



Airworthiness Directive

AD No.: 2019-0282R1

Issued: 25 August 2021

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 and Trent 7000 engines

Effective Date: Revision 1: 01 September 2021
Original issue: 27 November 2019

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: This AD revises EASA AD 2019-0282 dated 20 November 2019.

ATA 72 – Engine – Intermediate Pressure Compressor Shaft Assembly – Inspection

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 (ESN), except those on which Rolls-Royce modification (mod) 72-K571 has been embodied in production, or on which Rolls-Royce Trent 1000 SB 72-K571 has been embodied in service; and

Trent 7000-72 and Trent 7000-72C engines, all ESN, except those on which Rolls-Royce mod 72-K570 has been embodied in production, or on which Rolls-Royce Trent 1000 SB 72-K570 has been embodied in service.

These engines are known to be installed on, but not limited to, Boeing 787 and Airbus A330 aeroplanes.

Definitions:

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



Where, in this AD, reference is made to a Rolls-Royce 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 TRENT 1000 Alert NMSB 72-AK451.

The applicable mod SB: Rolls-Royce SB TRENT 1000 72-K570 and SB TRENT 1000 72-K571, as applicable.

Affected part: Intermediate pressure compressor (IPC) shaft assemblies, having Part Number KH18436.

Serviceable part: An IPC shaft assembly which is not an affected part; or an affected part which is new (never previously installed on an engine); or an affected part that, before (re)installation, has passed (no crack detected) an inspection in accordance with the instructions of the NMSB.

Reason:

An occurrence was reported of finding cracks in the front air seal of the IPC shaft assembly during stripping of a flight test engine. Follow-up inspections of other in-shop engines revealed two more cracked front air seals of IPC shaft assemblies.

This condition, if not detected and corrected, could lead to IPC shaft failure, possibly resulting in engine in-flight shut-down and consequent reduced control of the aeroplane.

To address this potential unsafe condition, Rolls-Royce developed an inspection method and issued the NMSB, providing those inspection instructions. Consequently, EASA issued AD 2019-0282 to require repetitive on-wing inspections of the front air seal of the affected part at a specific area between the fourth (rearmost) seal fin of the IPC shaft assembly front air seal and the IPC Stage 1 disc and, depending on findings, removal from service of the engine for corrective action(s).

Since that AD was issued, Rolls-Royce developed mod 72-K570 (Trent 7000) and mod 72-K571 (Trent 1000) as optional terminating action for the required repetitive inspections. Rolls-Royce also issued the applicable mod SB to provide in-service modification instructions, revised the NMSB, and issued TRENT 1000 NMSB 72-K618 (later revised) to provide alternative inspection instructions.

For the reasons described above, this AD is revised to exclude post-mod and post-SB engines from the Applicability, introduces the applicable mod SB as optional terminating action and includes reference to Rolls-Royce issued TRENT 1000 NMSB 72-K618 as an acceptable alternative method for the repetitive inspections.



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

Required as indicated, unless accomplished previously:

Inspection(s):

- (1) Initially, within the compliance times specified in Table 1 of this AD, and, thereafter, at intervals not to exceed 200 flight cycles (FC), inspect the affected part in accordance with the instructions of Section 3.B of the NMSB.

Table 1 – Initial Inspection of Affected Part (see Note 1 of this AD)

FC Accumulated	Compliance Time
700 FC or less	Before exceeding 500 FC, or within 100 FC after 27 November 2019 [the effective date of the original issue of this AD], whichever occurs later
More than 700 FC, up to 1 000 FC (inclusive)	Within 50 FC after 27 November 2019 [the effective date of the original issue of this AD]
More than 1 000 FC	Within 25 FC or 30 days, whichever occurs first after 27 November 2019 [the effective date of the original issue of this AD]

Note 1: Unless indicated otherwise, the FC specified in Table 1 of this AD are those accumulated by the affected part since new (first installation on an engine).

- (2) An in-shop inspection in accordance with the instructions of Section 3.A of the NMSB may be substituted for any on-wing inspection as required by paragraph (1) of this AD, provided the compliance time is not exceeded.

An in-shop inspection in accordance with the instructions of Rolls-Royce TRENT 1000 NMSB 72-K618 may be substituted for any on-wing inspection as required by paragraph (1) of this AD, provided the compliance time is not exceeded.

Corrective Action(s):

- (3) If, during any on-wing inspection as required by paragraph (1) of this AD, any crack is detected, before next flight, remove the engine from service and, before release to service of the engine, contact Rolls-Royce for approved corrective actions instructions and accomplish those instructions accordingly.
- (4) If, during any in-shop inspection as specified in paragraph (2) of this AD, any crack is detected, before release to service of the engine, contact Rolls-Royce for approved corrective actions instructions and accomplish those instructions accordingly.

Credit:

- (5) Inspection of an engine, either on-wing or in-shop, before 27 November 2019 [the effective date of the original issue of this AD] in accordance with the instructions of Rolls-Royce TRENT 1000 NMSB 72-K452 or Technical Variance TV207889, as applicable, is an acceptable method to comply with the initial inspection as required by paragraph (1), or as specified in paragraph (2) of this AD, as applicable.



Terminating Action:

- (6) Modification of an engine in accordance with the instructions of the applicable mod SB constitutes terminating action for the repetitive inspections as required by paragraph (1) of this AD for that engine.

Parts Installation:

- (7) From 27 November 2019 [the effective date of the original issue of this AD], it is allowed to install on any engine an affected part, provided it is a serviceable part, as defined in this AD.

Ref. Publications:

Rolls-Royce TRENT 1000 Alert NMSB 72-AK451 original issue dated 14 November 2019, or Revision 1 dated 15 July 2021.

Rolls-Royce TRENT 1000 NMSB 72-K618 original issue dated 08 September 2020, or Revision 1 dated 15 July 2021.

Rolls-Royce TRENT 1000 SB 72-K570 original issue dated 15 June 2021.

Rolls-Royce TRENT 1000 SB 72-K571 original issue dated 15 June 2021.

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

Rolls-Royce TRENT 1000 NMSB 72-K452 original issue dated 21 October 2019.

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. 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](#). This may include reporting on the same or similar components, other than those covered by the design to which this AD applies, if the same unsafe condition can exist or may develop on an aircraft with those components installed. Such components may be installed under an FAA Parts Manufacturer Approval (PMA), Supplemental Type Certificate (STC) or other modification.
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 <https://www.rolls-royce.com/contact-us/civil-aerospace.aspx> identifying the correspondence as being related to **Airworthiness Directives**.

