



Airworthiness Directive

AD No.: 2018-0086

Issued: 17 April 2018

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: 01 May 2018

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA Emergency AD 2017-0253-E dated 21 December 2017.

ATA 72 – Engine – Removal / De-Pairing

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 identified in Appendix 1 of the NMSB at Revision 2, except those that have embodied RR Service Bulletin (SB) TRENT 1000 72-H818 in service.

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:

The NMSB: Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) TRENT 1000 72-AJ992.

Where, in this AD, reference is made to an RR 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.



Reason:

An occurrence was reported where, following N2 vibration and multiple messages, the flight crew performed an engine in-flight shut-down (IFSD) and returned to the departure airport, landing uneventfully. The post-flight borescope inspection of the engine revealed an intermediate pressure turbine blade (IPTB) missing at the shank. Analysis shows that this kind of failure is due to sulphidation corrosion cracking.

This condition, if not detected and corrected, could lead to IPTB shank release, possibly resulting in an IFSD and consequent reduced control of the aeroplane.

To address this potential unsafe condition, RR issued Alert NMSB Trent 1000 72-AJ575 to provide instructions for engine removal from service when any IPTB with a high level of sulphidation exposure is identified by corrosion fatigue life (CFL) model. Consequently, EASA issued AD 2017-0056 to require removal from service of certain engines, to be corrected in shop.

Since that AD was issued, prompted by further occurrences and analyses, it was decided that, to reduce the risk of dual IFSD, a new cyclic life limit must be applied to certain engines, which determines when an engine can no longer be installed on an aeroplane in combination with certain other engines. RR published the original issue of the NMSB to provide de-pairing instructions, including the relevant IPTB cyclic limit for each engine. Consequently, EASA issued Emergency AD 2017-0253-E to require de-pairing of the affected engines.

Since that AD was issued, RR issued Revision 2 of the NMSB, which removes and adds certain ESN from the list of affected engines and introduces another IPTB cyclic limit.

For the reason described above, this AD retains the requirements of EASA AD 2017-0253-E, which is superseded, amends the Applicability, and requires application of the new limit.

This AD is still considered an interim action and further AD action may follow.

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

Required as indicated, unless accomplished previously:

De-Pairing of Affected Engines:

- (1) For an aeroplane that has two affected engines installed: Before both engines exceed their respective IPTB cyclic limit, as specified in Appendix 1 of the NMSB at Revision 2, or within 20 flight cycles after the effective date of this AD, whichever occurs later, remove one of the affected engines from the aeroplane.

Affected Engine Installation:

- (2) After removal of an affected engine, as required by paragraph (1) of this AD, do not install that engine on an aeroplane, except within the limitations as specified in Section 3.A of the NMSB.

Terminating Action:

- (3) Modification of an affected engine in accordance with the instructions of RR SB TRENT 1000 72-H818 constitutes terminating action for the requirements of paragraphs (1) and (2) of this AD for that engine.



Ref. Publications:

Rolls-Royce Alert NMSB TRENT 1000 72-AJ992 original issue, dated 20 December 2017, Revision 1 dated 03 January 2018, and Revision 2 dated 16 April 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. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.
2. Based on the required actions and the compliance time, EASA have decided to issue a Final AD with Request for Comments, postponing the public consultation process until after publication.
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**.

