet readiness by changing the engine model with an engine control software change.

The FAA does not agree. When new data from tests or analysis suggests that component low cycle fatigue lives need to be reduced, different approaches may be taken, depending on the circumstances. If there are significant numbers of affected engines in the field (e.g. AE 3007A, AE 3007A1, AE 3007A1/1, AE 3007A1/2, and AE 3007C models), a life management program is developed that allows the users some operational flexibility while maintaining an acceptable level of risk for the fleet. If there is a very small number of affected engines in the field, the FAA prefers a life management program structured on the lifing methodology intended for original certification of the engine design. For the AE 3007A1/3 and AE 3007A1P engines, therefore, the FAA has determined to use the original FAA approved lifing methodology.

## **Increase Cone Shaft Life Limits for AE 3007A3 Engines**

One commenter requests that the FAA increase the cone shaft life limits for the AE 3007A3 engines.

The FAA does not agree. This engine model was not included in the NPRM and is beyond the scope of this AD.

## **Incorrect Model Designation**

The NPRM incorrectly specifies the AE 3007A1/P engine. This designation should read "AE 3007A1P." This has been corrected in the final rule.

## Conclusion

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule with the changes described previously. The FAA has determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

## Economic Analysis

There are approximately 598 engines of the affected design in the worldwide fleet. The FAA estimates that 364 engines installed on aircraft of U.S. registry will be affected by this AD, that it will take approximately 150 work hours per engine to accomplish the required actions, and that the average labor rate is \$60 per work hour. Required parts will cost approximately \$3,921 per engine. Based on these figures, the total cost impact of the AD on U.S. operators is estimated to be \$4,703,244.

## Regulatory Impact

This rule does not have federalism implications, as defined in Executive Order 13132, because it does not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Accordingly, the FAA has not consulted with state authorities prior to publication of this rule.

For the reasons discussed above, I certify that this action (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. A final evaluation has been prepared for this action and is contained in the Rules Docket. A copy of it may be obtained from the Rules Docket at the location provided under the caption "ADDRESSES."

## List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Safety.

## Adoption of the Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

### PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### §39.13 [Amended]

2. Section 39.13 is amended by adding the following new airworthiness directive:

# AIRWORTHINESS DIRECTIVE



REGULATORY SUPPORT DIVISION  
P.O. BOX 26460  
OKLAHOMA CITY, OKLAHOMA 73125-0460

U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

*AD's are posted on the internet at <http://av-info.faa.gov>*

The following Airworthiness Directive issued by the Federal Aviation Administration in accordance with the provisions of Federal Aviation Regulations, Part 39, applies to an aircraft model of which our records indicate you may be the registered owner. Airworthiness Directives affect aviation safety and are regulations which require immediate attention. You are cautioned that no person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of the Airworthiness Directive (reference 14 CFR part 39, subpart 39.3).

**2000-09-05 Allison Engine Company:** Amendment 39-11714; Docket 99-NE-46-AD.

*Applicability:* Allison Engine Company Models AE 3007A, AE 3007A1, AE 3007A1/1, AE 3007A1/2, AE 3007A1/3, AE 3007A1P, and AE 3007C turbofan engines, with cone shafts, part numbers (P/Ns) 23050728 and 23070729, installed. These engines are installed on but not limited to EMBRAER EMB-135 and EMB-145 series and Cessna 750 (Citation X) series airplanes.

**Note 1:** This airworthiness directive (AD) applies to each engine identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (h) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

*Compliance:* Required as indicated, unless accomplished previously.

To prevent low cycle fatigue failure of cone shafts, which could result in an uncontained engine failure and damage to the aircraft, accomplish the following:

## **Removal from Service**

- (a) For Allison Engine Company model AE 3007A engines, remove cone shafts from service prior to accumulating 9,500 cycles-since-new (CSN) and replace with serviceable parts.
- (b) For Allison Engine Company model AE 3007C engines, remove cone shafts from service prior to accumulating 14,500 CSN and replace with serviceable parts.
- (c) For Allison Engine Company models AE 3007A1, AE 3007A1/1, and AE 3007A1/2 engines, remove cone shafts from service prior to accumulating 7,500 CSN and replace with serviceable parts.

(d) For Allison Engine Company model AE 3007A1/3 engines, remove cone shafts from service prior to accumulating 3,500 CSN and replace with serviceable parts.

(e) For Allison Engine Company model AE 3007A1P engines, remove cone shafts from service prior to accumulating 2,400 CSN and replace with serviceable parts.

### **New Life Limits**

(f) Paragraphs (a), (b), (c), (d) and (e) of this AD establish new, lower life limits for cone shafts, P/Ns 23050728 and 23070729.

(g) Except for the provisions of paragraph (h) of this AD, no cone shafts, P/Ns 23050728 and 23070729, may remain in service exceeding the life limits established in paragraphs (a), (b), (c), (d) and (e) of this AD.

### **Alternative Method of Compliance**

(h) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Chicago Aircraft Certification Office (ACO). Operators shall submit their requests through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, Chicago ACO.

**Note 2:** Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the Chicago ACO.

### **Ferry Flights**

(i) No special flight permits will be issued.

### **Effective Date**

(j) This amendment becomes effective on July 5, 2000.

### **FOR FURTHER INFORMATION CONTACT:**

John Tallarovic, Aerospace Engineer, Chicago Aircraft Certification Office, FAA, Small Airplane Directorate, 2300 East Devon Avenue, Des Plaines, IL 60018; telephone (847) 294-8180, fax (847) 294-7834.

Issued in Burlington, Massachusetts, on April 27, 2000.

David A. Downey, Assistant Manager, Engine and Propeller Directorate, Aircraft Certification Service.