



Notification of a Proposal to issue an Airworthiness Directive

PAD No.: 17-148

Issued: 19 October 2017

Note: This Proposed Airworthiness Directive (PAD) is issued by EASA, acting in accordance with Regulation (EC) 216/2008 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.

In accordance with the EASA Continuing Airworthiness Procedures, the Executive Director is proposing the issuance of an EASA Airworthiness Directive (AD), applicable to the aeronautical product(s) identified below.

All interested persons may send their comments, referencing the PAD Number above, to the e-mail address specified in the 'Remarks' section, prior to the consultation date indicated.

Design Approval Holder's Name:

ROLLS-ROYCE plc

Type/Model designation(s):

Trent 1000 engines

Effective Date: [TBD – standard: 14 days after Final AD issue date]

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: None

ATA 72 – Engine – Intermediate Pressure Compressor Rotor 1 and 2 Blades – Inspection

Manufacturer(s):

Rolls-Royce plc (RR)

Applicability:

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, all serial numbers.

These engines are known to be installed on, but not limited to, Boeing 787 series aeroplanes.

Reason:

Occurrences have been reported on RR Trent 1000 'Pack C' engines, where some Intermediate Pressure Compressor (IPC) Stage (Rotor) 1 and Rotor 2 blades were found cracked.

This condition, if not detected and corrected, could lead to in-flight blade release, possibly resulting in reduced control of the aeroplane.



To address this potential unsafe condition, RR issued Alert Non-Modification Service Bulletin (NMSB) TRENT 1000 72-AJ814 and 72-AJ819 to provide inspection instructions for IPC Rotor 1 blades, and IPC Rotor 2 blades and IPC shaft Stage 2 dovetail posts, respectively.

For the reasons described above, this AD requires repetitive inspections of the affected IPC Rotor blades and IPC shaft Stage 2 dovetail posts and, depending on findings, removal from service of the engine for corrective action.

This AD is considered an interim action, pending the development of a modification which is expected to be terminating action for the repetitive inspections as required by this AD.

Required Action(s) and Compliance Time(s):

Required as indicated, unless accomplished previously:

Note 1: Where, in this AD, reference is made to an RR NMSB with an 'A' (Alert) in the number, it should be recognised that an earlier or later revision may not have that 'A'. This kind of change does not effectively alter the publication references for the purpose of this AD.

Note 2: RR Alert NMSB TRENT 1000 72-AJ814 Revision 1 dated 26 September 2017 and Alert NMSB TRENT 1000 72-AJ819 Revision 1 dated 09 October 2017 are hereafter collectively referred to as 'the applicable NMSB' in this AD.

Pre-NMSB TRENT 1000 72-J871 Repetitive Inspections:

- (1) From the effective date of this AD, following receipt of an alert engine health monitoring (EHM) notification (see Note 3 of this AD and example shown in Figure 1 of this AD) from the RR Operational Service Desk (OSD), within the compliance time specified in Table 1 of this AD, as applicable, and, thereafter, at intervals not to exceed 200 flight cycles (FC), accomplish an ultrasonic inspection in accordance with the instructions of the applicable NMSB (see Note 2 of this AD).

Note 3: RR OSD manages the EHM process and will send an Alert EHM notification containing the wording as shown in Figure 1 of this AD. The EHM Alert is only provided for the initial inspection (threshold), not for subsequent repeat inspections.

Figure 1 – Example Alert EHM Notification

Engine: #2/10ad4 on aircraft cV-fJC

Symptoms: Possible cracking of Rotor 1 and/or Rotor 2 in accordance with NMSB 72-AJ814 or 72-AJ819

Diagnosis: Risk of IP Compressor Rotor 1 or Rotor 2 Cracking

Please be advised that we have observed IP Compressor Rotor 1 and 2: Crack inspection required. The recommended fault isolation process for Risk of IP Compressor Rotor Cracks states:

Possible Causes: The above engine is identified as being at increased risk of cracking on the IP Compressor Rotor 1 & Rotor 2 blades and/or shaft dovetail posts.

Reaction Time: 80 flight cycles.



Table 1 – Initial Visual Inspection (see Note 4 of this AD)

Inspected	Compliance Time
No	Within 80 FC, or within the reaction time specified in the EHM Alert, whichever occurs first after receiving the EHM Alert
Yes	Within 200 FC after the last inspection, or within 30 FC after receiving the EHM Alert, whichever occurs later

Note 4: For the purpose of Table 1 of this AD, ‘inspected’ means that the affected engine has passed an inspection (no cracks identified) in accordance with the instructions of RR Technical Variation (TV) TV176758 or TV177125, or the original issue of RR NMSB TRENT 1000 72-AJ814; or TV177005, TV177006, TV177187, TV177623 or TV177659, or the original issue of RR NMSB TRENT 1000 72-AJ819, or NMSB TRENT 1000 72-J744, as applicable.

Post-NMSB TRENT 1000 72-J871 Repetitive Inspections:

- (2) For an engine, subject to inspections as required by paragraph (1) of this AD, after in-shop replacement of the affected IPC Rotor 1 blades, IPC Rotor 2 blades, and the IPC shaft Stage 2 assembly, Part Number FW89043, on that engine in accordance with the instructions of RR NMSB TRENT 1000 72-J871, before exceeding the threshold, and, thereafter, at intervals not exceeding the values, as specified in RR NMSB TRENT 1000 72-AJ869, accomplish an inspection in accordance with the instructions of the applicable NMSB (see Note 2 of this AD).

Corrective Action(s):

- (3) If, during any inspection as required by this AD, any crack indication is found, before next flight, remove the engine from service, contact RR for approved corrective action instructions and, before release to service of the engine, accomplish those instructions accordingly.

Terminating Action:

- (4) None.

Ref. Publications:

Rolls-Royce Alert NMSB TRENT 1000 72-AJ814 original issue dated 17 August 2017, and Revision 1 dated 26 September 2017.

Rolls-Royce Alert NMSB TRENT 1000 72-AJ819 original issue dated 17 August 2017, and Revision 1 dated 9 October 2017.

Rolls-Royce NMSB TRENT 1000 72-J744 original issue dated 20 June 2017.

Rolls-Royce NMSB TRENT 1000 72-J871 [to be issued].

Rolls-Royce Alert NMSB TRENT 1000 72-AJ869 [to be issued].

The use of later approved revisions of these documents is acceptable for compliance with the requirements of this AD.



Remarks:

1. This Proposed AD will be closed for consultation on 02 November 2017.
2. Enquiries regarding this PAD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
3. For any question concerning the technical content of the requirements in this PAD, please contact your designated Rolls-Royce representative, or download the publication from your Rolls Royce Care account at <https://customers.rolls-royce.com>.

If you do not have a designated representative or Rolls Royce Care account, please contact **Corporate Communications** at **Rolls-Royce plc**, P.O. Box 31, Derby, DE24 8BJ, United Kingdom Telephone +44 (0)1332 242424,

or send an email through http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to **Airworthiness Directives**.

