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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2010-0068; Directorate Identifier 2010-NE-05-AD; Amendment 39-16580; AD 2011-02-07]

RIN 2120-AA64

Airworthiness Directives; General Electric Company CF6-45 and CF6-50 Series Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: We are superseding an existing airworthiness directive (AD) for General Electric Company (GE) CF6-45 and CF6-50 series turbofan engines with certain low-pressure turbine (LPT) rotor stage 3 disks installed. That AD currently requires initial and repetitive borescope inspections of the high-pressure turbine (HPT) rotor stage 1 and stage 2 blades for wear and damage, including excessive airfoil material loss. That AD also requires fluorescent-penetrant inspection (FPI) of the LPT rotor stage 3 disk under certain conditions and removal of the disk from service before further flight if found cracked. That AD also requires repetitive exhaust gas temperature (EGT) system checks (inspections). This AD requires HPT rotor stage 1 and stage 2 blade inspections and EGT system inspections. This AD also requires FPI of the LPT rotor stage 3 disk under certain conditions, removal of the disk from service before further flight if found cracked, and an ultrasonic inspection (UI) of the LPT rotor stage 3 disk forward spacer arm. This AD also requires initial and repetitive engine core vibration surveys and reporting to the FAA any crack findings, disks that fail the UI, and engines that fail the engine core vibration survey.

This AD was prompted by reports received of additional causes of HPT rotor imbalance not addressed in AD 2010-12-10, and two additional LPT rotor stage 3 disk events. We are issuing this AD to prevent critical life-limited rotating engine part failure, which could result in an uncontained engine failure and damage to the airplane.

DATES: This AD is effective February 22, 2011.

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in the AD as of February 22, 2011.

We must receive any comments on this AD by March 21, 2011.

ADDRESSES: You may send comments by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590.
- Hand Delivery: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

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 street address for the Docket Office (phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

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; e-mail: tomasz.rakowski@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

On June 4, 2010, we issued AD 2010-12-10, Amendment 39-16331 (75 FR 32649, June 9, 2010), for CF6-45 and CF6-50 series turbofan engines with certain LPT rotor stage 3 disks installed. That AD requires initial and repetitive borescope inspections of the HPT rotor stage 1 and stage 2 blades for wear and damage, including excessive airfoil material loss. That AD also requires FPI of the LPT rotor stage 3 disk under certain conditions, removal of the disk from service before further flight if found cracked, and repetitive EGT system checks (inspections). That AD resulted from reports received of two additional LPT rotor stage 3 disk events since the original AD 2010-06-15, Amendment 39-16240 (75 FR 12661, March 17, 2010) was issued. We issued those ADs to prevent critical life-limited rotating engine part failure, which could result in an uncontained engine failure and damage to the airplane.

Actions Since AD was Issued

Since we issued AD 2010-12-10, investigations have revealed additional causes for HPT rotor imbalance not addressed in that AD, and two additional LPT rotor stage 3 disk events have occurred.

FAA's Determination

We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

AD Requirements

This AD requires:

- HPT rotor stage 1 and stage 2 blade inspections and EGT system inspections; and
- FPI of the LPT rotor stage 3 disk under certain conditions and removal of the disk from service before further flight if found cracked; and
- A UI of the LPT rotor stage 3 disk forward spacer arm; and
- Initial and repetitive engine core vibration surveys; and
- Reporting to the FAA any crack findings, disks that fail the UI, and engines that fail the engine core vibration survey.

FAA's Justification and Determination of the Effective Date

An unsafe condition exists that requires the immediate adoption of this AD. The FAA has found that the risk to the flying public justifies waiving notice and comment prior to adoption of this rule because we require near immediate corrective action to address the unsafe condition. Therefore, we find that notice and opportunity for prior public comment are impracticable, and that good cause exists for making this amendment effective in less than 30 days.

Comments Invited

This AD is a final rule that involves requirements affecting flight safety, and we did not provide you with notice and an opportunity to provide your comments before it becomes effective. However, we invite you to send any written data, views, or arguments about this AD. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2010-0068 and directorate identifier 2010-NE-05-AD at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this AD. We will consider all comments received by the closing date and may amend this AD because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this AD.

Costs of Compliance

We estimate that this AD will affect 387 CF6-45 and CF6-50 series turbofan engines installed on airplanes of U.S. registry. We also estimate that it will take, about 8 hours to perform the HPT blade inspection, 6 hours to perform a vibration survey, 4 hours to perform an ultrasonic inspection, 2 hours to perform an EGT resistance check, and 1 hour to perform an EGT thermocouple inspection for each engine. The average labor rate is \$85 per work-hour. We anticipate no required parts cost. Based on these figures, we estimate the total cost of the AD to U.S. operators to be \$690,795.

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 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. The FAA amends § 39.13 by removing airworthiness directive (AD) 2010-12-10, Amendment 39-16331 (75 FR 32649, June 9, 2010) and adding the following new AD:



2011-02-07 General Electric Company: Amendment 39-16580; Docket No. FAA-2010-0068; Directorate Identifier 2010-NE-05-AD.

Effective Date

(a) This AD is effective February 22, 2011.

Affected ADs

(b) This AD supersedes AD 2010-12-10, Amendment 39-16331.

Applicability

(c) This AD applies to the following engines with any of the low-pressure turbine (LPT) rotor stage 3 disk part numbers listed in Table 1 of this AD installed in:

(1) General Electric Company (GE) CF6-45A, CF6-45A2, CF6-50A, CF6-50C, CF6-50CA, CF6-50C1, CF6-50C2, CF6-50C2B, CF6-50C2D, CF6-50E, CF6-50E1, and CF6-50E2 turbofan engines, including engines marked on the engine data plate as CF6-50C2-F and CF6-50C2-R.

(2) These engines are installed on, but not limited to, Airbus A300 series, Boeing 747 series, McDonnell Douglas DC-10 series, and DC-10-30F (KDC-10) airplanes.

Table 1 – Applicable LPT Rotor Stage 3 Disk Part Numbers

9061M23P06	9061M23P07	9061M23P08	9061M23P09	9224M75P01
9061M23P10	1473M90P01	1473M90P02	1473M90P03	1473M90P04
9061M23P12	9061M23P14	9061M23P15	9061M23P16	1479M75P01
1479M75P02	1479M75P03	1479M75P04	1479M75P05	1479M75P06
1479M75P07	1479M75P08	1479M75P09	1479M75P11	1479M75P13
1479M75P14	N/A	N/A	N/A	N/A

Unsafe Condition

(d) This AD results from reports received of additional causes of high-pressure turbine (HPT) rotor imbalance not addressed in AD 2010-12-10, and two additional LPT rotor stage 3 disk events. We are issuing this AD to prevent critical life-limited rotating engine part failure, which could result in an uncontained engine failure and damage to the airplane.

Compliance

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

Borescope Inspections of HPT Rotor Stage 1 and Stage 2 Blades

(f) For the borescope inspections required by paragraphs (f)(1), (f)(2), and (f)(3) of this AD, inspect the blades from the forward and aft directions. Inspect all areas of the blade airfoil: Your inspection must include blade leading and trailing edges, and their convex and concave airfoil surfaces. Inspect for signs of impact, cracking, burning, damage, or distress.

(1) Perform an initial borescope inspection of the HPT rotor stage 1 and stage 2 blades, within 10 cycles after the effective date of this AD.

(2) Thereafter, repeat the borescope inspection of the HPT rotor stage 1 and stage 2 blades within every 75 cycles-since-last-inspection (CSLI).

(3) Borescope-inspect the HPT rotor stage 1 and stage 2 blades within the cycle limits after the engine has experienced any of the events specified in Table 2 of this AD.

(4) Remove any engine from service before further flight if the engine fails any of the borescope inspections required by this AD.

Table 2 – Conditional Borescope Inspection Criteria

If The Engine Has Experienced:	Then Borescope-Inspect:
(i) An exhaust gas temperature (EGT) above redline.	Within 10 cycles.
(ii) A shift in the smoothed EGT trending data that exceeds 18° F (10° C), but is less than or equal to 36° F (20° C).	Within 10 cycles.
(iii) A shift in the smoothed EGT trending data that exceeds 36° F (20° C).	Before further flight.
(iv) Two consecutive raw EGT trend data points that exceed 18° F (10° C) above the smoothed average, but is less than or equal to 36° F (20° C).	Within 10 cycles.
(v) Two consecutive raw EGT trend data points that exceed 36° F (20° C) above the smoothed average.	Before further flight.

Actions Required for Engines With Damaged HPT Rotor Blades

(g) For those engines that fail any borescope inspection requirements of this AD, before returning the engine to service, fluorescent-penetrant inspect the inner diameter surface forward cone body (forward spacer arm) of the LPT rotor stage 3 disk. If a crack is found or if a circumferential band of fluorescence appears, remove the disk from service.

EGT Thermocouple Probe Inspections

(h) Inspect the EGT thermocouple probe for damage within 50 cycles after the effective date of this AD or before accumulating 750 CSLI, whichever occurs later.

(i) Thereafter, re-inspect the EGT thermocouple probe for damage within every 750 CSLI.

(j) If any EGT thermocouple probe shows wear through the thermocouple guide sleeve, remove and replace the EGT thermocouple probe before further flight, and ensure the turbine mid-frame liner does not contact the EGT thermocouple probe.

EGT System Resistance Check Inspections

(k) Perform an EGT system resistance check within 50 cycles from the effective date of this AD or before accumulating 750 cycles-since-the-last-resistance check on the EGT system, whichever occurs later.

(l) Thereafter, repeat the EGT system resistance check within every 750 cycles-since-the-last-resistance check.

(m) Remove and replace, or repair any EGT system component that fails the resistance system check before further flight.

Ultrasonic Inspection (UI) of the LPT Rotor Stage 3 Disk Forward Spacer Arm

(n) Within 75 cycles after the effective date of this AD, perform a UI of the forward cone body (forward spacer arm) of the LPT rotor stage 3 disk. Use paragraphs E. through K. of Appendix A of GE Service Bulletin (SB) No. CF6-50-SB 72-1312, Revision 1, dated October 18, 2010, to do the UI.

Engine Core Vibration Survey

(o) Within 75 cycles after the effective date of this AD, perform an initial engine core vibration survey.

(1) Use approximately a one-minute acceleration and a one-minute deceleration of the engine between ground idle and 84% N2 (about 8,250 rpm) to perform the engine core vibration survey.

(2) Use a spectral/trim balance analyzer or equivalent, to determine the N2 rotor vibration.

(p) Thereafter, within every 350 cycles-since-the-last-engine core vibration survey, perform the engine core vibration survey as required in paragraphs (o)(1) through (o)(2) of this AD.

(q) If the vibration level is above 5 mils Double Amplitude then before further flight, remove the engine from service.

(r) For those engines that fail any engine core vibration survey requirements of this AD, before returning the engine to service, fluorescent-penetrant inspect the inner diameter surface forward cone body (forward spacer arm) of the LPT rotor stage 3 disk. If a crack is found or if a circumferential band of fluorescence appears, remove the disk from service.

(s) If the engine has experienced any vibration reported by maintenance or flight crew that is suspected to be caused by the HPT rotor (N2), perform the engine core vibration survey as required in paragraphs (o)(1) through (o)(2) of this AD within 10 cycles after the report.

(t) You can find further guidance about performing the engine core vibration survey in GE SB No. CF6-50-SB 72-1313, Revision 1, dated October 18, 2010.

Reporting Requirements

(u) Report to the FAA within 10 days after any of the following:

(1) Any crack findings; and

(2) Any disks that failed a UI performed as specified in paragraph (n) of this AD; and

(3) Any engines that failed an engine core vibration survey as specified in paragraphs (o) and (p) of this AD.

(4) Submit these findings to FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: tomasz.rakowski@faa.gov; phone: 781-238-7735; fax: 781-238-7199.

Paperwork Reduction Act Burden Statement

(5) A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2120-0056. Public reporting for this collection of information is estimated to be approximately 5 minutes per response, including the time for reviewing instructions, completing and reviewing the collection of information. All responses to this collection of information are mandatory. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave., SW., Washington, DC 20591, Attn: Information Collection Clearance Officer, AES-200.

Definitions

(v) For the purposes of this AD, an EGT above redline is a confirmed over-temperature indication that is not a result of EGT system error.

(w) For the purposes of this AD, a shift in the smoothed EGT trending data is a shift in a rolling average of EGT that can be confirmed by a corresponding shift in the trending of fuel flow or fan speed/core speed (N1/N2) relationship. You can find further guidance about evaluating EGT trend data in GE Company Service Rep Tip 373 "Guidelines For Parameter Trend Monitoring."

Previous Credit

(x) A borescope inspection performed before the effective date of this AD using AD 2010-06-15, Amendment 39-16240 (75 FR 12661, March 17, 2010) or AD 2010-12-10, Amendment 39-16331 (75 FR 32649, June 9, 2010) within the last 75 cycles, satisfies the initial borescope inspection requirement in paragraph (f)(1) of this AD.

(y) A UI performed before the effective date of this AD using GE SB No. CF6-50-SB 72-1312, dated August 9, 2010 or GE SB No. CF6-50-SB 72-1312 Revision 1, dated October 18, 2010, satisfies the inspection requirement in paragraph (n) of this AD.

(z) An engine core vibration survey performed before the effective date of this AD using GE SB No. CF6-50-SB 72-1313, dated August 9, 2010 or GE SB No. CF6-50-SB 72-1313 Revision 1, dated October 18, 2010, within the last 350 cycles, satisfies the initial survey requirement in paragraph (o) of this AD.

Alternative Methods of Compliance (AMOCs)

(aa) AMOCs previously approved for AD 2010-06-15, Amendment 39-16240 (75 FR 12661, March 17, 2010) are not approved for this AD. However, AMOCs previously approved for AD 2010-12-10, Amendment 39-16331 (75 FR 32649, June 9, 2010) are approved for this AD.

(bb) The Manager, Engine Certification Office, has the authority to approve alternative methods of compliance for this AD if requested using the procedures found in 14 CFR 39.19.

Related Information

(cc) 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; e-mail: tomasz.rakowski@faa.gov, for more information about this AD.

Material Incorporated by Reference

(dd) You must use GE Service Bulletin No. CF6-50-SB 72-1312, Revision 1, dated October 18, 2010, to do the ultrasonic inspections required by this AD.

(1) The Director of the Federal Register approved the incorporation by reference of this service bulletin in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

(2) Contact General Electric Company, GE-Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215, telephone (513) 552-3272; fax (513) 552-3329; e-mail: geae.aoc@ge.com for a copy of this service information.

(3) You may review copies at the FAA, New England Region, 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 NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Burlington, Massachusetts, on January 14, 2011.

Peter A. White,
Acting Manager, Engine & Propeller Directorate,
Aircraft Certification Service.