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Signed in Washington, DC, on May 20, 2020.

**Treana V. Garrett,**

*Federal Register Liaison Officer, U.S. Department of Energy.*

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## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2020-0442; Project Identifier AD-2020-00260-E]

RIN 2120-AA64

#### **Airworthiness Directives; Pratt & Whitney Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to adopt a new airworthiness directive (AD) for all Pratt & Whitney (PW) PW2037, PW2037M, PW2040, and F117-PW-100 model turbofan engines. This proposed AD was prompted by a report of an uncontained engine failure resulting from cracks in the knife edge of the high-pressure turbine (HPT) 2nd-stage air seal. This proposed AD would require initial and repetitive borescope inspections (BSIs), fluorescent penetrant inspections (FPIs), and visual inspections of the HPT 2nd-stage air seal assembly and, depending on the results of the inspections, replacement of the HPT 2nd-stage air seal assembly with a part eligible for installation. This proposed AD would also require replacement of the affected HPT 2nd-stage air seal assembly, depending on the engine model, at either the next engine shop visit or the next piece-part opportunity. The FAA is proposing this AD to address the unsafe condition on these products.

**DATES:** The FAA must receive comments on this proposed AD by July 16, 2020.

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- **Federal eRulemaking Portal:** Go to <https://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:** Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this NPRM, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118, United States; phone: 800-565-0140; fax: 860-565-5442; email: [help24@pw.utc.com](mailto:help24@pw.utc.com); website: <https://fleetcare.pw.utc.com>. You may view this 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 781-238-7759.

#### **Examining the AD Docket**

You may examine the AD docket on the internet at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-0442; 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 NPRM, any comments received, and other information. The street address for Docket Operations is listed above. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Carol Nguyen, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7655; fax: 781-238-7199; email: [carol.nguyen@faa.gov](mailto:carol.nguyen@faa.gov).

#### **SUPPLEMENTARY INFORMATION:**

##### **Comments Invited**

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under the **ADDRESSES** section. Include “Docket No. FAA-2020-0442; Project Identifier AD-2020-00260-E” at the beginning of your comments. The FAA specifically invites comments on the overall regulatory, economic, environmental, and energy aspects of this NPRM. The FAA will consider all comments received by the closing date and may amend this NPRM because of those comments.

Except for Confidential Business Information as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to <https://www.regulations.gov>, including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact received about this NPRM.

#### **Confidential Business Information**

Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Carol Nguyen, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

#### **Discussion**

The FAA received a report of an uncontained engine failure during a revenue flight. The failure resulted from a crack originating in the knife edge of the HPT 2nd-stage air seal assembly. After further analysis, it was determined that the knife-edge crack was due to seal rubbing that elevated the HPT 2nd-stage air seal temperature and induced fatigue. This condition, if not addressed, could result in uncontained HPT 2nd-stage air seal assembly release, damage to the engine, and damage to the airplane.

#### **Related Service Information Under 14 CFR Part 51**

The FAA reviewed PW Service Bulletin (SB) PW2000 72-773, dated March 11, 2020. The SB describes procedures for performing a BSI of the HPT 2nd-stage air seal assembly. This service information is reasonably available because the interested parties have access to it through their normal

course of business or by the means identified in the **ADDRESSES** section.

**Other Related Service Information**

The FAA reviewed PW SB PW2000 72–754, Revision No. 2, dated April 30, 2019, and PW SB PWF117 72–402, Revision No. 2, dated May 3, 2019. The SBs describe procedures for inspecting and replacing the HPT 2nd-stage air seal assembly.

**FAA’s Determination**

The FAA is proposing this AD because it 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.

**Proposed AD Requirements**

This proposed AD would require initial and repetitive BSIs, FPIs, and visual inspections of the HPT 2nd-stage air seal assembly and, depending on the results of the inspections, replacement of the HPT 2nd-stage air seal assembly with a part eligible for installation. This proposed AD would also require

replacement of the affected HPT 2nd-stage air seal assembly, depending on the engine model, at either the next engine shop visit or the next piece-part opportunity.

**Costs of Compliance**

The FAA estimates that this proposed AD affects 445 engines installed on airplanes of U.S. registry.

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

**ESTIMATED COSTS**

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
BSI the HPT 2nd-stage air seal assembly .....	2 work-hours × \$85 per hour = \$170 .....	\$0	\$170	\$75,650
Visual inspection, strip the knife edge coating, and FPI the HPT 2nd-stage air seal assembly.	10 work-hours × \$85 per hour = \$850 .....	0	850	378,250

The FAA estimates the following costs to do any necessary replacements. The FAA has no way of determining how many replacements of the HPT 2nd-stage air seal assembly will be done

with a modified HPT 2nd-stage air seal assembly and how many will be done with a new HPT 2nd-stage air seal assembly. The FAA also has no way of determining the number of engines that

might need replacement of the HPT 2nd-stage air seal assembly, HPT 1st-stage disk, and HPT 2nd-stage hub.

**ON-CONDITION COSTS**

Action	Labor cost	Parts cost	Cost per product
Replace the HPT 2nd-stage air seal assembly with modified HPT 2nd-stage air seal assembly.	10 work-hours × \$85 per hour = \$850 .....	\$5,000	\$5,850
Replace the HPT 2nd-stage air seal assembly with new seal assembly.	0.25 work-hours × \$85 per hour = \$21.25 .....	355,000	355,021.25
Replace the HPT 2nd-stage air seal assembly, HPT 1st-stage disk, and HPT 2nd-stage hub (based on FPI results).	0.25 work-hours × \$85 per hour = \$21.25 .....	970,000	970,021.25

**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 determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would 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 this proposed regulation:

- (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 Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 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):

**Pratt & Whitney:** Docket No. FAA–2020–0442; Project Identifier AD–2020–00260–E.

**(a) Comments Due Date**

The FAA must receive comments by July 16, 2020.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all Pratt & Whitney (PW) PW2037, PW2037M, PW2040, and F117–PW–100 model turbofan engines.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

**(e) Unsafe Condition**

This AD was prompted by a report of an uncontained engine failure resulting from cracks originating in the knife edge of the high-pressure turbine (HPT) 2nd-stage air seal assembly. The FAA is issuing this AD to prevent failure of the HPT 2nd-stage air seal assembly. The unsafe condition, if not addressed, could result in uncontained HPT 2nd-stage air seal assembly release, damage to the engine, and damage to the airplane.

**(f) Compliance**

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

**(g) Required Actions****(1) Borescope Inspection (BSI) of HPT 2nd-Stage Air Seal Assembly**

For PW PW2037, PW2037M, and PW2040 model turbofan engines with an HPT 2nd-stage air seal assembly, part number (P/N) 1A8209 or 1A8209–001, installed, and with any of the following: An engine with serial number 716301 to 716600, inclusive; 717901 to 717999, inclusive; 718000; 726501 to 727132, inclusive; or 727135 to 727143, inclusive; or an engine that has operated with electronic engine control model number EEC104–1 since the last HPT overhaul:

(i) Within 2,500 flight cycles (FCs) since the last HPT 2nd stage air seal assembly installation or 500 FCs after the effective date of this AD, whichever occurs later, perform an initial BSI of the HPT 2nd-stage air seal assembly using the Accomplishment Instructions, paragraph 6, of PW Service Bulletin (SB) PW2000 72–773, dated March 11, 2020.

(ii) Thereafter, perform the BSI required by paragraph (g)(1)(i) of this AD within every 500 FCs since performance of the last BSI.

(iii) If, during any BSI required by paragraphs (g)(1)(i) or (ii) of this AD, a cracked seal is found, before further flight, remove the HPT 2nd-stage air seal assembly from the engine and perform additional inspections of the HPT 2nd-stage air seal assembly using paragraph (g)(2) of this AD.

**(2) Visual Inspection and Fluorescent Penetrant Inspection (FPI) of HPT 2nd-Stage Air Seal Assembly**

For PW PW2037, PW2037M, PW2040, and F117–PW–100 model turbofan engines, after the effective date of this AD, at every piece part opportunity of the HPT 1st-stage disk, HPT 2nd-stage disk, or the HPT 2nd-stage air seal assembly:

(i) Perform a visual inspection of the HPT 2nd-stage air seal assembly, strip the knife edge coating from the HPT 2nd-stage air seal assembly, and then perform an FPI of the HPT 2nd-stage air seal assembly.

(ii) If a crack is found in the HPT 2nd-stage air seal assembly during the visual inspection or FPI required by paragraph (g)(2)(i) of this AD, before further flight, remove the HPT 2nd-stage air seal assembly from service and replace it with a part eligible for installation.

(iii) If a through-crack is found in the forward edge or aft edge of the HPT 2nd-stage air seal assembly during the visual inspection or FPI required by paragraph (g)(2)(i) of this AD, before further flight, remove the HPT 2nd-stage air seal assembly, mating HPT 1st-stage disk, and HPT 2nd-stage hub from service, and replace the parts with parts eligible for installation. In order to return the mating HPT 1st-stage disk and HPT 2nd-stage hub to service, the inspections of the HPT 2nd-stage air seal assembly cannot reveal a through-crack.

**(3) Replacement of HPT 2nd-Stage Air Seal Assembly**

(i) For PW PW2037, PW2037M, and PW2040 model turbofan engines, at the next engine shop visit after the effective date of this AD, remove the HPT 2nd-stage air seal assembly, P/N 1A8209 or 1A8209–001, and replace it with a part eligible for installation.

(ii) For PW F117–PW–100 model turbofan engines, at the next piece part opportunity after the effective date of this AD, remove the HPT 2nd-stage air seal assembly, P/N 1A8209 or 1A8209–001, and replace it with a part eligible for installation.

**(h) Terminating Action**

Removal of the HPT 2nd-stage air seal assembly, P/N 1A8209 or 1A8209–001, and its replacement with a part eligible for installation as required by paragraph (g)(3) of this AD is a terminating action for the repetitive BSI requirements in paragraph (g)(1)(ii) of this AD.

**(i) Definitions**

(1) 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 pairs of major mating engine flanges, except that the separation of engine flanges solely for the purposes of transportation of the engine without subsequent engine maintenance does not constitute an engine shop visit.

(2) For the purpose of this AD, a “piece-part opportunity” is when the part is completely disassembled.

(3) For the purpose of this AD, a “part eligible for installation” is:

(i) An HPT 2nd-stage air seal assembly that is not P/N 1A8209 or 1A8209–001, or;

(ii) An HPT 2nd-stage air seal assembly that has been modified using PW SB PW2000

72–754, Revision No. 2, dated April 30, 2019, or PW SB PWF117 72–402, Revision No. 2, dated May 3, 2019.

(4) For the purpose of this AD, a “through-crack” is a crack that has propagated through the thickness of the part and is present on both the inner diameter and outer diameter of either the forward or aft edge of the HPT 2nd-stage air seal assembly.

(5) For the purpose of this AD, an “HPT overhaul” is the disassembly of the HPT and maintenance of the HPT module that included an inspection of the HPT 2nd-stage air seal assembly.

**(j) 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 (k)(1) of this AD. You may email your request to: [ANE-AD-AMOC@faa.gov](mailto: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.

**(k) Related Information**

(1) For more information about this AD, contact Carol Nguyen, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781–238–7655; fax: 781–238–7199; email: [carol.nguyen@faa.gov](mailto:carol.nguyen@faa.gov).

(2) For service information identified in this AD, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118, United States; phone: 800–565–0140; fax: 860–565–5442; email: [help24@pw.utc.com](mailto:help24@pw.utc.com); website: <https://fleetcare.pw.utc.com>. 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 781–238–7759.

Issued on May 22, 2020.

**Lance T. Gant,**

*Director, Compliance & Airworthiness Division, Aircraft Certification Service.*

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