



Airworthiness Directive

AD No.: 2017-0017R2

Issued: 15 September 2017

Note: This Airworthiness Directive (AD) 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.

This AD is issued in accordance with Regulation (EU) 748/2012, Part 21.A.3B. In accordance with Regulation (EU) 1321/2014 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [Regulation (EU) 1321/2014 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [Regulation (EC) 216/2008, Article 14(4) exemption].

Design Approval Holder's Name:

ROLLS-ROYCE plc

Type/Model designation(s):

Trent 1000 engines

Effective Date: Revision 2: 15 September 2017
Revision 1: 26 July 2017
Original issue: 15 February 2017

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Revision: This AD revises EASA AD 2017-0017R1 dated 26 July 2017.

ATA 72 – Engine – Intermediate Pressure Compressor Rotor Seal – Inspection

Manufacturer(s):

Rolls-Royce plc (RR)

Applicability:

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2, Trent 1000-AE2 and Trent 1000-CE2 engines, all serial numbers.

These engines are known to be installed on, but not limited to, Boeing 787-8 and 787-9 aeroplanes.

Reason:

A low speed abort (60 to 65 knots) occurred on take-off on a Trent 1000-powered Boeing 787 aeroplane. The pilot performed a commanded engine shutdown and the aeroplane safely returned to the gate. Following investigation, failure and release of the intermediate pressure compressor (IPC) rotor seal was confirmed as having caused this event. RR have confirmed that other IPC rotor seals, Part Number (P/N) KH19098, have been found with cracking at the seal head.

This condition, if not detected and corrected, could lead to engine power loss, possibly resulting in reduced control of the aeroplane.



To address this potential unsafe condition, RR published Alert Non-Modification Service Bulletin (NMSB) TRENT 1000 72-AJ467, providing inspection instructions. Consequently, EASA issued AD 2017-0017 to require repetitive borescope inspections of the affected IPC rotor seals and, depending on findings, accomplishment of applicable corrective action(s).

Subsequently, it was determined that engines that embody modification (MOD.)72-J603, introducing a revised IPC buffer static seal assembly, are not affected. RR published SB TRENT 1000 72-J603 to provide modification instructions for in-service engines. EASA issued AD 2017-0017R1 accordingly, providing an optional terminating action.

After that AD was issued, prompted by operator inquiries, it was confirmed that another (conditional) terminating action, as specified in RR published Alert NMSB TRENT 1000 72-AJ467 Revision 2, is acceptable. This AD is revised accordingly, introducing paragraphs (8) and (9) to clarify the conditions for use of that terminating action.

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 MOD, SB or 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-AJ467 is hereafter referred to as 'the NMSB' in this AD.

Note 3: IPC rotor seal P/N KH19098 is hereafter identified as 'affected seal' in this AD.

Note 4: For the purpose of this AD, Group 1 engines are those that, on the effective date of this AD, have an affected seal (see Note 3 of this AD) installed. Group 2 engines are those that, on the effective date of this AD, do not have an affected seal installed. Engines in post-MOD.72-J603 or post-MOD.72-J704 configuration, ESN 10554 and higher, are Group 2 engines.

Repetitive Inspections of Group 1 Engines (see Note 4 of this AD):

- (1) Within the compliance times as specified in the NMSB, accomplish an on-wing borescope inspection of the affected seal in accordance with the instructions of Section 3, Part A (front face) of the NMSB, and/or, depending on findings (see Figure 1 of the NMSB), Part B (rear face) of the NMSB, as applicable. Thereafter, depending on findings, repeat the on-wing borescope inspection at intervals not to exceed the value(s) as specified in Figures 1, 2 or 4 of the NMSB, as applicable.
- (2) An in-shop inspection in accordance with the instructions of RR NMSB TRENT 1000 72-J353 may be substituted for an on-wing inspection as required by paragraph (1) of this AD, provided the compliance times are not exceeded.



Limitation:

- (3) From 15 February 2017 [the effective date of the original issue of this AD], do not operate an aeroplane, having two engines installed that are both subject to the 20 engine flight cycles inspection interval (see Figure 4 of the NMSB).

Corrective Action(s):

- (4) If, during any on-wing inspection as required by paragraph (1) of this AD, or any in-shop inspection as specified in paragraph (2) of this AD, as applicable, any crack is found on the rear face of the affected seal, that is at or beyond the reject limits as specified in the NMSB, before next flight, or before release to service of the engine, as applicable, replace the affected seal with a new part.

Credit:

- (5) Inspections and corrective actions on an engine, accomplished before 15 February 2017 [the effective date of the original issue of this AD] in accordance with the instructions of the NMSB (on wing), or that meet the intent of the NMSB, or RR NMSB TRENT 1000 72-J353 (in-shop), are acceptable to comply with the initial requirements of paragraphs (1) and (4) of this AD, for that engine.

Terminating Action:

- (6) Modification of an engine in accordance with the instructions of RR SB TRENT 1000 72-J603 or SB TRENT 1000 72-J704 constitutes terminating action for the repetitive inspections required by paragraph (1) of this AD for that engine.

Part(s) Installation:

- (7) From 15 February 2017 [the effective date of the original issue of this AD], it is allowed to install an affected seal on any Group 1 or Group 2 engine, provided that, following installation, inspections on that engine are re-started as required by paragraph (9) of this AD.

Alternative (Conditional) Terminating Action:

- (8) For an engine on which an affected seal, by the results of two consecutive inspections of the front face in accordance with the instructions of Section 3, Part A, of the NMSB, is confirmed to be without cracks, no further inspections are required by this AD on that engine, except as required by paragraph (9) of this AD.
- (9) Before release to service of an engine after maintenance action on the O2 module, where a new P/N KH19094 IPC static seal and an affected seal (see Note 3 of this AD) are installed, or after replacement of the O2 module, as applicable, contact RR to determine when the repetitive inspections, as required by paragraph (1) of this AD, must be re-started on that engine.

Ref. Publications:

RR NMSB TRENT 1000 72-J353, original issue, dated 25 August 2016.

RR SB TRENT 1000 72-J603, original issue, dated 12 October 2016.

RR SB TRENT 1000 72-J704, original issue, dated 23 June 2017.



RR Alert NMSB TRENT 1000 72-AJ467, original issue, dated 9 November 2016, or Revision 1 dated 13 February 2017, or Revision 2 dated 2 June 2017.

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

Remarks:

1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.
2. The original issue of this AD was posted on 15 December 2016 as PAD 16-173 for consultation until 29 December 2016. The Comment Response Document can be found in the [EASA Safety Publications Tool](#), in the compressed (zipped) file attached to the record for this AD.
3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
4. For any question concerning the technical content of the requirements in this AD, 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**.

