Airworthiness Directive

AD No.: 2019-0099R2

Issued: 06 September 2019

Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 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 (EU) 2018/1139, Article 71 exemption].

Design Approval Holder's Name:
ROLLS-ROYCE DEUTSCHLAND Ltd & Co KG

Type/Model designation(s):
Trent 1000 engines

Effective Date: Revision 2: 13 September 2019
Revision 1: 25 July 2019
Original issue: 20 May 2019

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Revision: This AD revises EASA AD 2019-0099R1 dated 18 July 2019.

ATA 72 – Engine – High Pressure Turbine Blades – Inspection / De-Pairing Limitation

Manufacturer(s):
Rolls-Royce plc

Applicability:
Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3 and Trent 1000-R3 engines, all serial numbers.

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

Definitions:
For the purpose of this AD, the following definitions apply:

Where, in this AD, reference is made to a Rolls-Royce modification (mod), Service Bulletin (SB) or Non-Modification SB (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.

The NMSB: Rolls-Royce Alert NMSB TRENT 1000 72-AK316.

Affected part: High pressure turbine (HPT) blades, having Part Number (P/N) KH10575 (pre-mod/SB 72-J550), or P/N KH64485 (post-mod/SB 72-J550).

Serviceable part: An affected part which is new (not previously installed).

Reason:

In-service experience with Trent 1000 TEN engines has shown that the affected parts may deteriorate, despite being subject to the inspections and life limits as specified in the current Rolls-Royce Time Limits Manual, T-Trent-10RRT, Chapters 05-10 and 05-20.

This condition, if not detected and corrected, could lead to HPT blade failure, possibly resulting in engine in-flight shut-down (IFSD) and consequent reduced control of the aeroplane.

To address this potential unsafe condition, Rolls-Royce developed instructions to de-pair engines with a certain number of combined flight cycles (FC). In addition, an FC limit was determined when one affected engine is installed. Finally, an on-wing borescope inspection method has been introduced, and Rolls-Royce issued the NMSB accordingly.

For the reasons described above, EASA issued AD 2019-0099 (later revised) to require repetitive inspections of the affected parts to detect axial cracking and, depending on findings, removal from service of the engine for in-shop replacement of the affected parts. That AD also introduced de-pairing instructions and limitations.

Since EASA AD 2019-0099R1 was issued, it was determined that, since new blades must be installed (in-shop) as replacement, the definition of 'serviceable part' needs to be corrected. Consequently, this AD is revised accordingly, deleting reference to used parts that passed an inspection.

This revised AD is still considered to be an interim action and further AD action is expected.

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

Required as indicated, unless accomplished previously:

Inspection(s):

(1) Before exceeding the compliance time as specified in Table 1 of this AD, as applicable, and, thereafter, at intervals not to exceed 50 FC, accomplish an on-wing borescope inspection of all affected parts in accordance with the instructions of Section 3.C of the NMSB.

Table 1 – Inspection Threshold(s) (see Note 1 of this AD)

FC Accumulated	Compliance Time
Less than 625 FC	Before exceeding 650 FC
625 FC or more	Within 25 FC after 20 May 2019 [the effective date of the original issue of this AD]

Note 1: Unless indicated otherwise, the FC specified in Table 1 and paragraphs (4) and (5) of this AD are those accumulated by the engine(s) since first flight, or since last in-service HPT blade set replacement(s), as applicable.

(2) DELETED.

(3) From 20 May 2019 [the effective date of the original issue of this AD], within 10 FC after IFSD of an engine on an aeroplane, accomplish an on-wing borescope inspection of all affected parts installed on the not-affected (no IFSD) engine of that aeroplane in accordance with the instructions of Section 3.C of the NMSB.

Limitations:

(4) From 20 May 2019 [the effective date of the original issue of this AD], do not operate an aeroplane having an engine installed that has accumulated 1 000 FC or more (see Note 1 of this AD).

(5) From 20 May 2019 [the effective date of the original issue of this AD], do not operate an aeroplane having two engines installed that have accumulated a combined number of 1 400 FC or more (see Note 1 of this AD). Management of affected engines can be accomplished in accordance with the instructions of Section 3.B of the NMSB.

Corrective Action(s):

(6) If, during any inspection as required by paragraph (1) or (3) of this AD, any crack indication is found, within the compliance time specified in Table 2 of this AD, as applicable, remove the engine from service and, before release to service of that engine, replace the affected parts with a full set of serviceable parts, as defined in this AD, in accordance with the instructions of Rolls-Royce SB TRENT 1000 72-J550.

Table 2 – Engine Removal from Service

Affected Part Finding(s)	Compliance Time
Cracks exceeding 4 mm (0.16 inch) in length	Before next flight
Cracks up to 4 mm (0.16 inch) in length	Within 10 FC after the inspection detecting crack(s)

(7) Following removal from service of an engine, prompted by the limitations as required by paragraph (4) or (5) of this AD, as applicable, in-shop replacement on that engine of the affected parts with a full set of serviceable parts, as defined in this AD, in accordance with the instructions of Rolls-Royce SB TRENT 1000 72-J550, allows that engine to be returned to service.

Terminating Action:

(8) None.

Ref. Publications:

Rolls-Royce Alert NMSB TRENT 1000 72-AK316 original issue dated 09 April 2019, or Revision 1 dated 18 April 2019, or Revision 2 date 30 April 2019, or Revision 3 dated 16 July 2019.

Rolls-Royce SB TRENT 1000 72-J550 original issue dated 21 November 2017.

The use of later approved revisions of the above-mentioned 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 10 April 2019 as PAD 19-059 for consultation until 24 April 2019. 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 Programming and Continued Airworthiness Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.

4. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this AD, and which may occur, or have occurred on a product, part or appliance not affected by this AD, can be reported to the EU aviation safety reporting system.

5. 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**.