

# DEPARTMENT OF TRANSPORTATION

## Federal Aviation Administration

### 14 CFR Part 39

[Docket No. FAA-2011-0273; Directorate Identifier 2011-NE-08-AD; Amendment 39-16845; AD 2011-22-03]

RIN 2120-AA64

### Airworthiness Directives; Rolls-Royce Corporation Turbofan Engines

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

**ACTION:** Final rule; request for comments.

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**SUMMARY:** We are adopting a new airworthiness directive (AD) for Rolls-Royce Corporation (RRC) AE 3007A, AE 3007A1/1, AE 3007A1, AE 3007A1/3, AE 3007A1E, AE 3007A1P, and AE 3007A3 turbofan engines. This AD requires initial and repetitive eddy current inspections (ECI) of certain 6th-through-13th stage compressor wheel knife edge seals, and initial and repetitive ECIs of the compressor wheel outer circumference, for cracks. This AD was prompted by reports of low-cycle fatigue cracks found during shop visits, in the 6th-through-13th stage compressor wheels having chrome-carbide coated or uncoated knife edge seals. We are issuing this AD to prevent uncontained failure of the 6th-through-13th stage compressor wheel, leading to damage to the airplane.

**DATES:** This AD is effective November 17, 2011.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of November 17, 2011.

We must receive comments on this AD by December 19, 2011.

**ADDRESSES:** You may send comments 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: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this AD, contact Rolls-Royce Corporation, P.O. Box 420, Indianapolis, IN 46206; phone: (317) 230-3774; fax: (317) 230-6084; email: [indy.pubs.services@rolls-royce.com](mailto:indy.pubs.services@rolls-royce.com). 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 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:** Kyri Zaroyiannis, Aerospace Engineer, Chicago Aircraft Certification Office, Small Airplane Directorate, FAA, 2300 E. Devon Ave., Des Plaines, IL 60018; phone: (847) 294-7836; fax: (847) 294-7834; email: [kyri.zaroyiannis@faa.gov](mailto:kyri.zaroyiannis@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

We received reports of low-cycle fatigue cracks found during shop visits, in the 6th-through-13th stage compressor wheels having chrome-carbide coated or uncoated knife edge seals, on RRC AE 3007A, AE 3007A1/1, AE 3007A1, AE 3007A1/3, AE 3007A1E, AE 3007A1P, and AE 3007A3 turbofan engines. These cracks can deteriorate the integrity of the compressor wheel by lengthening into the outer circumference of the wheel. This condition, if not corrected, could result in uncontained failure of the 6th-through-13th stage compressor wheel, leading to damage to the airplane.

### **Relevant Service Information**

We reviewed RRC Alert Service Bulletin (ASB) No. AE 3007A-A-72-386, Revision 4, dated June 27, 2011, which describes procedures for performing a one-time comprehensive ECI of the compressor wheel outer circumference, for cracks. We also reviewed RRC ASB No. AE 3007A-A-72-390, Revision 3, dated June 27, 2011, which describes procedures for initial and repetitive inspections of affected 6th-through-13th stage compressor wheel knife edge seals and the compressor wheel outer circumference, for cracks.

### **FAA's Determination**

We are issuing 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.

### **AD Requirements**

This AD requires accomplishing the actions specified in the service information described previously. The AD also requires sending the inspection results to AE Service Data, Rolls-Royce Corporation, Attn: AE Service Data Manager, P.O. Box 420, Speed Code U17, Indianapolis, IN 46206-0420, email: [.](mailto:royce.com)

### **FAA's Justification and Determination of the Effective Date**

An unsafe condition exists that requires the immediate adoption of this AD. The FAA has found that the risk to the flying public justifies waiving notice and comment prior to adoption of this rule because our risk assessment indicates these parts, uninspected, pose an unacceptable level of risk to the traveling public. Therefore, we find that notice and opportunity for prior public comment are impracticable and that good cause exists for making this amendment effective in less than 30 days.

## Comments Invited

This AD is a final rule that involves requirements affecting flight safety and was not preceded by notice and an opportunity for public comment. However, we invite you to send any written data, views, or arguments about this AD. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2011-0273 and Directorate Identifier 2011-NE-08-AD at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this AD. We will consider all comments received by the closing date and may amend this 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 AD.

## Costs of Compliance

We estimate that this AD will affect 1,402 RRC AE 3007A, AE 3007A1/1, AE 3007A1, AE 3007A1/3, AE 3007A1E, AE 3007A1P, and AE 3007A3 turbofan engines installed on 616 airplanes of U.S. registry. We also estimate that it will take about 6 hours to perform one inspection of the affected 6th-through-13th stage compressor wheel knife edge seals and the compressor wheel outer circumference, for each engine. The average labor rate is \$85 per work-hour. We anticipate required parts costs to be \$35,546,000. Based on these figures, we estimate the total cost of the AD to U.S. operators to be \$36,259,926.

## 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

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),
- (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.

## **Adoption of 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 adding the following new airworthiness directive (AD):



**2011-22-03 Rolls-Royce Corporation (Formerly Allison Engine Company):** Amendment 39-16845; Docket No. FAA-2011-0273; Directorate Identifier 2011-NE-08-AD.

**(a) Effective Date**

This AD is effective November 17, 2011.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to Rolls-Royce Corporation (RRC) AE 3007A, AE 3007A1/1, AE 3007A1, AE 3007A1/3, AE 3007A1E, AE 3007A1P, and AE 3007A3 turbofan engines, with any of the 6th-through-13th stage compressor wheel part numbers (P/Ns) in Table 1 of this AD installed.

**Table 1–6th-Through-13th Stage Compressor Wheel P/Ns Affected by This AD**

<b>Compressor Wheel Stage:</b>	<b>Wheel P/Ns with Chrome-Carbide Coated Knife Seals:</b>	<b>Wheel P/Ns with Uncoated Knife Seals:</b>
6 <sup>th</sup>	23074717	23062666, 23071261, 23071396
7 <sup>th</sup>	23074719, 23074217	23062667, 23071262, 23071397
8 <sup>th</sup>	23074721	23061628, 23071263,
9 <sup>th</sup>	23074722	23061629, 23071264
10 <sup>th</sup>	23074723	23061630, 23071265
11 <sup>th</sup>	23074724	23061631, 23066231
12 <sup>th</sup>	23074725	23061632, 23071267
13 <sup>th</sup>	23074213, 23074726	23061633, 23071268

**(d) Unsafe Condition**

This AD was prompted by reports of low-cycle fatigue cracks found during shop visits, in the 6th-through-13th stage compressor wheels having chrome-carbide coated or uncoated knife edge seals. We are issuing this AD to prevent uncontained failure of the 6th-through-13th stage compressor wheel, leading to damage to the airplane.

**(e) Compliance**

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

**(f) Initial Inspection**

The initial inspection compliance times for the 6th-through-13th stage compressor wheels are based on cycles-since-new (CSN) and cycles-in-service (CIS) of their 12th and 13th stage compressor wheels. For engines that one or both 12th and 13th stage compressor wheels have chrome-carbide coated knife edge seals, use the compliance times listed in Table 2 of this AD. For engines that both 12th and 13th stage compressor wheels do not have chrome-carbide coated knife edge seals, use the compliance times listed in Table 3 of this AD.

(1) Perform a one-time comprehensive eddy current inspection (ECI) of the 6th-through-13th stage compressor wheel knife edge seals for cracks, using paragraph 2, Accomplishment Instructions, of RRC Alert Service Bulletin (ASB) No. AE 3007A-A-72-386, Revision 4, dated June 27, 2011 (Completion of this one-time comprehensive ECI relieves you thereafter of the repetitive inspection requirements of this AD); or

(2) Perform an initial ECI of the 6th-through-13th stage compressor wheel outer circumferences for cracks, using paragraph 2, Accomplishment Instructions, of RRC ASB No. AE 3007A-A-72-390, Revision 3, dated June 27, 2011.

**Table 2—Initial Inspection Compliance Times for Engines, That One or Both 12th and 13th Stage Compressor Wheels Have Chrome-Carbide Coated Knife Edge Seals**

<b>For 12<sup>th</sup> and or 13<sup>th</sup> Stage Compressor Wheels With the Following CSN on the Effective Date of this AD:</b>	<b>Initially Inspect After the Effective Date of this AD:</b>
(i) 18,185 or more CSN.	Within 15 CIS.
(ii) 16,700 to 18,184 CSN.	Before accumulating 18,200 CSN.
(iii) 16,000 to 16,699 CSN.	Within 1,500 CIS.
(iv) 15,100 to 15,999 CSN.	Within 2,000 CIS.
(v) 14,300 to 15,099 CSN.	Within 2,800 CIS.
(vi) 13,000 to 14,299 CSN.	Within 3,400 CIS.
(vii) 12,300 to 12,999 CSN.	Within 4,000 CIS.
(viii) 11,200 to 12,299 CSN.	Within 4,600 CIS.
(ix) 9,700 to 11,199 CSN	Within 5,300 CIS.
(x) Fewer than 9,700 CSN.	Before accumulating 15,000 CSN or at the next shop visit when the engine has more than 7,000 cycles, whichever occurs first.

**Table 3–Initial Inspection Compliance Times for Engines, That Both 12<sup>th</sup> and 13th Stage Compressor Wheels Do Not Have Chrome-Carbide Coated Knife Edge Seals**

<b>For 12<sup>th</sup> and or 13<sup>th</sup> Stage Compressor Wheels With the Following CSN on the Effective Date of this AD:</b>	<b>Initially Inspect After the Effective Date of This AD:</b>
(i) 18,300 or more CSN.	Within 200 CIS.
(ii) 16,000 to 18,299 CSN.	Within 1,500 CIS.
(iii) 15,100 to 15,999 CSN.	Within 2,000 CIS.
(iv) 14,300 to 15,099 CSN.	Within 2,800 CIS.
(v) 13,000 to 14,299 CSN.	Within 3,400 CIS.
(vi) 12,300 to 12,999 CSN.	Within 4,000 CIS.
(vii) 11,200 to 12,299 CSN.	Within 4,600 CIS.
(viii) 9,700 to 11,199 CSN.	Within 5,300 CIS.
(ix) Fewer than 9,700 CSN.	Before accumulating 15,000 CSN or at the next shop visit when the engine has more than 7,000 cycles, whichever occurs first.

**(g) Repetitive Inspections**

(1) After passing the initial inspection, perform repetitive ECIs of the compressor wheel outer circumference, for cracks, within every 5,000 cycles-since-last-inspection (CSLI), using paragraph 2, Accomplishment Instructions, of RRC ASB No. AE 3007A-A-72-390, Revision 3, dated June 27, 2011; or

(2) Perform a one-time comprehensive ECI of the 6th-through-13th stage compressor wheel knife edge seals for cracks, within 5,000 CSLI using paragraph 2, Accomplishment Instructions, of RRC ASB No. AE 3007A-A-72-386, Revision 4, dated June 27, 2011. Completion of this one-time ECI comprehensive inspection relieves you thereafter of the repetitive inspection requirements of this AD.

**(h) 6th-Through-13th Stage Compressor Wheels Found Cracked**

Remove from service before further flight 6th-through-13th stage compressor wheels that are found cracked.

**(i) Special Flight Permits**

Special Flight Permits are limited to essential flight crew only.

**(j) Reporting Requirements**

Report all inspection results within 10 days, to AE Service Data, Rolls-Royce Corporation, Attn: AE Service Data Manager, P.O. Box 420, Speed Code U17, Indianapolis, IN 46206-0420, email: royce.com">cra.rel.data@rolls-royce.com. Use the reporting instructions in:

(1) Paragraph 2.D. of ASB No. AE 3007A-A-72-386, Revision 4, dated June 27, 2011.

(2) Service Bulletin Compliance Form of RRC ASB No. AE 3007A-A-72-390, Revision 3, dated June 27, 2011.

**(k) Paperwork Reduction Act Burden Statement**

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2120-0056. Public reporting for this collection of information is estimated to be approximately 5 minutes per response, including the time for reviewing instructions, completing and reviewing the collection of information. All responses to this collection of information are mandatory. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave. SW., Washington, DC 20591, Attn: Information Collection Clearance Officer, AES-200.

**(l) Previous Inspection Credit**

(1) If you previously performed an ECI of the 6th-through-13th stage compressor wheels using RRC ASB No. AE 3007A-A-390, Revision 1, dated February 14, 2011 or Revision 2, dated June 10, 2011, or Revision 3, dated June 27, 2011, you met the initial inspection requirements of this AD.

(2) If you previously performed a one-time comprehensive ECI of the 6th-through-13th stage compressor wheel knife edge seals, using RRC ASB No. AE 3007A-A-72-386, dated October 20, 2010, or Revision 1, dated December 17, 2010, or Revision 2 dated January 10, 2011, or Revision 3, dated June 10, 2011, you met the initial inspection requirements of paragraph (f) of this AD. Completion of this one-time comprehensive inspection relieves you of the repetitive inspection requirements of this AD.

(3) If you previously performed an ultrasonic inspection of the compressor wheel knife edge seals, using RRC Service Bulletin No. AE 3007A-72-382, dated April 6, 2010, prior to publication of RRC ASB No. AE 3007A-A-72-386, dated October 20, 2010, you met the initial inspection requirements of this AD. Completion of this one-time ultrasonic inspection relieves you of the repetitive inspection requirements of this AD.

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

The Manager, Chicago Aircraft Certification Office, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request.

**(n) Related Information**

For more information about this AD, contact Kyri Zaroyiannis, Aerospace Engineer, Chicago Aircraft Certification Office, Small Airplane Directorate, FAA, 2300 E. Devon Ave., Des Plaines, IL 60018; phone: (847) 294-7836; fax: (847) 294-7834; email: kyri.zaroyiannis@faa.gov.

**(o) Material Incorporated by Reference**

You must use the following service information to do the actions required by this AD, unless the AD specifies otherwise. The Director of the Federal Register approved the incorporation by reference (IBR) under 5 U.S.C. 552(a) and 1 CFR part 51 of the following service information on the date specified:

(1) Rolls-Royce Corporation Alert Service Bulletin No. AE 3007A-A-72-386, Revision 4, dated June 27, 2011, approved for IBR November 17, 2011.



(2) Rolls-Royce Corporation Alert Service Bulletin No. AE 3007A-A-72-390, Revision 3, dated June 27, 2011, approved for IBR November 17, 2011.

(3) For service information identified in this AD, contact Rolls-Royce Corporation, P.O. Box 420, Indianapolis, IN 46206; phone: (317) 230-3774; fax: (317) 230-6084; email: [.](mailto:royce.com)

(4) You may review copies of the 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.

(5) You may also review copies of the service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at an NARA facility, call (202) 741-6030, or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

Issued in Burlington, Massachusetts, on October 25, 2011.

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