



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2010-0217; Directorate Identifier 2009-NE-23-AD;**

**RIN 2120-AA64**

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

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

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

**SUMMARY:** We propose to supersede an existing airworthiness directive (AD) that applies to all Pratt & Whitney Division (Pratt & Whitney) PW4052, PW4056, PW4060, PW4062, PW4062A, PW4074, PW4077, PW4077D, PW4084D, PW4090, PW4090-3, PW4152, PW4156A, PW4158, PW4164, PW4168, PW4168A, PW4460, and PW4462 turbofan engines. The existing AD currently requires initial and repetitive fluorescent penetrant inspections (FPI) for cracks in the blade locking and loading slots of the high-pressure compressor (HPC) drum rotor disk assembly rear drum. Since we issued that AD, Pratt & Whitney has developed a redesigned HPC drum rotor disk assembly for certain affected engine models. This proposed AD would also require replacement of the 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> stage HPC seals as an additional action and would add an optional terminating action to the repetitive inspection requirements by allowing replacement of the entire HPC drum rotor disk assembly. We are proposing this AD to prevent failure of the HPC drum rotor disk assembly, which could lead to an uncontained engine failure, and damage to the airplane.

**DATES:** We must receive comments on this proposed AD by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**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 <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: 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 AD, contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; phone: 860-565-7700; fax: 860-565-1605. You may review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

#### **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 proposed 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:** James Gray, Aerospace Engineer, Engine & Propeller Directorate, FAA, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7742; fax: 781-238-7199; e-mail: [james.e.gray@faa.gov](mailto:james.e.gray@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Comments Invited**

We invite you to send any written relevant data, views, or arguments about this proposed AD. Send your comments to an address listed under the ADDRESSES section. Include “Docket No. FAA-2010-0217; Directorate Identifier 2009-NE-23-AD” at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed 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 proposed AD.

### **Discussion**

On August 26, 2010, we issued AD 2010-18-13, Amendment 39-16427 (75 FR 55459, September 13, 2010), for all Pratt & Whitney PW4052, PW4056, PW4060, PW4062, PW4062A, PW4074, PW4077, PW4077D, PW4084D, PW4090, PW4090-3, PW4152, PW4156A, PW4158, PW4164, PW4168, PW4168A, PW4460, and PW4462 turbofan engines. That AD requires initial and repetitive FPI for cracks in the blade locking and loading slots of the HPC rear drum. That AD resulted from reports of cracked locking and loading slots in the HPC rear drum. We issued that AD to prevent failure of the HPC drum rotor disk assembly, which could lead to an uncontained engine failure, and damage to the airplane.

### **Actions Since Existing AD Was Issued**

Since we issued AD 2010-18-13 (75 FR 55459, September 13, 2010), Pratt & Whitney has developed a redesigned HPC drum rotor disk assembly for PW4000-94” and

PW4000-100” engine models. The redesign includes new 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> stage HPC seals that lower the temperature in the loading and locking slots and decrease the likelihood of cracking. Based on the risk analysis, it was determined that installing the redesigned 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> stage HPC seals on the original design HPC drum rotor disk assembly is an additional required action to maintain an acceptable level of safety and prevent cracking in the loading and locking slots while the redesigned HPC drum rotor disk assembly is being implemented. The option of installing a redesigned HPC drum rotor disk assembly is considered final corrective action to the repetitive inspections required by this AD.

#### **Relevant Service Information**

Prior to publishing AD 2010-18-13 (75 FR 55459, September 13, 2010), we reviewed the technical contents of Pratt & Whitney Service Bulletin (SB) No. PW4ENG 72-796, dated June 11, 2009, SB No. PW4G-100-72-186, Revision 1, dated September 2, 2004, and SB No. PW4G-112-72-264, Revision 2, dated February 23, 2010. Those three SBs describe procedures for performing a local FPI of the HPC rear drum blade locking and loading slots for cracks.

During the development of this proposed AD, we reviewed Pratt & Whitney SB No. PW4ENG 72-816, dated December 2, 2011, and SB No. PW4G-100-72-240, dated November 15, 2011. Those two SBs describe procedures for replacing the 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> stage HPC seals in PW4000-94” and PW4000-100” engine models, with redesigned seals. We also reviewed Pratt & Whitney SB No. PW4ENG 72-817, dated December 7, 2011, and SB No. PW4G-100-72-241, dated November 15, 2011. Those two SBs describe procedures for replacing the HPC drum rotor disk assemblies in PW4000-94” and PW4000-100” engine models, with redesigned HPC drum rotor disk assemblies.

### **FAA's Determination**

We are proposing 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.

### **Proposed AD Requirements**

This proposed AD would retain all of the requirements of AD 2010-18-13 (75 FR 55459, September 13, 2010). This proposed AD would also require replacement of the 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> stage HPC seals with redesigned seals, and would add an optional terminating action to the repetitive inspection requirements by allowing replacement of the HPC drum rotor disk assembly with a redesigned HPC drum rotor disk assembly.

### **Costs of Compliance**

We estimate that this proposed AD would affect 911 engines installed on airplanes of U.S. registry. We also estimate that it would take about 1 work-hour per engine to perform an inspection using an average labor rate of \$85 per work-hour. We estimate that there are 770 PW4000-94" and PW4000-100" engines that would require replacement of 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup> stage HPC seals, at a parts cost of \$3,000 per engine. No additional labor is assumed when the replacement is done at piece-part exposure of the HPC drum rotor disk assembly. The replacement parts cost of the redesigned HPC drum rotor disk assembly is \$630,000. Based on these figures, we estimate that the total cost of the proposed AD to U.S. operators will be \$2,387,435.

### **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 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 that the proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under the 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.

### **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 removing airworthiness directive (AD) 2010-18-13, Amendment 39-16427 (75 FR 55459, September 13, 2010), and adding the following new AD:

**Pratt & Whitney Division:** Docket No. FAA-2010-0217; Directorate Identifier 2009-NE-23-AD.

#### **(a) Comments Due Date**

The FAA must receive comments on this AD action by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

This AD supersedes AD 2010-18-13, Amendment 39-16427 (75 FR 55459, September 13, 2010).

#### **(c) Applicability**

This AD applies to the following Pratt & Whitney Division (Pratt & Whitney) turbofan engines:

(1) PW4000-94” engine models PW4052, PW4056, PW4060, PW4062, PW4062A, PW4152, PW4156A, PW4158, PW4460, and PW4462, including those models with any dash number suffix, with a high-pressure compressor (HPC) drum rotor disk assembly listed in Table 1 of this AD.

(2) PW4000-100” engine models PW4164, PW4168, and PW4168A, with a HPC drum rotor disk assembly listed in Table 1 of this AD.

(3) PW4000-112” engine models PW4074, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3, with a HPC drum rotor disk assembly listed in Table 1 of this AD.

**Table 1 – Affected HPC Drum Rotor Disk Assemblies**

<b>Engine Models</b>	<b>Affected HPC Drum Rotor Disk Assembly Part Numbers</b>
PW4000-94”	50H936; 50H936-002; 53H923-01; 53H923-001; 53H973-01; 53H973-001; 54H803-01; 54H803-001; 54H803-002; 56H013-01; 56H013-001; 58H236-01
PW4000-100”	53H973-01; 53H973-001; 54H803-01; 54H803-001; 54H803-002; 56H013-01; 56H013-001; 58H236-01
PW4000-112”	55H722-01; 55H410-01; 57H010-01; 57H210-01; 57H610-01; 57H910-01

**(d) Unsafe Condition**

This AD was prompted by Pratt & Whitney developing a redesigned HPC drum rotor disk assembly for certain affected engine models. We are issuing this AD to prevent failure of the HPC drum rotor disk assembly, which could lead to an uncontained engine failure, and damage to the airplane.

**(e) Compliance**

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

**(f) Local Fluorescent Penetrant Inspection**

(1) Perform a local fluorescent penetrant inspection for cracks in the HPC drum rotor disk assembly rear drum blade locking and loading slots of the specific stages of the HPC drum rotor disk assemblies from which any of the blades are removed as specified in Table 2 of this AD.

**Table 2 – Compliance Times and Service Bulletins by Engine Model**

<b>For Engine Model</b>	<b>Inspect whenever ...</b>	<b>To inspect, use...</b>
PW4074, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3.	Any of the HPC 13 <sup>th</sup> or 14 <sup>th</sup> stage blades are removed during a shop visit.	Paragraphs 1.A. through 1.B. of the Accomplishment Instructions of PW4G-112-72-264, Revision 2, dated February 23, 2010.
PW4164, PW4168, and PW4168A.	Any of the HPC 13 <sup>th</sup> , 14 <sup>th</sup> , or 15 <sup>th</sup> stage blades are removed during a shop visit.	Paragraphs 1.A. through 1.C of the Accomplishment Instructions of PW4G-100-72-186, Revision 1, dated September 2, 2004.
PW4052, PW4056, PW4060, PW4062, PW4062A, PW4152, PW4156A, PW4158, PW4460, and PW4462.	Any of the HPC 13 <sup>th</sup> , 14 <sup>th</sup> , or 15 <sup>th</sup> stage blades are removed during a shop visit.	Paragraphs 1.A. through 1.C. of the Accomplishment Instructions of PW4ENG 72-796, dated June 11, 2009.

(2) Remove from service any HPC drum rotor disk assembly rear drum found with a crack in any of the blade loading and locking slots.

**(g) Replacement of 13th, 14th, and 15th HPC Seals**

At the next piece-part exposure of the HPC drum rotor disk assembly after the effective date of this AD:

(1) Replace the 13th, 14th, and 15th stage HPC seals of engines listed in paragraph (c)(1) of this AD in accordance with the Accomplishment Instructions of Pratt & Whitney Service Bulletin (SB) No. PW4ENG 72-816, dated December 2, 2011.

(2) Replace the 13th, 14th, and 15th stage HPC seals of engines listed in paragraph (c)(2) of this AD in accordance with the Accomplishment Instructions of Pratt & Whitney SB No. PW4G-100-72-240, dated November 15, 2011.

**(h) Optional Terminating Action**

As optional terminating action to the repetitive inspection requirements of this AD:

(1) Replace the HPC drum rotor disk assembly of engines listed in paragraph (c)(1) of this AD with a redesigned HPC drum rotor disk assembly in accordance with the Accomplishment Instructions of Pratt & Whitney SB No. PW4ENG 72-817, dated December 7, 2011.

(2) Replace the HPC drum rotor disk assembly of engines listed in paragraph (c)(2) of this AD with a redesigned HPC drum rotor disk assembly in accordance with the Accomplishment Instructions of Pratt & Whitney SB No. PW4G-100-72-241, dated November 15, 2011.

**(i) Definition**

For the purpose of this AD, piece-part exposure means that the HPC drum rotor disk assembly is removed from the engine and completely disassembled.

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

The Manager, Engine Certification Office, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request. AMOCs approved previously in accordance with AD 2010-18-13, Amendment 39-16427 (75 FR 55459, September 13, 2010) are approved as AMOCs for the corresponding requirements in paragraph (f) of this AD.

**(k) Related Information**

(1) For more information about this AD, contact James Gray, Aerospace Engineer, Engine & Propeller Directorate, FAA, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7742; fax: 781-238-7199; e-mail: james.e.gray@faa.gov.

(2) For service information identified in this AD, contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; phone: 860-565-7700; fax: 860-565-1605. You may

review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Issued in Burlington, Massachusetts, on May 16, 2012.

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

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