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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2022-0384; Project Identifier AD-2022-00027-E; Amendment 39-22122; AD 2022-15-03]

RIN 2120-AA64

Airworthiness Directives; Pratt & Whitney Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is superseding Airworthiness Directive (AD) 2021-14-06 for all Pratt & Whitney (PW) PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, PW1525G-3, PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines. AD 2021-14-06 required repetitive borescope inspections (BSI) of certain low-pressure compressor (LPC) rotor 1 (R1) until replacement of electronic engine control (EEC) full authority digital electronic control (FADEC) software with updated software. AD 2021-14-06 also required a BSI after installation of the updated EEC FADEC software if certain Onboard Maintenance Message fault codes are displayed and meet specified criteria. AD 2021-14-06 also required, depending on the results of the BSI, replacement of the LPC R1. Since the FAA issued AD 2021-14-06, the manufacturer redesigned the compressor intermediate case (CIC) assembly to incorporate a shortened bleed duct configuration and updated the EEC FADEC software. This AD continues to require repetitive BSI of certain LPC R1s until replacement of EEC FADEC software with updated software and also a BSI after installation of the updated EEC FADEC software if certain Onboard Maintenance Message fault codes are displayed and meet specified criteria. This AD continues to require, depending on the results of the BSI, replacement of the LPC R1. This AD also requires removal and replacement of the existing CIC assembly with a CIC assembly eligible for installation. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective August 19, 2022.

ADDRESSES: For service information identified in this final rule, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118; phone: (800) 565-0140; email: help24@pw.utc.com; website: http://fleetcare.pw.utc.com. You may view this service information at the Airworthiness Products Section, FAA, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

Examining the AD Docket

You may examine the AD docket at https://www.regulations.gov by searching for and locating Docket No. FAA-2022-0384; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is 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: Mark Taylor, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7229; email: Mark.Taylor@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2021-14-06, Amendment 39-21633 (86 FR 36061, July 8, 2021), (AD 2021-14-06). AD 2021-14-06 applied to all PW PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, PW1525G-3, PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines. The NPRM published in the Federal Register on April 04, 2022 (87 FR 19405). The NPRM was prompted by reports of inflight shutdowns due to failure of the LPC R1 and by subsequent findings of cracked LPC R1s during inspection. Additionally, the manufacturer redesigned the CIC assembly to incorporate a shortened bleed duct configuration. The shortened bleed duct addresses the unsafe condition by preventing the coincidence between bleed and the acoustic excitation. The manufacturer also updated the EEC FADEC software to provide compatibility with both current and future operation of engines and airplanes with the redesigned CIC assembly installed. In the NPRM, the FAA proposed to continue to require removal from service of certain EEC FADEC software and the installation of a software version eligible for installation. The NPRM proposed to require a BSI of LPC R1 for damage and cracks after replacing certain EEC FADEC software versions. The NPRM proposed to continue to require a BSI of LPC R1 after installation of an eligible EEC FADEC software version if certain Onboard Maintenance Message fault codes are displayed and meet specified criteria. The NPRM proposed to continue to require, depending on the results of the BSI, replacement of the LPC R1. The NPRM also proposed to require removal and replacement of certain CIC assemblies, identified by part number, with a CIC assembly eligible for installation.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from three commenters. The commenters were Air Line Pilots Association, International (ALPA), Delta Air Lines, Inc, (DAL), and an individual commenter. One commenter, ALPA, supported the proposal without change. Two commenters, DAL and an individual commenter, requested changes. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request To Revise the Required Action Proposed in Paragraph (g)(3)

DAL requested that the FAA remove the following language as proposed in paragraph (g)(3) of the NPRM: "after installation of the EEC FADEC software version eligible for installation as required by paragraphs (g)(1) and (g)(2) of this AD." DAL noted that this requirement would create an unnecessary restriction on when the BSI of the LPC R1 can be accomplished and may cause operators to perform a second BSI if the BSI of the LPC R1 was performed prior to the software upgrade.

The FAA agrees and has revised paragraph (g)(3) of this AD as requested by DAL.

DAL also requested that the FAA revise paragraph (g)(3) of this AD by changing the language from "For the model turbofan engines identified in paragraphs (g)(1) and (g)(2) . . ." to "For the model turbofan engines identified in paragraphs (g)(1) or (g)(2). . . ." DAL noted that there is no overlap in turbofan engine models between paragraphs (g)(1) and (g)(2), thus it is not possible for an engine model to be identified in both paragraphs.

The FAA disagrees with changing this AD as requested by DAL. Paragraph (g)(3) of this AD applies to the model turbofan engines identified in paragraph (g)(1) and the model turbofan engines identified in paragraph (g)(2). The FAA did not change the AD as a result of this comment.

Request To Include Future Revisions to Service Information

DAL requested that the FAA add "or later" to Note 1 to paragraph (g)(4) to allow for the use of future revisions to PW Service Bulletins (SBs) PW1000G-A-72-00-0125-00A-930A-D, Issue No. 004, dated October 13, 2021, and PW1000G-A-72-00-0075-00B-930A-D, Issue No. 004, dated July 21, 2021. DAL noted that this would ensure that any LPC R1 serial numbers added in subsequent revisions to these SBs would be included in the applicability of this AD. DAL also requested that the FAA add "or later" to Note 2 to paragraph (g)(5) to allow for the use of future revisions to PW engine maintenance manual (EMM) PW1000G-A-72-00-00-02A-0B5A-A. DAL noted that this would ensure that any changes made to the guidance on determining N1 exceedance duration would be applicable within the AD. DAL also requested that the FAA add "or later" to Note 3 to paragraph (g)(5) to allow for the use of future revisions to PW EMM PW1000G-A-72-31-00-00A-312A-D, Issue No. 017, dated March 19, 2021. DAL noted that this would ensure that any changes made to the guidance on performing the BSI of the LPC R1 will be applicable within the AD. DAL also requested that the FAA add a reference to A220 aircraft maintenance publication (AMP) Task BD500-A-J72-00-00-02AAA-0B5A-A to help ensure consistency across different manuals used by on-wing maintenance personnel.

The FAA disagrees with adding "or later" to the service information referenced in notes to paragraph (g) of this AD. The use of notes in the regulatory text is for informational purposes only, and the use of this service information is not required by this AD, but may assist the operator while complying with this AD. Therefore, including future revisions of the service information referenced in the notes would not affect the applicability of this AD. Additionally, future revisions of the service information have not yet been published by the manufacturer or reviewed by the FAA. The FAA disagrees with the need to add reference to future PW EMM revisions within Note 2 to paragraph (g)(5) of this AD, as the currently cited documents provide the appropriate guidance. The FAA did not change the AD as a result of these comments.

Request To Correct Reference to EEC FADEC Software Version

DAL and an individual commenter requested that the FAA revise paragraph (h)(1) of this AD to change the EEC FADEC software version eligible for installation from version V2.11.12.4 to version V2.11.12.1. Both commenters noted that PW SB PW1000G-A-73-00-0052-00A-930A-D, Issue No. 001, dated October 7, 2021, defines EEC FADEC software version V2.11.12.1 as the software version that is eligible for installation on PW1519G, PW1521G, PW1521G-3, PW1521GA,

PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines. The FAA agrees and has updated paragraph (h)(1) of this AD.

Conclusion

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting the AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Related Service Information

The FAA reviewed PW SB PW1000G-A-73-00-0025-00B-930A-D, Issue No. 001, dated November 23, 2021; PW SB PW1000G-A-72-00-0125-00A-930A-D, Issue No. 004, dated October 13, 2021; PW SB PW1000G-A-72-00-0075-00B-930A-D, Issue No. 004, dated July 21, 2021; PW SB PW1000G-A-73-00-0052-00A-930A-D, Issue No. 001, dated October 7, 2021; PW SB PW1000G-A-72-00-0121-00B-930A-D, Issue No. 001, dated July 9, 2021; PW SB PW1000G-A-72-00-0175-00A-930A-D, Issue No. 001, dated July 1, 2021.

PW SB PW1000G-A-73-00-0025-00B-930A-D, Issue No. 001, dated November 23, 2021, describes procedures for replacing or modifying the EEC to incorporate EEC FADEC software version V9.6.5.6 in PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines. PW SBs PW1000G-A-72-00-0125-00A-930A-D, Issue No. 004, dated October 13, 2021, and PW1000G-A-72-00-0075-00B-930A-D, Issue No. 004, dated July 21, 2021, describe procedures for performing repetitive BSIs of LPC R1s. PW SB PW1000G-A-73-00-0052-00A-930A-D, Issue No. 001, dated October 7, 2021, describes procedures for replacing or modifying the EEC to incorporate EEC FADEC software version V2.11.12 in PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, PW1525G-3 model turbofan engines. PW SBs PW1000G-A-72-00-0121-00B-930A-D, Issue No. 001, dated July 9, 2021, and PW1000G-A-72-00-0175-00A-930A-D, Issue No. 001, dated July 1, 2021, describe procedures for replacing or modifying the CIC assembly.

The FAA also reviewed Section PW1000G-A-72-00-00-02A-0B5A-A of PW EMM, Issue No. 016, dated January 15, 2021; and Section PW1000G-A-72-31-00-00A-312A-D of PW EMM, Issue No. 017, dated March 19, 2021. Section PW1000G-A-72-00-00-02A-0B5A-A of PW EMM, Issue No. 016, dated January 15, 2021, describes procedures for inspecting the engine for possible engine damage after receiving notification of an N1 or N2 overspeed operation. Section PW1000G-A-72-31-00-00A-312A-D of PW EMM, Issue No. 017, dated March 19, 2021, describes procedures for performing a BSI of the LPC.

Costs of Compliance

The FAA estimates that this AD affects 114 engines installed on airplanes of U.S. registry. The FAA estimates that five percent of engines installed on airplanes of U.S. registry will require EEC FADEC software upgrade and BSI of the LPC R1.

The FAA estimates the following costs to comply with this AD:

Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Replace EEC FADEC software	2 work-hours × $85 per hour = $170	$0	$170	$19,380
BSI of the LPC R1	2 work-hours × $85 per hour = $170	0	170	969
Replace CIC assembly	428 work-hours × $85 per hour = $36,380	124,522	160,902	18,342,828

The FAA estimates the following costs to do any necessary inspection if certain Onboard Maintenance Message fault codes are displayed or if any necessary replacement is required based on the results of the inspection. The agency has no way of determining the number of aircraft that might need these replacements or inspections:

On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Replace LPC R1	40 work-hours × $85 per hour = $3,400	$156,000	$159,400
BSI of the LPC R1 if Onboard Maintenance Message fault codes are displayed and meet specified criteria	2 work-hours × $85 per hour = $170	$0	$170

The FAA has included all known costs in its cost estimate. According to the manufacturer, however, some of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals.

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.

The FAA is 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

The FAA has determined that 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) Will not affect intrastate aviation in Alaska, 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.

List of Subjects in 14 CFR Part 39

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

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:

a. Removing Airworthiness Directive 2021-14-06, Amendment 39-21633 (86 FR 36061, July 8, 2021); and

b. Adding the following new airworthiness directive:

2022-15-03 Pratt & Whitney: Amendment 39-22122; Docket No. FAA-2022-0384; Project Identifier AD-2022-00027-E.

(a) Effective Date

This airworthiness directive (AD) is effective August 19, 2022.

(b) Affected ADs

This AD replaces AD 2021-14-06, Amendment 39-21633 (86 FR 36061, July 8, 2021).

(c) Applicability

This AD applies to Pratt & Whitney PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, PW1525G-3, PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines.

(d) Subject

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section.

(e) Unsafe Condition

This AD was prompted by reports of in-flight shutdowns due to failure of the low-pressure compressor (LPC) rotor 1 (R1) and by subsequent findings of cracked LPC R1s during inspection. The FAA is issuing this AD to prevent failure of the LPC R1. The unsafe condition, if not addressed, could result in an uncontained release of the LPC R1, damage to the engine, damage to the airplane, and loss of the airplane.

(f) Compliance

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

(g) Required Actions

(1) For PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines with installed electronic engine control (EEC) full authority digital electronic control (FADEC) software earlier than EEC FADEC software version V2.11.10.4, before further flight, remove the EEC FADEC software and install EEC FADEC software version eligible for installation.

(2) For PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines with installed EEC FADEC software earlier than EEC FADEC software version V9.5.6.7, before further flight, remove the EEC FADEC software and install EEC FADEC software version eligible for installation.

(3) For the model turbofan engines identified in paragraphs (g)(1) and (g)(2) of this AD, before further flight, perform a one-time borescope inspection (BSI) of the LPC R1 for damage and cracks at the following LPC R1 locations:

(i) The blade tip;

(ii) The leading edge;

(iii) The leading edge fillet to rotor platform radius; and

(iv) The airfoil convex side root fillet to rotor platform radius.

(4) Based on the results of the BSI required by paragraph (g)(3) of this AD, before further flight, remove and replace the LPC R1 if:

(i) There is damage on an LPC R1 that exceeds serviceable limits; or

(ii) Any crack in the LPC R1 exists.

Note 1 to paragraph (g)(4): Guidance on determining the serviceable limits in paragraphs (g)(4) and (6) of this AD can be found in Pratt & Whitney (PW) Service Bulletin (SB) PW1000G-A-72-00-0125-00A-930A-D, Issue No. 004, dated October 13, 2021, and PW SB PW1000G-A-72-00-0075-00B-930A-D, Issue No. 004, dated July 21, 2021.

(5) For PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines with EEC FADEC software version V2.11.10.4 or later installed, within 15 flight cycles after receipt of Onboard Maintenance Message fault code 7100F0029 or 7100F0030, perform a BSI of the LPC R1 for damage and cracks at the locations specified in paragraph (g)(3) of this AD if the fault code is displayed on the Active Failure Messages and meets the following criteria:

(i) N1 Exceedance is above 95.2%;

(ii) N1 Exceedance occurred above 29,100 feet;

(iii) N1 Exceedance occurs for a duration of 40 seconds (15 seconds of cockpit display) or more during any flight; and

(iv) Compressor intermediate case (CIC) assembly installed has part number (P/N) 5379926, P/N 5379940, P/N 5379946, or P/N 5379926-001.

Note 2 to paragraph (g)(5): Guidance on determining the N1 Exceedance duration can be found in Section PW1000G-A-72-00-00-02A-0B5A-A of PW engine maintenance manual (EMM), Issue No. 016, dated January 15, 2021.

Note 3 to paragraph (g)(5): Guidance on performing the BSI can be found in Section PW1000G-A-72-31-00-00A-312A-D of PW EMM, Issue No. 017, dated March 19, 2021.

(6) Based on the results of the BSI required by paragraph (g)(5) of this AD, before further flight, remove and replace the LPC R1 if:

(i) There is damage on an LPC R1 that exceeds serviceable limits; or

(ii) Any crack in the LPC R1 exists.

(7) For all affected model turbofan engines, at the next engine shop visit after the effective date of this AD, remove CIC assembly with P/N 5379926, P/N 5379940, P/N 5379946, or P/N 5379926-001 and replace with a CIC assembly eligible for installation.

(8) For PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines with installed EEC FADEC software version V2.11.10.4, at the next engine shop visit after the effective date of this AD, remove the EEC FADEC software and install EEC FADEC software version eligible for installation.

(9) For PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines with installed EEC FADEC software version V9.5.6.7, at the next engine shop visit after the effective date of this AD, remove the EEC FADEC software and install EEC FADEC software version eligible for installation.

(h) Definitions

(1) For the purpose of this AD, “EEC FADEC software version eligible for installation” is EEC FADEC software version V2.11.12.1 or later for PW1519G, PW1521G, PW1521G-3, PW1521GA,

PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines, and EEC FADEC software version V9.6.5.6 or later for PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines.

(2) For the purpose of this AD, an "engine shop visit" is the induction of an engine into the shop for maintenance involving the separation of the LPC Flange 1 or separation of the LPC Flange 4, except for the following situations, which do not constitute an engine shop visit.

(i) Separation of engine flanges solely for the purposes of transportation without subsequent engine maintenance.

(ii) Separation of engine flanges solely for the purpose of replacing the fan without subsequent maintenance.

(3) For the purpose of this AD, a "CIC assembly eligible for installation" is any CIC assembly that does not have P/N 5379926, P/N 5379940, P/N 5379946, or P/N 5379926-001.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j)(1) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

(1) For more information about this AD, contact Mark Taylor, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7229; email: Mark.Taylor@faa.gov.

(2) For service information identified in this AD, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118; phone: (800) 565-0140; email: help24@pw.utc.com; website: http://fleetcare.pw.utc.com.

(3) You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

(k) Material Incorporated by Reference

None.

Issued on July 7, 2022.

Gaetano A. Sciortino,

Deputy Director for Strategic Initiatives, Compliance & Airworthiness Division, Aircraft Certification Service.

[FR Doc. 2022-15131 Filed 7-14-22; 8:45 am]