



Notification of a Proposal to issue an Airworthiness Directive

PAD No.: 18-141

Issued: 19 October 2018

Note: This Proposed Airworthiness Directive (PAD) 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.

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 AD issue date]

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA AD 2017-0056 dated 05 April 2017 and AD 2018-0139 dated 29 June 2018.

ATA 72 – Engine – Intermediate Pressure Turbine Blades – Replacement

Manufacturer(s):

Rolls-Royce plc (RR)

Applicability:

Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, Trent 1000-H, Trent 1000-AE, Trent 1000-CE, 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, serial numbers (ESN) as listed in Appendices 1, 2 and 3 of the NMSB, except those that have embodied RR modification (Mod) 72-H818 in production, or the SB in service. ESN 10368, which is inadvertently not included in the NMSB, is also subject to this AD and is expected to be added to Appendix 1 and Appendix 3 in the next NMSB revision.

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 an RR 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: RR Alert NMSB TRENT 1000 72-AK186. Appendix 1 of the NMSB contains the time limit to remove the engines from service for replacement of intermediate pressure turbine blades (IPTB). Appendix 2 contains a list of ESN that, at the time of NMSB issuance, were known to be in shop. Appendix 3 provides the applicable IPTB cyclic limits, as applicable, after installation of SUM (used, refurbished) IPTB as replacement.

Affected IPTB: IPTB having Part Number (P/N) KH30773.

The SB: RR SB TRENT 1000 72-H818, introducing IPTB P/N KH11808.

Reason:

Occurrences were reported of IPTB shank cracking. Analysis shows that this kind of failure is due to sulphidation corrosion.

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

Prompted by these events, RR identified engines with a high level of sulphidation exposure using a corrosion fatigue life (CFL) model. Consequently, EASA issued AD 2017-0056 to require removal from service of certain engines, to be corrected in shop. In addition, to reduce the risk of dual IFSD, it was decided to introduce a new cyclic life limit to certain engines, determining when an engine can no longer be installed on an aeroplane in combination with certain other engines. Consequently, EASA issued Emergency AD 2017-0253-E, AD 2018-0086, and finally AD 2018-0139, each next AD superseding the previous one, to require de-pairing of the affected engines.

Since EASA AD 2018-0139 was issued, prompted by further analyses of data provided by operators, RR developed an updated service management approach to minimise the risk of IPTB release and issued the NMSB, identifying those ESN at highest risk, and providing the corresponding cyclic limits for in-shop IPTB replacement.

For the reason described above, this AD supersedes EASA AD 2017-0056 and AD 2018-0139, and requires removal from service of certain engines, to be corrected in shop. This AD also requires, for engines having SUM IPTB installed, the introduction of IPTB cyclic limits. Finally, this AD retains the optional terminating action as previously provided by EASA AD 2018-0139.

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

Required as indicated, unless accomplished previously:

Removal from Service:

- (1) Before exceeding the affected IPTB life limit (cycles) as specified in Appendix 1 of the NMSB, as applicable to ESN, or within 15 days after the effective date of this AD, whichever occurs later, remove the affected engine from service. For ESN 10368, a limit of 500 cycles applies.



Corrective Action(s):

- (2) After removing an engine from service as required by paragraph (1) of this AD, before release to service of that engine, replace the IPTB.
- (3) For an engine identified by ESN in Appendix 2 of the NMSB, that, on the effective date of this AD, is in shop, before release to service of that engine, replace the IPTB.

Cyclic Life Limit:

- (4) For an engine on which SUM parts are installed during IPTB replacement, either as required by paragraph (2) or (3) of this AD, as applicable, or at any time thereafter, before exceeding the applicable IPTB cyclic limit as specified in Appendix 3 of the NMSB after that installation, remove that engine from service and, before release to service of that engine, replace the IPTB. For ESN 10368, a limit of 500 cycles applies.

Replacement:

- (5) Replacement of IPTB, as required by paragraph (2), (3) or (4) of this AD, as applicable, can be accomplished by using the instructions of RR TRENT 1000 NMSB 72-J442 Revision 3, or RR TRENT 1000 NMSB 72-J465 Revision 4, as applicable, installing SUM parts.

Optional Terminating Action:

- (6) Modification of an affected engine in accordance with the instructions of the SB constitutes terminating action for the requirements of this AD for that engine.

Ref. Publications:

Rolls-Royce Alert NMSB TRENT 1000 72-AK186 original issue dated 08 October 2018.

Rolls-Royce NMSB TRENT 1000 72-J442 Revision 3 dated 08 October 2018.

Rolls-Royce NMSB TRENT 1000 72-J465 Revision 4 dated 08 October 2018.

Rolls-Royce SB TRENT 1000 72-H818 original issue dated 14 November 2016.

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

Remarks:

1. This Proposed AD will be closed for consultation on 02 November 2018.
2. Enquiries regarding this PAD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
3. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this PAD, and which may occur, or have occurred on a product, part or appliance not affected by this PAD, can be reported to the [EU aviation safety reporting system](#).



4. 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**.

