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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

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

**[Docket No. FAA-2019-0528; Product Identifier 2018-NE-24-AD; Amendment 39-19717; AD 2019-16-14]**

**RIN 2120-AA64**

#### **Airworthiness Directives; Rolls-Royce Deutschland Ltd & Co KG Turbofan Engines**

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

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

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**SUMMARY:** The FAA is superseding airworthiness directive (AD) 2018-25-01 for all Rolls-Royce plc (RR) Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, and Trent 1000-H turbofan model engines. AD 2018-25-01 required initial and repetitive inspections of the intermediate-pressure compressor (IPC) stage 1 rotor (R1) blades, IPC stage 2 rotor (R2) blades, and IPC shaft stage 2 dovetail posts, and removing any cracked parts from service. This AD retains those inspections, revises certain reinspection intervals, and adds certain engine models to the applicability. This AD was prompted by a determination by the manufacturer of the need to revise inspection intervals for certain affected engines. In addition, the FAA added recently validated additional engine models to the applicability. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective September 11, 2019.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of September 11, 2019.

The FAA must receive any comments on this AD by October 11, 2019.

**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: 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 plc, Corporate Communications, P.O. Box 31, Derby, United Kingdom, DE24 8BJ; phone: 011-44-1332-242424; fax: 011-44-1332-249936; email: corporate.care@rolls-royce.com; internet: <https://customers.rolls-royce.com/public/rollsroycecare>. You may view this service information at the FAA, Engine & Propeller Standards Branch, 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 on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2019-0528.

## **Examining the AD Docket**

You may examine the AD docket on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2019-0528; 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 AD, the mandatory continuing airworthiness information (MCAI), regulatory evaluation, 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:** Dorie Resnik, Aerospace Engineer, Boston ACO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7693; fax: 781-238-7199; email: [dorie.resnik@faa.gov](mailto:dorie.resnik@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

The FAA issued AD 2018-25-01, Amendment 39-19511 (83 FR 62694, December 6, 2018), (“AD 2018-25-01”), for all RR Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, and Trent 1000-H turbofan engine models. AD 2018-25-01 required initial inspections and repetitive inspections of the IPC R1 blades, IPC R2 blades, and IPC shaft stage 2 dovetail posts, and removal of any cracked parts from service. AD 2018-25-01 resulted from the manufacturer determining the need for repetitive inspections of the IPC R1 blades, IPC R2 blades, and IPC shaft stage 2 dovetail posts. The FAA issued AD 2018-25-01 to prevent failure of the IPC, which could result in failure of one or more engines, loss of thrust control, and loss of the airplane.

### **Actions Since AD 2018-25-01 Was Issued**

Since the FAA issued AD 2018-25-01, RR determined that inspection intervals for certain affected engines need to be revised. Also, since the FAA issued AD 2018-25-01, the European Union Aviation Safety Agency (EASA) has issued EASA AD 2019-0075, dated March 29, 2019 (“the MCAI”), which requires initial and repetitive inspections of IPC R1 blades, IPC R2 blades, and IPC shaft stage 2 dovetail posts installed on certain engines and removal of any cracked parts from service.

Also, since the FAA issued AD 2018-25-01, the type certificate (TC) for all Trent 1000 turbofan model engines was revised to add RR Trent 1000-AE2 and Trent 1000-CE2 engine models to the list of applicable engine models. Both Trent 1000-AE2 and Trent 1000-CE2 engine models were identified in EASA AD 2019-0075 and are subject to the same unsafe condition as the other models listed in the Applicability of this AD.

In addition, Rolls-Royce plc transferred TC E00076EN to Rolls-Royce Deutschland Ltd & Co KG (RRD) on February 21, 2019. The FAA has therefore revised the TC holder name from “Rolls-

Royce plc” in AD 2018-25-01 to “Rolls-Royce Deutschland Ltd & Co KG” in this AD. Where applicable, for example when referring to the relevant service information, the FAA continues to use the name “Rolls-Royce plc” in this AD.

The FAA also updated our estimate for labor hours when replacing the IPC blades and the IPC drum to be consistent with the estimates provided in the service information.

The FAA is issuing this AD to address the unsafe condition on these products.

### **Related Service Information Under 1 CFR Part 51**

The FAA reviewed RR Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK130, Revision 4, dated March 4, 2019, and RR NMSB Trent 1000 72-K132, Revision 2, dated March 26, 2019. RR Alert NMSB Trent 1000 72-AK130 describes procedures for performing initial and repetitive inspections of the IPC R1 blades, IPC R2 blades, and IPC shaft stage 2 dovetail posts, and lists engine serial numbers. RR NMSB Trent 1000 72-K132, describes procedures for replacement of the IPC R1 blades, IPC R2 blades, and the IP compressor drum during refurbishment. 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 RR NMSB Trent 1000 72-K099, Revision 2, dated September 27, 2018, and earlier revisions; RR NMSB Trent 1000 72-K100, Initial Issue, dated June 11, 2018; RR NMSB Trent 1000 72-K129, Initial Issue, dated June 11, 2018; and RR NMSB Trent 1000 72-K129, Revision 3, dated February 28, 2019, and earlier revisions. RR NMSB Trent 1000 72-K099, Initial Issue, and RR NMSB Trent 1000 72-K099, Revision 2, and earlier revisions, describe procedure for an ultrasonic inspection of the IPC R1 blades. RR NMSB Trent 1000 72-K100, Initial Issue, describes procedures for a visual borescope inspection of the IPC R2 blades and IPC shaft stage 2 dovetail posts. RR NMSB Trent 1000 72-K129, Revision 3, and earlier revisions, describe procedures for an ultrasonic inspection of the IPC R2 blades.

### **FAA's Determination**

This product has been approved by EASA and is approved for operation in the United States. Pursuant to our bilateral agreement with the European Community, EASA has notified us of the unsafe condition described in EASA AD 2019-0075, dated March 29, 2019, and service information referenced above. The FAA is issuing this AD because we evaluated all the relevant information provided by EASA 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 initial and repetitive inspections of the IPC R1 blades, IPC R2 blades, and IPC shaft stage 2 dovetail posts, and removal of any cracked parts from service.

### **Differences Between This AD and the MCAI or Service Information**

This AD requires inspections of any affected IPC part to be completed within 15 days of the effective date of this AD. EASA AD 2019-0075, dated March 29, 2019, requires inspection of certain affected IPC parts to be completed within 30 days of the effective date of EASA AD 2019-0075. The FAA expects most operators have already complied with EASA AD and find that completing the inspections within 15 days of the effective date of this AD provides an appropriate level of safety.

## Interim Action

The FAA considers this AD interim action. The manufacturer is still reviewing this unsafe condition and may develop follow-on actions.

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

No domestic operators use this product. Therefore, the FAA finds that notice and opportunity for prior public comment are unnecessary 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 the FAA did not provide you with notice and an opportunity to provide your comments before it becomes effective. However, the FAA invites you to send any written data, views, or arguments about this final rule. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2019-0528 and product identifier 2018-NE-24-AD at the beginning of your comments. The FAA specifically invites comments on the overall regulatory, economic, environmental, and energy aspects of this final rule. The FAA will consider all comments received by the closing date and may amend this final rule because of those comments.

The FAA will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact we receive about this final rule.

## Regulatory Flexibility Act

The requirements of the Regulatory Flexibility Act (RFA) do not apply when an agency finds good cause pursuant to 5 U.S.C. 553 to adopt a rule without prior notice and comment. Because the FAA has determined that it has good cause to adopt this rule without notice and comment, RFA analysis is not required.

## Costs of Compliance

The FAA estimates that this AD affects 0 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
Inspect IPC blades and dovetail posts	20 work-hours × \$85 per hour = \$1700	\$0	\$1,700	\$0

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

### On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Replace IPC R1 blade	128 work-hours × \$85 per hour = \$10,880	\$1,528	\$12,408
Replace IPC R2 blade	128 work-hours × \$85 per hour = \$10,880	993	11,873
Replace IPC 1-8 drum	224 work-hours × \$85 per hour = \$19,040	1,365,219	1,384,259

#### 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.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to engines, propellers, and associated appliances to the Manager, Engine and Propeller Standards Branch, Policy and Innovation Division.

#### 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, and
- (2) Will not affect intrastate aviation in Alaska.

#### 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 part 39 of the Federal Aviation Regulations (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) 2018-25-01, Amendment 39-19511 (83 FR 62694, December 6, 2018), and adding the following new AD:



**2019-16-14 Rolls-Royce Deutschland Ltd & Co KG:** Amendment 39-19717; Docket No. FAA-2019-0528; Product Identifier 2018-NE-24-AD.

**(a) Effective Date**

This AD is effective September 11, 2019.

**(b) Affected ADs**

This AD replaces AD 2018-25-01, Amendment 39-19511 (83 FR 62694, December 6, 2018).

**(c) Applicability**

This AD applies to all Rolls-Royce Deutschland Ltd. & Co KG (RRD) Trent 1000-A, Trent 1000-AE, Trent 1000-C, Trent 1000-CE, Trent 1000-D, Trent 1000-E, Trent 1000-G, and Trent 1000-H turbofan model engines.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section.

**(e) Unsafe Condition**

This AD was prompted by reports of intermediate-pressure compressor (IPC) rotor blade cracks, which could lead to rotor blade separations resulting in engine failures. The FAA is issuing this AD to prevent failure of the IPC. The unsafe condition, if not addressed, could result in failure of one or more engines, loss of thrust control, and loss of the airplane.

**(f) Compliance**

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

**(g) Required Actions**

(1) Within 15 days of the effective date of this AD, or within the compliance times specified in the Accomplishment Instructions, Table 1, of Rolls-Royce plc (RR) Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK130, Revision 4, dated March 4, 2019 ("RR Alert NMSB Trent 100 72-AK130"), whichever occurs later, perform an on-wing inspection of the IPC stage 1 rotor (R1) blades in accordance with the Accomplishment Instructions, paragraph 3.A.(1), of RR Alert NMSB Trent 1000 72-AK130.

(2) Thereafter, repeat the on-wing inspections of the IPC R1 blades using the Accomplishment Instructions, paragraph 3.A.(1), and within the compliance times specified in the Accomplishment Instructions, Table 1, of RR Alert NMSB Trent 1000 72-AK130.

(3) Within 15 days of the effective date of this AD, or before exceeding the applicable threshold defined in the Accomplishment Instructions, Table 2 or Table 3, of RR Alert NSMB 72-AK130, whichever occurs later, perform an on-wing inspection of the IPC stage 2 rotor (R2) blades and IPC shaft stage 2 dovetail posts in accordance with the Accomplishment Instructions, paragraphs 3.B.(1) and 3.C.(1), of RR Alert NMSB Trent 1000 72-AK130.

(4) After performing the inspection in paragraph (g)(3) of this AD, repeat the on-wing inspections of IPC R2 blades and IPC shaft stage 2 dovetail posts using paragraphs 3.B.(1) and 3.C.(1) of RR Alert NMSB Trent 1000 72-AK130 and within the compliance times specified in the Accomplishment Instructions, Table 2 and Table 3, of RR Alert NMSB Trent 1000 72-AK130.

(5) For any on-wing inspection required by paragraphs (g)(1) through (4) of this AD, provided the stated thresholds and intervals are not exceeded, you may substitute:

(i) An in-shop inspection of an engine or module performed in accordance with the instructions of the Accomplishment Instructions, paragraphs 3.A.(2), 3.B.(2), and 3.C.(2) of the RR Alert NMSB Trent 1000 72-AK130, Revision 4, dated March 4, 2019; or

(ii) An in-shop piece part inspection during refurbishment in accordance with the Accomplishment Instructions, paragraphs 3.B.(2)(f)(vi), 3.B.(2)(g)(v), 3.B.(3)(d)(iii) of RR NMSB Trent 1000 72-K132, Revision 2, dated March 26, 2019.

(6) If any IPC R1 blade, IPC R2 blade, or IPC shaft stage 2 dovetail post is found cracked during any inspection (on-wing or in-shop) required by this AD, remove the cracked part from service and replace with a part eligible for installation before further flight.

#### **(h) Inspection After Operation Under Asymmetric Power**

As of the effective date of this AD, before the next flight after each occurrence where engine operation in asymmetric power conditions was sustained for more than 30 minutes at less than 25,000 feet, either resulting from engine power reduction or from engine in-flight shut-down (IFSD), inspect the IPC R1 blades, the IPC R2 blades, and the IPC shaft stage 2 dovetail posts in accordance with the Accomplishment Instructions, paragraphs 3.A.(1), 3.B.(1), and 3.C.(1), of RR Alert NMSB Trent 1000 72-AK130, Revision 4, dated March 4, 2019, on the engine that did not experience the power reduction or IFSD installed on the airplane.

#### **(i) Credit for Previous Actions**

You may take credit for the inspections required by paragraphs (g)(1) and (3) of this AD if you performed these inspections before the effective date of this AD using RR Alert NMSB Trent 1000 72-AK130, Revision 3, dated January 10, 2019, or earlier revisions.

#### **(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 (l) of this AD. 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.

### **(k) Related Information**

(1) For more information about this AD, contact Dorie Resnik, Aerospace Engineer, Boston ACO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: 781-238-7693; fax: 781-238-7199; email: [dorie.resnik@faa.gov](mailto:dorie.resnik@faa.gov).

(2) Refer to European Union Aviation Safety Agency (EASA) AD 2019-0075, dated March 29, 2019, for more information. You may examine the EASA AD in the AD docket on the internet at <http://www.regulations.gov> by searching for and locating it in Docket No. FAA-2019-0528.

### **(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Rolls-Royce plc (RR) Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK130, Revision 4, dated March 4, 2019.

(ii) RR NMSB Trent 1000 72-K132, Revision 2, dated March 26, 2019.

(3) For RR service information identified in this AD, contact Rolls-Royce plc, Corporate Communications, P.O. Box 31, Derby, United Kingdom, DE24 8BJ; phone: 011-44-1332-242424; fax: 011-44-1332-249936; email: [corporate.care@rolls-royce.com](mailto:corporate.care@rolls-royce.com); internet: <https://customers.rolls-royce.com/public/rollsroycecare>.

(4) You may view this service information at FAA, Engine and Propeller Standards Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call 781-238-7759.

(5) You may view this service information 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 August 21, 2019.

Karen M. Grant,  
Acting Manager, Engine & Propeller Standards Branch,  
Aircraft Certification Service.