



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2021-0191; Project Identifier AD-2020-01492-E; Amendment 39-21633; AD 2021-14-06]

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) 2019-21-11 and AD 2020-07-02. AD 2019-21-11 applied to 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 2020-07-02 applied to all PW PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines. AD 2019-21-11 required initial and repetitive borescope inspections (BSIs) of the low-pressure compressor (LPC) rotor 1 (R1) and, depending on the results of the inspections, replacement of the LPC. AD 2020-07-02 required the removal from service of certain electronic engine control (EEC) full authority digital electronic control (FADEC) software and the installation of a software version eligible for installation. This AD continues to require repetitive BSIs of certain LPC R1s until replacement of EEC FADEC software with the updated software. This AD also requires a BSI after installation of the updated EEC FADEC software if certain Onboard Maintenance Message fault codes are displayed and meet specified criteria. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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 (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0191.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0191; 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: Nicholas Paine, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7116; fax: (781) 238-7199; email: nicholas.j.paine@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2019-21-11, Amendment 39-19777 (84 FR 57813, October 29, 2019), (AD 2019-21-11) and AD 2020-07-02, Amendment 39-21106 (85 FR 17742, March 31, 2020), (AD 2020-07-02). AD 2019-21-11 applied to certain PW PW1519G, PW1521G, PW1521GA, PW1524G, PW1525G, PW1521G-3, PW1524G-3, PW1525G-3, PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines. AD 2020-07-02 applied to all PW PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G33, PW1525G, and PW1525G33 model turbofan engines.

The NPRM published in the *Federal Register* on March 26, 2021 (86 FR 16137). The NPRM was prompted by reports of in-flight shutdowns due to failure of the LPC R1 and by subsequent findings of cracked LPC R1s during inspection. Additionally, the

manufacturer performed further root cause analysis of the LPC R1 failures and determined the need to update the EEC FADEC software to automate rotor speed management and limit the maximum climb and maximum continuous thrust ratings. In the NPRM, the FAA proposed to retain certain requirements of AD 2019-21-11 and none of the requirements of AD 2020-07-02. In the NPRM, the FAA proposed to continue to require a BSI of certain LPC R1s for damage and cracks and, depending on the results of the BSI, replacement of the LPC R1. In the NPRM, the FAA proposed to continue to require repetitive BSIs of certain LPC R1s until replacement of the EEC FADEC software with the updated software. In the NPRM, the FAA also proposed to require a BSI of the LPC R1 after installation of the updated EEC FADEC software if certain Onboard Maintenance Message fault codes are displayed and meet specified criteria.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from two commenters. The commenters were Air Line Pilots Association, International (ALPA) and Delta Air Lines, Inc. (DAL). ALPA supported the proposal without change. DAL supported the proposal but recommended certain changes. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request to Correct the Effective Date of AD 2019-19-11

DAL requested that the FAA correct the reference to the effective date of AD 2019-19-11, in paragraph (g)(1)(i) of this AD from October 29, 2019, to September 26, 2019 (the effective date of AD 2019-19-11).

The FAA agrees and has revised paragraph (g)(1)(i) of this AD as requested. This change adds no additional burden on any operator who is required to comply with this AD.

Request to Allow Use of Later Revisions of Service Information

DAL requested that the FAA add the phrase "or later" after PW Section PW1000G-A-72-00-00-02A-0B5A-A of PW Engine Maintenance Manual (EMM), Issue No. 016, dated January 15, 2021, and PW Section PW1000G-A-72-31-00-00A-312A-D of PW EMM, Issue No. 016, dated January 11, 2021, referenced in Notes 2 and 3 to

paragraph (g)(6) of this AD. DAL stated that if a maintenance technician were troubleshooting Onboard Maintenance Message fault code 7100F0029 or 7100F0030, the maintenance technician would be guided to the latest issue of the publication.

The FAA disagrees to add the phrase “or later” to the required actions section as requested by DAL. Notes 2 and 3 to paragraph (g)(6) of this AD, which contain references to the sections of the EMM specified by DAL, provide guidance for both determining the N1 Exceedance duration and for performing the BSI. This AD does not mandate the use of specific manual revisions for purposes of compliance with the required actions.

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 Pratt & Whitney Service Bulletin (SB) PW1000G-A-72-00-0125-00A-930A-D, Issue No. 002, dated October 24, 2019; Pratt & Whitney SB PW1000G-A-72-00-0075-00B-930A-D, Issue No. 003, dated October 24, 2019; Pratt & Whitney SB PW1000G-A-73-00-0044-00A-930A-D, Issue No. 004, dated February 23, 2021; and Pratt & Whitney SB PW1000G-A-73-00-0023-00B-930A-D, Issue No. 002, dated February 22, 2021. The FAA also reviewed Section PW1000G-A-72-00-00-02A-0B5A-A of Pratt & Whitney EMM, Issue No. 016, dated January 15, 2021; and Section PW1000G-A-72-31-00-00A-312A-D of Pratt & Whitney EMM, Issue No. 016, dated January 11, 2021.

Pratt & Whitney SBs PW1000G-A-72-00-0125-00A-930A-D, Issue No. 002, dated October 24, 2019, and PW1000G-A-72-00-0075-00B-930A-D, Issue No. 003, dated October 24, 2019, describe procedures for performing initial and repetitive BSI of certain LPC R1s. Pratt & Whitney SB PW1000G-A-73-00-0044-00A-930A-D, Issue No.

004, dated February 23, 2021, describes procedures for replacing or modifying the EEC to incorporate EEC FADEC software version V2.11.10.4. Pratt & Whitney SB PW1000G-A-73-00-0023-00B-930A-D, Issue No. 002, dated February 22, 2021, describes procedures for replacing or modifying the EEC to incorporate EEC FADEC software version V9.5.6.7.

Section PW1000G-A-72-00-00-02A-0B5A-A of Pratt & Whitney 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 Pratt & Whitney EMM, Issue No. 016, dated January 11, 2021, describes procedures for performing a BSI of the LPC.

Interim Action

The FAA considers this AD to be an interim action. If final corrective action is later identified, the FAA might consider additional rulemaking.

Costs of Compliance

The FAA estimates that this AD affects 94 engines installed on airplanes of U.S. registry.

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 x \$85 per hour = \$170	\$0	\$170	\$15,980
BSI per inspection cycle	2 work-hours x \$85 per hour = \$170	\$0	\$170	\$15,980

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the inspection. The agency has no way of determining the number of aircraft that might need this replacement:

On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Replace LPC R1	40 work-hours x \$85 per hour =	\$156,000	\$159,400

	\$3,400		
BSI of the LPC R1 if Onboard Maintenance Message fault codes are displayed	2 work-hours x \$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 AD 2019-21-11, Amendment 39-19777 (84 FR 57813, October 29, 2019); and AD 2020-07-02, Amendment 39-21106 (85 FR 17742, March 31, 2020); and

b. Adding the following new airworthiness directive:

2021-14-06 Pratt & Whitney: Amendment 39-21633; Docket No. FAA-2021-0191; Project Identifier AD-2020-01492-E.

(a) Effective Date

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

This AD replaces AD 2019-21-11, Amendment 39-19777 (84 FR 57813, October 29, 2019); and AD 2020-07-02, Amendment 39-21106 (85 FR 17742, March 31, 2020).

(c) Applicability

This AD applies to Pratt & Whitney (PW) 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 uncontained release of the LPC R1, damage to the engine, damage to the airplane, and loss of control of the airplane.

(f) Compliance

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

(g) Required Actions

(1) Except for those model turbofan engines identified in paragraph (g)(2) of this AD, perform a borescope inspection (BSI) of the LPC R1 for damage and cracks as follows:

(i) For engines that have accumulated fewer than 300 flight cycles since new (CSN), perform a BSI within 50 flight cycles (FCs) from September 26, 2019 (the effective date of AD 2019-19-11), or before further flight, whichever occurs later.

(ii) For engines that have accumulated fewer than 300 FCs since installation of V2.11.7 or V2.11.8 electronic engine control (EEC) full authority digital electronic control (FADEC) software, perform a BSI within 50 FCs from October 29, 2019 (the effective date of AD 2019-21-11), or before further flight, whichever occurs later.

(iii) Thereafter, at intervals not to exceed 50 FCs until the engine accumulates 300 flight CSN or accumulates 300 FCs since the installation of V2.11.7 or V2.11.8 EEC FADEC software, whichever occurs later, repeat the BSI for damage and cracks.

(iv) Perform the BSI required by paragraphs (g)(1)(i) through (iii) of this AD at the following LPC R1 locations:

- (A) The blade tip;
- (B) The leading edge;
- (C) The leading edge fillet to rotor platform radius; and
- (D) The airfoil convex side root fillet to rotor platform radius.

(2) For any affected PW model turbofan engine installed as a “zero time spare,” except for PW1519G, PW1521GA, PW1919G, and PW1922G model turbofan engines,

within 15 FCs from the effective date of this AD, and thereafter at intervals not to exceed 15 FCs until the engine accumulates 300 flight CSN, perform a BSI of the LPC R1 for damage and cracks at the locations in paragraph (g)(1)(iv) of this AD.

(3) Based on the results of the BSIs required by paragraphs (g)(1) and (2) 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)(3): Guidance on determining the serviceable limits in paragraph (g)(3) of this AD can be found in PW Service Bulletin (SB) PW1000G-A-72-00-0125-00A-930A-D, Issue No. 002, dated October 24, 2019, and PW SB PW1000G-A-72-00-0075-00B-930A-D, Issue No. 003, dated October 24, 2019.

(4) For PW PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines, within 120 days from the effective date of this AD, remove the EEC FADEC software if the version is earlier than EEC FADEC software version V2.11.10.4 and install EEC FADEC software that is eligible for installation.

(5) For PW PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines, within 120 days of the effective date of this AD, remove the EEC FADEC software if the version is earlier than EEC FADEC software version V9.5.6.7 and install EEC FADEC software that is eligible for installation.

(6) For PW 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 FCs 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 in paragraph (g)(1)(iv) 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; and
- (iii) N1 Exceedance occurs for a duration of 40 seconds (15 seconds of cockpit display) or more during any flight.

Note 2 to paragraph (g)(6): Guidance on determining the N1 Exceedance duration can be found in PW 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)(6): Guidance on performing the BSI can be found in PW Section PW1000G-A-72-31-00-00A-312A-D of PW EMM, Issue No. 016, dated January 11, 2021.

(7) As the result of the BSI of the LPC R1 required by paragraph (g)(6) 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.

(h) Terminating Actions

(1) For PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, and PW1525G-3 model turbofan engines, the installation of EEC FADEC software required by paragraph (g)(4) of this AD terminates the repetitive BSI requirements of paragraphs (g)(1) and (2) of this AD.

(2) For PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines, the installation of EEC FADEC software required by paragraph (g)(5) of this AD terminates the repetitive BSI requirements of paragraphs (g)(1) and (2) of this AD.

(i) Installation Prohibition

After the effective date of this AD, do not install EEC FADEC software earlier than version V2.11.10.4 or version V9.5.6.7 onto any engine identified in paragraph (c) of this AD.

(j) Definitions

(1) For the purpose of this AD, a “zero time spare” is an engine that had zero flight hours time-in-service when it was installed on an airplane after the airplane had entered service.

(2) For the purpose of this AD, “EEC FADEC software that is eligible for installation” is EEC FADEC software version V2.11.10.4 or later for PW1519G, PW1521G, PW1521G-3, PW1521GA, PW1524G, PW1524G-3, PW1525G, PW1525G-3

model turbofan engines and EEC FADEC software version V9.5.6.7 or later for PW1919G, PW1921G, PW1922G, PW1923G, and PW1923G-A model turbofan engines.

(k) 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 Related Information. You may email your request 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.

(3) AMOCs approved for AD 2019-21-11 (84 FR 57813, October 29, 2019) are approved as AMOCs for the corresponding provisions of this AD except for paragraphs (g)(1)(i) through (iv) and (g)(3)(i) and (ii) of this AD.

(l) Related Information

For more information about this AD, contact Nicholas Paine, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7116; fax: (781) 238-7199; email: nicholas.j.paine@faa.gov.

(m) Material Incorporated by Reference

None.

Issued on June 23, 2021.

Lance T. Gant, Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.