



## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

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

**[Docket No. FAA-2023-1637; Project Identifier MCAI-2023-00184-E; Amendment  
39-22588; AD 2023-22-04]**

**RIN 2120-AA64**

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

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

**ACTION:** Final rule.

**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for all Rolls-Royce Deutschland Ltd & Co KG (RRD) Model Trent 1000-A2, Trent 1000-AE2, Trent 1000-C2, Trent 1000-CE2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, and Trent 1000-L2 engines. This AD was prompted by reports of cracking and separation of certain low-pressure turbine (LPT) stage 1 blade assemblies. This AD requires initial and repetitive inspections of affected LPT stage 1 blade assemblies for cracking or separation and, depending on the results of the inspections, reduction of the inspection interval or replacement of the LPT stage 1 blade set and disk, as specified in a European Union Aviation Safety Agency (EASA) AD, which is incorporated by reference. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

## **ADDRESSES:**

*AD Docket:* You may examine the AD docket at [regulations.gov](https://www.regulations.gov) under Docket No.FAA-2023-1637; 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 final rule, the mandatory continuing airworthiness information (MCAI), any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

### *Material Incorporated by Reference:*

- For service information identified in this final rule, contact EASA, Konrad-Adenauer-Ufer 3, 50668 Cologne, Germany; phone: +49 221 8999 000; email: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu); website: [easa.europa.eu](https://easa.europa.eu). You may find this material on the EASA website at [ad.easa.europa.eu](https://ad.easa.europa.eu).

- 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 (817) 222-5110. It is also available at [regulations.gov](https://www.regulations.gov) under Docket No. FAA-2023-1637.

**FOR FURTHER INFORMATION CONTACT:** Sungmo Cho, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (781) 238-7241; email: [sungmo.d.cho@faa.gov](mailto:sungmo.d.cho@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Background**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all RRD Model Trent 1000-A2, Trent 1000-AE2, Trent 1000-C2, Trent 1000-CE2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, and Trent 1000-L2 engines. The NPRM

published in the *Federal Register* on July 31, 2023 (88 FR 49361). The NPRM was prompted by EASA AD 2023-0027, dated January 31, 2023 (EASA AD 2023-0027) (also referred to as the MCAI) issued by EASA, which is the Technical Agent for the Member States of the European Union. The MCAI states that manufacturer inspections detected cracking and separation of blade pairs in the weld region of certain LPT stage 1 blade assemblies. A blade assembly consists of a pair of blades welded together at the outer shroud. There are 85 LPT stage 1 blade assemblies in one set. Such cracking and separation could cause failure of affected parts and damage to the LPT module.

You may examine the MCAI in the AD docket at [regulations.gov](https://www.regulations.gov) under Docket No. FAA-2023-1637.

In the NPRM, the FAA proposed to require initial and repetitive inspections of affected LPT stage 1 blade assemblies for cracking or separation and, depending on the results of the inspections, reduction of the inspection interval or replacement of the LPT stage 1 blade set and disk. The FAA is issuing this AD to address the unsafe condition on these products.

## **Discussion of Final Airworthiness Directive**

### **Comments**

The FAA received one comment from The Boeing Company (Boeing). Boeing supported the NPRM without change.

### **Conclusion**

These products have been approved by the aviation authority of another country and are approved for operation in the United States. Pursuant to the FAA's bilateral agreement with this State of Design Authority, it has notified the FAA of the unsafe condition described in the MCAI referenced above. The FAA reviewed the relevant data, considered the comment received, and determined that air safety requires adopting the AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition

on these products. Except for minor editorial changes, this AD is adopted as proposed in the NPRM.

**Related Service Information under 1 CFR Part 51**

The FAA reviewed EASA AD 2023-0027, which specifies procedures for inspection of affected LPT stage 1 blade assemblies and replacement of the LPT stage 1 blade set and disk. EASA AD 2023-0027 also specifies a reduction of the repetitive inspection intervals if cracking or separation is detected and meets certain criteria.

This material is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

**Costs of Compliance**

The FAA estimates that this AD affects 26 engines installed on airplanes of U.S. registry.

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

**Estimated costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Inspection LPT stage 1 blade assemblies	4 work-hours x \$85 per hour = \$340	\$0	\$340	\$8,840

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

**On-condition costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>
Replace LPT stage 1 blade set and disk	4 work-hours x \$85 per hour = \$340	\$720,000	\$720,340

## **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**

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) 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 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:

**2023-22-04 Rolls-Royce Deutschland Ltd & Co KG:** Amendment 39-22588; Docket No. FAA-2023-1637; Project Identifier MCAI-2023-00184-E.

#### **(a) Effective Date**

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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

None.

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

This AD applies to Rolls-Royce Deutschland Ltd & Co KG (RRD) Model Trent 1000-A2, Trent 1000-AE2, Trent 1000-C2, Trent 1000-CE2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, and Trent 1000-L2 engines.

#### **(d) Subject**

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

#### **(e) Unsafe Condition**

This AD was prompted by reports of cracking and separation of certain low-pressure turbine (LPT) stage 1 blade assemblies. The FAA is issuing this AD to prevent failure of the LPT stage 1 blades. The unsafe condition, if not addressed, could result in

high energy debris release, damage to the airplane, and reduced control of the airplane.

**(f) Compliance**

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

**(g) Required Actions**

Except as specified in paragraphs (h) and (i) of this AD: Perform all required actions within the compliance times specified in, and in accordance with, European Union Aviation Safety Agency AD 2023-0027, dated January 31, 2023 (EASA AD 2023-0027).

**(h) Exceptions to EASA AD 2023-0027**

(1) Where EASA AD 2023-0027 specifies compliance from its effective date, this AD requires using the effective date of this AD.

(2) This AD does not adopt the Remarks paragraph of EASA AD 2023-0027.

(3) Where the service information referenced in EASA AD 2023-0027 specifies discarding the removed LP turbine stage 1 blade set, this AD requires removing the affected part from service.

(4) Where the service information referenced in EASA AD 2023-0027 specifies to quarantine the removed LP turbine stage 1 rotor disc, this AD requires removing the affected part from service.

**(i) No Reporting Requirement**

Although the service information referenced in EASA AD 2023-0027 specifies to submit certain information to the manufacturer, this AD does not include that requirement.

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

(1) The Manager, AIR-520 Continued Operational Safety 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 AIR-520 Continued Operational Safety Branch, send it to the attention of the person identified in paragraph (k) of this AD and email 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) Additional Information**

For more information about this AD, contact Sungmo Cho, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (781) 238-7241; email: sungmo.d.cho@faa.gov.

**(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference 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) European Union Aviation Safety Agency (EASA) AD 2023-0027, dated January 31, 2023.

(ii) [Reserved]

(3) For EASA AD 2023-0027, contact EASA, Konrad-Adenauer-Ufer 3, 50668 Cologne, Germany; phone: +49 221 8999 000; email: ADs@easa.europa.eu; website: easa.europa.eu. You may find this EASA AD on the EASA website at ad.easa.europa.eu.

(4) You may view this service information at 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 (817) 222-5110.

(5) You may view this material at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, visit [www.archives.gov/federal-register/cfr/ibr-locations](http://www.archives.gov/federal-register/cfr/ibr-locations) or email [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov).

Issued on October 27, 2023.

Caitlin Locke,  
Director, Compliance & Airworthiness Division,  
Aircraft Certification Service.

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