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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2010-0596; Directorate Identifier 2010-NE-22-AD; Amendment 39-16533; AD 2010-24-14]**

**RIN 2120-AA64**

#### **Airworthiness Directives; Pratt & Whitney PW4000 Series Turbofan Engines**

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

**ACTION:** Final rule.

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**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for certain Pratt & Whitney PW4000 series turbofan engines. This AD requires initial and repetitive borescope inspections (BSI) or fluorescent penetrant inspections (FPI) for cracks in the anti-vortex tube (AVT) shelf slots on the 10th stage disk of the high-pressure compressor (HPC) drum rotor disk assembly. This AD results from 47 reports received since 2007 of HPC 10th stage disks found cracked in the AVT shelf slots during shop visit inspections. We are issuing this AD to prevent failure of the HPC 10th stage disk, uncontained engine failure, and damage to the airplane.

**DATES:** This AD becomes effective January 21, 2011. The Director of the Federal Register approved the incorporation by reference of certain publications listed in the regulations as of January 21, 2011.

**ADDRESSES:** You can get the service information identified in this AD from Pratt & Whitney, 400 Main St., East Hartford, CT 06108; telephone (860) 565-8770; fax (860) 565-4503.

The Docket Operations office is located at Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue, SE., West Building Ground Floor, Room W12-140, Washington, DC 20590-0001.

**FOR FURTHER INFORMATION CONTACT:** James Gray, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: james.e.gray@faa.gov; telephone (781) 238-7742; fax (781) 238-7199.

**SUPPLEMENTARY INFORMATION:** The FAA proposed to amend 14 CFR part 39 with a proposed AD. The proposed AD applies to certain Pratt & Whitney PW4000 series turbofan engines.

We published the proposed AD in the Federal Register on July 14, 2010 (75 FR 40757). That action proposed to require initial and repetitive BSI or FPI for cracks in the AVT shelf slots on the 10th stage disk of the HPC drum rotor disk assembly.

### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov>; or in person at the Docket Operations office 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 Operations office (telephone (800) 647-5527) is provided in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

### **Comments**

We provided the public the opportunity to participate in the development of this AD. We have considered the comments received.

### **Request for Airplane Model Changes in the Applicability**

One commenter, The Boeing Company, requests that we change the list of airplane models in the applicability paragraph. The commenter requests that we add the 747-400 and -400F airplane models, and remove the 747-200 airplane model. These changes will make the list accurate.

We agree. We changed the AD applicability to reflect these changes.

### **Request To Include Engine Removal Disassembly Labor Costs**

One commenter, Japan Airlines, requests that we change the costs of compliance estimate to include engine removal and disassembly labor costs. The commenter states that their domestic routes can go 7,000 cycles-in-service or more between engine overhauls. Since the inspection compliance interval in the proposed AD is within every 7,200 cycles-in-service, some of their engines could be removed and disassembled before they would normally be scheduled.

We do not agree. The inspection compliance interval of within every 7,200 cycles-in-service captures when most of the fleet will remove the low-pressure turbine shaft, or overhaul the HPC. Most operators will incur no additional costs. We did not change the AD.

### **Request To Add Service Bulletins as Terminating Action**

Two commenters, Martinair Holland and Delta Airlines, Inc., request that we add Pratt & Whitney Service Bulletin (SB) No. PW4ENG 72-801 to the AD as terminating action for the repeat inspection. The commenters state that Pratt & Whitney issued that SB, as well as SB No. PW4G-100-72-225, to introduce a redesigned HPC 9th stage stator that will correct the cracking problem.

We agree. We modified the AD to include optional terminating action for the repetitive inspections.

### **Reference the Latest Service Bulletin**

Since we issued the proposed AD, Pratt & Whitney has issued Revision 1 of Pratt & Whitney SB No. PW4ENG 72-799. We updated the AD to reference Revision 1 of this SB.

## **Conclusion**

We have carefully reviewed the available data, including 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 will neither increase the economic burden on any operator nor increase the scope of the AD.

## **Interim Actions**

These actions are interim actions and we may take further rulemaking actions in the future.

## **Costs of Compliance**

We estimate that this AD will affect 869 engines installed on airplanes of U.S. registry. We also estimate that it will take about one work-hour per engine to perform an inspection, and that the average labor rate is \$85 per work-hour. Required parts will cost about \$303,010 per HPC drum rotor disk assembly. About 61 HPC drum rotor disk assemblies will need replacement due to cracks. Based on these figures, we estimate the cost of the AD on U.S. operators to be \$18,557,475.

## **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**

We have 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) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); 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.

We prepared a summary of the costs to comply with this AD and placed it in the AD Docket. You may get a copy of this summary at the address listed under ADDRESSES.

## **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 Federal Aviation Administration 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:



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**2010-24-14 Pratt & Whitney:** Amendment 39-16533. Docket No. FAA-2010-0596; Directorate Identifier 2010-NE-22-AD.

**Effective Date**

- (a) This airworthiness directive (AD) becomes effective January 21, 2011.

**Affected ADs**

- (b) None.

**Applicability**

(c) This AD applies to the following Pratt & Whitney turbofan engines with a ring case configuration rear high-pressure compressor (HPC) installed, that includes a 9th stage compressor stator segment assembly with 24 slots. These engines are installed on, but not limited to, Boeing 747-400/-400F, 767-200/-300, and MD-11 airplanes, and Airbus A300-600, A310-300, A330-300, and A330-200 airplanes.

**PW4000-94" Engines**

(1) PW4000-94" series engine models PW4050, PW4052, PW4056, PW4060, PW4060A, PW4060C, PW4062, PW4062A, PW4152, PW4156, PW4156A, PW4158, PW4160, PW4460, PW4462, and PW4650, including all models with a dash number suffix.

**PW4000-100" Engines**

(2) PW4000-100" series engine models PW4168A-1D and PW4170 with serial numbers P735001 through P735039; and

(3) All engines converted to PW4164-1D, PW4168-1D, PW4168A-1D, or PW4170 model engines.

**Unsafe Condition**

(d) This AD results from 47 reports received since 2007 of HPC 10th stage disks found cracked in the anti-vortex tube (AVT) shelf slots during shop visit inspections. We are issuing this AD to prevent failure of the HPC 10th stage disk, uncontained engine failure, and damage to the airplane.

**Compliance**

(e) You are responsible for having the actions required by this AD performed within the compliance times specified unless the actions have already been done.

## **Initial Inspection of the AVT Shelf Slots**

(f) For engines listed in paragraphs (c)(1) and (c)(3) of this AD, do the following:

(1) Remove the low-pressure turbine (LPT) shaft and borescope-inspect (BSI) for cracks in the AVT shelf slots on the 10th stage disk of the HPC drum rotor disk assembly; or

(2) Remove the HPC drum rotor disk assembly and fluorescent-penetrant inspect (FPI) for cracks in the AVT shelf slots on the 10th stage disk of the HPC drum rotor disk assembly.

(3) Perform the inspection:

(i) Within 7,200 cycles-in-service (CIS) since incorporation of any of the following Pratt & Whitney Service Bulletins: (SB) No. PW4ENG 72-755, SB No. PW4ENG 72-756, SB No. PW4ENG 72-757, SB No. PW4ENG 72-759, or SB No. PW4G-100-72-220; or

(ii) Within 1,000 CIS after the effective date of this AD, whichever occurs later.

(4) If a crack is found, remove the HPC drum rotor disk assembly from service.

(g) For engines listed in paragraph (c)(2) of this AD, do the following:

(1) Remove the LPT shaft and BSI for cracks in the AVT shelf slots on the 10th stage disk of the HPC drum rotor disk assembly; or

(2) Remove the HPC drum rotor disk assembly and FPI for cracks in the AVT shelf slots on the 10th stage disk of the HPC drum rotor disk assembly.

(3) Perform the inspection:

(i) Within 7,200 cycles-since-new; or

(ii) Within 1,000 CIS after the effective date of this AD, whichever occurs later.

(4) If a crack is found, remove the HPC drum rotor disk assembly from service.

## **Repetitive Inspections of the AVT Shelf Slots**

(h) Thereafter, perform a BSI or FPI for cracks in the AVT shelf slots on the 10th stage HPC disk of the HPC drum rotor disk assembly within every 7,200 cycles-since-last-inspection.

(i) If a crack is found, remove the HPC drum rotor disk assembly from service.

## **Relevant Service Bulletins**

(j) Use paragraphs 3.A through 3.H of the Accomplishment Instructions of Pratt & Whitney SB No. PW4ENG 72-799, Revision 1, dated October 14, 2010, to perform the BSIs for engines listed in paragraph(c)(1) of this AD.

(k) Use paragraphs 3.A through 3.H of the Accomplishment Instructions of Pratt & Whitney SB No. PW4G-100-72-226, dated April 22, 2010, to perform the BSIs for engines listed in paragraphs(c)(2) and (c)(3) of this AD.

## **Optional Terminating Action**

(l) As optional terminating action to the repetitive inspection requirements of this AD, install new 9th stage compressor stator segments, part number (P/N) 50S479-01, P/N 50S479-02, P/N 50S479-03, and P/N 50S479-04, and perform one of the following:

(1) At the time the new 9th stage compressor stator segments are installed, replace the HPC drum rotor disk assembly with a new, 0 cycle, HPC drum rotor disk assembly; or

(2) At the time the new 9th stage compressor stator segments are installed, replace the 10th stage HPC disk with a new, 0 cycle, 10th stage HPC disk; or

(3) Perform a one-time BSI or FPI for cracks in the AVT shelf slots on the 10th stage HPC disk of the HPC drum rotor disk assembly between 4,000 and 7,200 cycles-in-service since installation of the new 9th stage compressor stator segments.

(i) If a crack is found, remove the HPC drum rotor disk assembly from service.

(ii) If no crack is found, then no further inspections are required.

(4) Guidance on installation of the new 9th stage compressor stator segments can be found in Pratt & Whitney SB No. PW4ENG 72-801, Revision 1, dated September 8, 2010, for engines listed in paragraph(c)(1) of this AD and in Pratt & Whitney SB No. PW4G-100-72-225 dated April 20, 2010, for engines listed in paragraphs(c)(2) and (c)(3) of this AD.

### **Alternative Methods of Compliance (AMOCs)**

(m) The Manager, Engine Certification Office, has the authority to approve AMOCs for this AD if requested using the procedures found in 14 CFR 39.19.

### **Related Information**

(n) Contact James Gray, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; e-mail: james.e.gray@faa.gov; telephone (781) 238-7742; fax (781) 238-7199, for more information about this AD.

### **Material Incorporated by Reference**

(o) You must use Pratt & Whitney Service Bulletin (SB) No. PW4G-100-72-226, dated April 22, 2010, and Pratt & Whitney SB No. PW4ENG 72-799, Revision 1, dated October 14, 2010, to perform the borescope inspections required by this AD. The Director of the Federal Register approved the incorporation by reference of these documents in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; telephone (860) 565-8770; fax (860) 565-4503, for a copy of this service information. You may review copies at the FAA, New England Region, 12 New England Executive Park, Burlington, MA; or 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 November 17, 2010.

Peter A. White,  
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Aircraft Certification Service.