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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2011-0982; Directorate Identifier 2011-NE-09-AD; Amendment 39-16954; AD 2012-03-12]

RIN 2120-AA64

Airworthiness Directives; General Electric Company (GE) Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for all GE CF6-80C2 model turbofan engines, including engines marked on the engine data plate as CF6-80C2B7F1. This AD was prompted by a report of a supplier shipping a batch of nonconforming No. 3 bearing packings that had incorrect cooling holes and by subsequent reports of nonconforming No. 3 bearing packings being installed on engines in service. This AD requires a one-time inspection of the No. 3 bearing packing for an incorrect cooling hole size and, if it is found nonconforming, removing the packing and removing certain engine rotating life-limited parts (LLPs), if they were operated with unacceptable rotor bore cooling flow for a specified number of cycles. We are issuing this AD to prevent an uncontained failure of the high-pressure compressor (HPC) rotor or the low-pressure turbine (LPT) rotor, or both, which could cause damage to the airplane.

DATES: This AD is effective April 5, 2012. The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of April 5, 2012.

ADDRESSES: For service information identified in this AD, contact GE Aviation, M/D Rm. 285, One Neumann Way, Cincinnati, OH 45215; phone: 513-552-3272; email: geae.aoc@ge.com. You may review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Examining the AD Docket

You may examine the AD docket on the Internet at http://www.regulations.gov; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and

other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Tomasz Rakowski, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7735; fax: 781-238-7199; email: tomasz.rakowski@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that would apply to the specified products. That NPRM published in the Federal Register on October 18, 2011 (76 FR 64291). That NPRM proposed to require a one-time inspection of the No. 3 bearing packing for an incorrect cooling hole size and, if it is found nonconforming, removing the packing and removing certain engine rotating LLPs, if they were operated with the wrong packing for a specified number of cycles.

Comments

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the proposal and the FAA's response to each comment.

Support for the NPRM as Written

Commenters the Boeing Company and Federal Express support the NPRM as written.

Request To Correct Part Number

Commenters GE and Delta Airlines (Delta) indicated that the part number noted in the Discussion section of the NPRM (76 FR 64291, October 18, 2011) was incorrect and should be ‘‘1471M25P04" rather than ‘‘1292M70P04" as listed in the NPRM.

We agree. However, the Applicability section of the final rule is correct. We did not change the AD.

Request To Clarify Incorrect Shipping Versus Installing Wrong Seal

Commenter Lufthansa Technik AG (Lufthansa) asked that we state more clearly the difference between the issues of packings shipped in a batch of nonconforming parts and nonconforming packings installed in engines in service.

We disagree. The AD sufficiently describes the difference between nonconforming packings shipped by the supplier and those in service. We did not change the AD.

Request To Correct Cost

Commenter Lufthansa suggested that the cost of compliance estimate in the NPRM covers only the cost of shipped nonconforming parts and does not include the cost of replacing nonconforming packings that are installed in engines in service. Lufthansa also noted that the installed parts are covered by a different service bulletin and are not covered by warranty.

We disagree. Our cost estimate covers the inspection and installed parts and is independent of any possible warranty coverage. We did not change the AD.

Request To Update GE Service Bulletin (SB) Reference

Commenter Lufthansa requested that we provide full instructions for compliance for engine models CF6-80C2L1F and CF6-80C2K1F. Lufthansa noted that neither the NPRM (76 FR 64291, October 18, 2011) nor GE SB CF6-80C2 S/B 72-1405 provide enough information for these engines to comply with the proposed rule. Lufthansa requested that we refer to Revision 01 of GE SB CF6-80C2 S/B 72-1405 rather than to the original version.

We agree. We changed the AD by updating the GE service bulletin references in the AD to GE SB CF6-80C2 S/B 72-1405, Revision 01, dated December 16, 2011.

Request To Revise Cost of Compliance Estimate

Commenter Atlas Air requested that we revise the cost estimate by including cost to replace LLPs.

We agree. We revised the cost of compliance section in the AD to include our estimate for the total fleet replacement cost of LLPs with unacceptable cooling flows.

Request for a Cut-Off Date

Commenter Presidential Flights requested that we specify a date after which the batch of non-conforming No. 3 bearing packings with incorrect cooling holes was supplied, and that we limit applicability to engines that had a shop visit after this specified date. Commenter Japan Airlines requested that the AD not apply to engines with a last shop visit prior to November 30, 2009, if there have not been reports of non-conforming packings for these engines. Commenter Atlas Air commented that applicability should only apply to engines with packings from the affected batch of nonconforming parts shipped from a supplier.

We do not agree. The AD applies to all CF6-80C2 engines, regardless of the date of the last shop visit, the service location, or the engine serial number. The explanation for inspecting the entire fleet is provided in the Discussion section of the NPRM (76 FR 64291, October 18, 2011). We did not change the AD.

Request To Limit AD by Engine Serial Number

Commenter Atlas Air also asked that applicability be changed to specific affected engine serial numbers. Commenter TES Aviation Group requested clarification regarding whether the AD applied only to engines with certain serial numbers or maintained in certain service locations.

We disagree. The AD applies to all CF6-80C2 engines, regardless of engine serial number or last service location. We did not change the AD.

Request Regarding Shop Visit

Commenter GE requested that the applicability be changed to apply to only those engines that have had a shop visit where the fan was removed from the engine core and GE SB CF6-80C2 S/B 72-1405 was not completed during or since that visit. GE indicated that no new production engines are affected by the nonconformance and engines that already complied with the GE SB CF6-80C2 S/B 72-1405 shop inspection have accomplished the requirements of the proposed rule.

We disagree. Excluding all engines that have not yet had a shop visit where the fan was removed from the core leaves an engine population in service that might be susceptible to installation of the nonconforming packing. We did not change the AD.

Credit for Previous Inspection

Commenter All Nippon Airways (ANA) asked that credit be given to engines inspected in accordance with GE SB CF6-80C2 S/B 72-1405 before the effective date of this AD.

We agree. We changed the AD to indicate that a previous inspection meets the one-time inspection requirements of this AD.

Request To Add Additional Engine Models for Compliance

Commenter Lufthansa requested that we include CF6-45/50, CF6-80A, and CF6-80E1 engines, as applicable, to the AD.

We disagree. We have not received reports of nonconforming packing installed in any engine other than the CF6-80C2. We did not change the AD.

Request To Mandate Compliance of Spare Parts

An unidentified commenter requested that we mandate compliance of spare parts.

We do not agree. This AD affects assembled engines in service on the effective date of the AD. Parts installed in an engine after the effective date of this AD must be airworthy per § 43.13 of Title 14 of the Code of Federal Regulations. Operators may choose to perform inspections in accordance with this AD before returning engines from shop into service, although these inspections are not required by this AD before specified compliance times. In order to avoid confusion, we added a prohibition statement, paragraph (i), which does not allow re-installation of the LLPs removed from service in accordance with this AD.

Request To Clarify Terminating Action

Commenter ANA requested that we clarify the terminating action to the AD.

We disagree. The AD mandates a one-time inspection and disposition. Terminating action does not apply. We did not change the AD.

Request To Allow Borescope Inspection (BSI) To Determine Packing Configuration

Eight commenters requested that we approve a BSI to determine the No. 3 bearing packing configuration either on-wing or in the shop and to determine if further actions are necessary.

We partially agree. We agree that a BSI may be used to measure packing hole diameters to determine acceptable cooling flows. We disagree with using a BSI to determine the part number of the packing or the need for further actions as a BSI cannot be used to make such a determination on all affected engines.

We changed the AD to allow the one-time No. 3 bearing packing inspection to occur at the next shop visit if a successful optional BSI is performed within 500 cycles in service (CIS) from the effective date of the AD.

Request To Modify Compliance Time

Commenters GE and Delta requested that we change the compliance time of the one-time inspection to be performed at the next shop visit in which the fan is separated from the HPC. GE indicated that it has not determined that removal from service prior to 5,500 CIS is required. GE regards 5,500 CIS as an economic threshold not a hard life removal threshold.

We disagree. We do not agree with unconditional deferral to the next shop visit as unacceptable cooling flow could affect the lives of the LLPs. We did not change the AD.

Request To Address Fan Frames With Small Cooling Holes

Commenter Atlas Air asked that the service information incorporated by reference be revised to address certain fan frame part numbers with small cooling holes. Atlas Air indicated that certain small fan frame hole diameters may affect cooling flows, even though the packing configuration is determined to provide acceptable flows.

We do not agree. The cooling flow assessment addressed the worst case configuration. Cooling flow acceptability should be determined from the packing hole diameter, not the fan frame hole diameter. We did not change the AD.

Request for Action for Engines That Have 5,500 CIS Since Last Shop Visit

Six commenters requested that a drawdown schedule be provided for engines that have accumulated 5,500 or more CIS since the last engine shop visit when the fan was removed from the core. Some of these commenters reported that some of their engines were already past 5,500 CIS since the last engine shop visit in which the fan was removed from the core.

We agree. We changed the AD to require the inspection within 500 CIS of the effective date of this AD for those post-5,500-cycle engines.

Request on LLP Pass/Fail Criteria

Commenters Air Canada and TES Aviation Group requested that growth checks, hardness checks, or calculations be allowed to determine the disposition of LLPs affected by the unacceptable cooling flows instead of removing the parts from service if they were operated for 5,500 CIS or more with a No. 3 bearing packing determined to be ‘‘UNACCEPTABLE FLOW."

We do not agree. We have no technical substantiation that supports pass/fail criteria for determining if LLPs have operated with an unacceptable flow packing configuration. We did not change the AD.

Request on LLP Determination

Commenter Presidential Flight requested that LLP determination be based on CIS since first shop visit after supply of the affected batch, not the last shop visit because, they noted, an engine may have had multiple shop visits since the affected batch of nonconforming packings was shipped. Commenters Air Canada, Atlas Air, and TES Aviation Group indicated that it is impossible to determine how many cycles the LLPs have operated with nonconforming packings, because the packings are not serialized or tracked. In addition, the commenters noted that, if an engine is inspected and found to have a conforming packing, there is no guarantee that a nonconforming packing had not been used on that engine between earlier shop visits. Also, the commenters observed that it is impossible to estimate the effect on life of the LLPs that had operated with a nonconforming packing and were later removed from the engine.

We do not agree. Installation dates when nonconforming packings might have been installed into engines in service are unknown. Similarly, engine operation with nonconforming packing cannot be determined other than via inspection of the currently installed packing. We did not change the AD.

Request for Disposition of LLPs for Unacceptable Flows

Commenters GE, American Airlines, and Delta requested that we provide the requirement for LLP disposition in the case of the cooling flows determined not to be ‘‘CORRECT FLOW" in accordance with GE SB CF6-80C2 S/B 72-1405, dated June 30, 2011.

We agree. Unacceptable cooling flows are now addressed in Revision 01 of GE SB CF6-80C2 S/B 72-1405, dated December 16, 2011, and GE SB CF6-80C2 S/B 72-1427, dated December 16,

2011. Therein, cooling flows not affecting the LLPs in the rotors are described as ‘‘acceptable flow." We revised the AD in paragraph (h) to remove from service those LLPs that had been operated for 5,500 CIS or more with unacceptable flow and added paragraph (g) to define criteria for acceptable flows determined during an optional borescope inspection.

Request To Revise Criteria for Shop Visit

Commenters GE and KLM Royal Dutch Airlines requested that the induction of an engine into a shop solely for a core vibration trim balance procedure that requires separation of a major engine flange not be considered an engine shop visit. Another commenter, Lufthansa, requested that the induction of an engine into a shop solely for the removal or replacement of the stage 1 fan disk or the fan forward case also not be considered an engine shop visit.

We partially agree. We agree that the induction of an engine into a shop solely for core vibration balance should not be considered an engine shop visit for the purposes of this AD, because it does not require separation of the fan from the core. We disagree that the induction of an engine into a shop solely for removal or replacement of the stage 1 fan disk or fan forward case should not be considered an engine shop visit for the purposes of this AD, because these procedures require maintenance to the fan module.

We changed the AD to define a shop visit as not including induction of an engine into a shop solely for core vibration trim balance procedures that require separation of a major engine flange.

Request To Revise Reference to Fan and Core Module

Commenter Delta requested that we use the phrase ‘‘fan module removed from the core module" instead of ‘‘fan removed from the core."

We do not agree. The current language is consistent with service documents that we incorporate by reference in this AD. We did not change the AD.

Explanation of Additional Changes to This AD

We provided incorrect contact information for GE in the NPRM (76 FR 64291, October 18, 2011). We have updated the contact information.

Conclusion

We reviewed all the data presented, considered the comments received, and determined that air safety and the public interest require adopting the AD with the changes described previously. We have determined that these changes:

Are consistent with the intent that was proposed in the NPRM (76 FR 64291, October 18, 2011) for correcting the unsafe condition; and

Do not add any additional burden upon the public than was already proposed in the NPRM (76 FR 64291, October 18, 2011).

We also determined that these changes will not increase the economic burden on any operator or increase the scope of the AD.

Costs of Compliance

We estimate that this AD will affect 688 engines installed on airplanes of U.S. registry. We also estimate that it will take about 1 work-hour per engine to perform the borescope inspection, about 1 work-hour per engine to perform the shop inspection, and 1 work-hour to replace the No. 3 bearing packing, if found nonconforming. The average labor rate is $85 per work-hour. Required parts cost about $488 per engine for the estimated 21 engines that will require new No. 3 bearing packing. We

estimate that one set of LLPs will need replacement, and the total replacement cost is $1,201,200. Based on these figures, we estimate the total cost of this AD to U.S. operators to be $1,330,193. Our estimate is exclusive of any possible warranty coverage.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: ‘‘General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will 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.

For the reasons discussed above, I certify that this AD:

(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),

(3) Will not affect intrastate aviation in Alaska, and

(4) 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.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 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. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

2012-03-12 General Electric Company (GE): Amendment 39-16954; Docket No. FAA-2011-0982; Directorate Identifier 2011-NE-09-AD.

(a) Effective Date

This AD is effective April 5, 2012.

(b) Affected ADs

None.

(c) Applicability

This AD is applicable to all GE CF6-80C2 model turbofan engines, including engines marked on the engine data plate as CF6-80C2B7F1.

(d) Unsafe Condition

This AD was prompted by a report of a supplier shipping a batch of nonconforming No. 3 bearing packings that had an incorrect size of cooling holes and by several subsequent reports of nonconforming No. 3 bearing packings being installed on engines in service. The nonconformance of No. 3 bearing packings will result in incorrect high-pressure compressor (HPC) rotor and low-pressure turbine (LPT) rotor bore cooling and, if not corrected, could result in a reduced parts life of the life-limited rotating parts. We are issuing this AD to prevent an uncontained failure of the HPC rotor or the LPT rotor, or both, which could cause damage to the airplane.

(e) Compliance

Comply with this AD within the compliance times specified, unless already done.

(f) One-Time Inspection and Disposition of the No. 3 Bearing Packing

(1) Perform a one-time inspection of the No. 3 bearing packing. Use paragraphs 3.A.(1) through 3.A.(1)(b) of the Accomplishment Instructions of GE Service Bulletin (SB) No. CF6-80C2 S/B 72-1405, Revision 01, dated December 16, 2011, to do your inspection. Inspect as follows:

(i) Before 5,500 engine cycles-in-service (CIS) since the last engine shop visit where the fan was removed from the core, or within 500 CIS from the effective date of this AD, whichever occurs later; or

(ii) At the next shop visit, if the engine passes an optional borescope inspection (BSI) within 500 CIS from the effective date of this AD.

(2) Remove the packing from service before further flight if the wrong packing part number (P/N) is found on the engine during the inspection of paragraph (f)(1) of this AD.

(g) Optional BSI

The optional BSI identified in paragraph (f)(1)(ii) of this AD must determine an ‘‘ACCEPTABLE FLOW" packing is installed. Use paragraph 3.A, excluding subparagraphs 3.A.(4)(a)6 through 3.A.(4)(a)9 and 3.A.(4)(b)5, of the Accomplishment Instructions of GE SB CF6-80C2 S/B 72-1427, dated December 16, 2011, to do your BSI.

(h) Disposition of Affected Rotating Parts

Remove the following rotating parts from service, if they were operated for 5,500 CIS or more with a packing determined to be an ‘‘UNACCEPTABLE FLOW" packing using paragraph 3.A.(1)(c) of the Accomplishment Instructions of GE SB CF6-80C2 S/B 72-1405, Revision 01, dated December 16, 2011:

(1) HPC rotor stage 10-through-14 spool, any P/N,
(2) HPC rotor stage 11-through-14 spool, any P/N,
(3) LPT rotor stage 3 disk, P/N 9373M53P05, and
(4) LPT rotor stage 4 disk, P/N 9373M54P03.

(i) Installation Prohibition

After the effective date of this AD, do not install or reinstall in any engine any rotating part that has been removed from service in accordance with paragraph (h) of this AD.

(j) Definition

For the purposes of this AD, an engine shop visit is the induction of an engine into the shop after the effective date of this AD, where the separation of a major engine flange occurs; except the following maintenance actions, or any combination, are not considered engine shop visits:

(1) Induction of an engine into a shop solely for removal of the compressor top or bottom case for airfoil maintenance or variable stator vane bushing replacement.
(2) Induction of an engine into a shop solely for replacement of the turbine rear frame.
(3) Induction of an engine into a shop solely for replacement of the accessory gearbox or transfer gearbox, or both.
(4) Induction of an engine into a shop solely for core vibration trim balance procedure that requires separation of a major engine flange.

(k) Credit for Previous Action

An inspection of the No. 3 bearing packing performed before the effective date of this AD using GE SB CF6-80C2 S/B 72-1405 satisfies the requirements of paragraph (f)(1) of this AD.

(l) Alternative Methods of Compliance (AMOCs)

The Manager, Engine Certification Office, FAA, may approve AMOCs for this AD. Use the procedures in 14 CFR 39.19 to make your request.

(m) Related Information

(1) For more information about this AD, contact Tomasz Rakowski, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7735; fax: 781-238-7199; email: tomasz.rakowski@faa.gov.

(2) GE SB CF6-80C2 S/B 72-1405, Revision 01, dated December 16, 2011, and GE SB CF6-80C2 S/B 72-1427, dated December 16, 2011, pertain to the subject of this AD. Contact GE Aviation, M/D Rm. 285, One Neumann Way, Cincinnati, OH 45215; phone: 513-552-3272; email: geae.aoc@ge.com; for a copy of this service information.

(n) Material Incorporated by Reference

(1) You must use the following service information to do the actions required by this AD, unless the AD specifies otherwise. The Director of the Federal Register approved the incorporation by reference (IBR) under 5 U.S.C. 552(a) and 1 CFR part 51 of the following service information:

(i) General Electric Company (GE) Service Bulletin (SB) CF6-80C2 S/B 72-1405, dated June 30, 2011;

(ii) GE SB CF6-80C2 S/B 72-1405, Revision 01, dated December 16, 2011; and

(iii) GE SB CF6-80C2 S/B 72-1427, dated December 16, 2011.

(2) For service information identified in this AD, contact GE Aviation, M/D Rm. 285, One Neumann Way, Cincinnati, OH 45215; phone: 513-552-3272; email: geae.aoc@ge.com.

(3) You may review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

(4) You may also review copies of the service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at an NARA facility, call 202-741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

Issued in Burlington, Massachusetts, on February 7, 2012.
Peter A. White,
Manager, Engine & Propeller Directorate,
Aircraft Certification Service.