

Airworthiness Directive

AD No.: 2024-0178

Issued: 12 September 2024

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, or Annex Vb Part ML.A.301, as applicable, 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 Annex Vb Part ML.A.303, as applicable] 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: 26 September 2024

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: None

ATA 72 – Engine – Intermediate Pressure Compressor Shaft Assembly / Front Air Seal – 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 manufacturer serial numbers (MSN); and

Trent 7000-72 and Trent 7000-72 C engines, all MSN.

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

Definitions:

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

The NMSB: Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72–AL139.

Where, in this AD, reference is made to a Rolls-Royce mod, Service Bulletin (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.

Affected part(s): Intermediate pressure compressor (IPC) shaft assemblies, having Part Number (P/N) LV18447 or P/N LV19601.

Serviceable part: IPC shaft assembly, eligible for installation in accordance with Rolls-Royce instructions, which is new (never installed); or an affected part which passed an inspection (no defect found) in accordance with the instructions of the NMSB, as defined in this AD, or Rolls-Royce NMSB Trent 1000 72-K618 Revision 2.

Groups:

Group 1 engines are:

Trent 1000 engine models that have Rolls-Royce Service Bulletin (SB) Trent 1000 72-K571 embodied; and

Trent 7000 engine models that have Rolls-Royce SB Trent 1000 72-K570 embodied.

Group 2 are engines those which are not Group 1.

Reason:

Occurrences of cracked IPC shaft assembly front air seals, installed on Group 1 engines were reported. The subsequent investigations identified possible change of the vibration and flutter characteristics of the affected parts and identified a potential propagation of the cracking into the IPC stage 1 disc.

This condition, if not detected and corrected, could possibly lead to IPC stage 1 disk burst with subsequent release of high energy debris and damage to the aeroplane or failure of the IPC front seal and release of debris leading to an engine IFSD, which in case of dual IFSD, resulting in reduced control of an aeroplane.

To address this potential unsafe condition, Rolls-Royce issued the NMSB to provide inspection instructions.

For the reasons described above, this AD requires repetitive inspections of the front air seal of the affected part and, depending on findings, removal of the engine from service and subsequent applicable corrective action(s).

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

Required as indicated by this AD, unless the action(s) required by this AD have been already accomplished:

On-wing Inspection:

- (1) For Group 1 engines: Within 500 engine flight cycles (EFC) accumulated by the affected part since new (for P/N LV19601) or since embodiment of Rolls-Royce SB Trent 1000 72-K571 (for P/N LV18447) or SB Trent 1000 72-K570 (for P/N LV18447), as applicable, or within the compliance time as defined in Table 1 of this AD, whichever occurs later, and, thereafter at



intervals not to exceed 300 EFC, accomplish a visual inspection of the front air seal of each affected part in accordance with the instructions of the NMSB (Method A or Method B).

Table 1 – Compliance Time

Number of EFC (see Note 1 of this AD)	Compliance Time
Less than 500	Within 500 EFC after embodiment of Rolls-Royce SB Trent 1000 72-K571 (Trent 1000 engines) or SB Trent 1000 72-K570 (Trent 7000 engines), as applicable; or within 300 EFC after the effective date of this AD, whichever occurs later
500 or more but less than 800	Within 800 EFC after embodiment of Rolls-Royce SB Trent 1000 72-K571 (Trent 1000 engines) or SB Trent 1000 72-K570 (Trent 7000 engines), as applicable; or within 200 EFC after the effective date of this AD, whichever occurs later
800 or more	Within 1 000 EFC after embodiment of Rolls-Royce SB Trent 1000 72-K571 (Trent 1000 engines) or SB Trent 1000 72-K570 (Trent 7000 engines), as applicable; or within 50 EFC after the effective date of this AD, whichever occurs later

Note 1: Unless indicated otherwise, the EFC specified in column 'Number of EFC' of the Table 1 of this AD are those accumulated on the effective date of this AD by the affected part having P/N LV18447 since accomplishment of Rolls-Royce SB Trent 1000 72-K571 (Trent 1000 engines) or SB Trent 1000 72-K570 (Trent 7000 engines), as applicable; or by the affected part having P/N LV19601 since new, as applicable.

In-shop Inspection:

- (2) For Group 1 engines: In-shop inspection of an engine or an affected part in accordance with the instructions of the NMSB or Rolls-Royce NMSB Trent 1000 72-K618 Revision 2 is acceptable to comply with the requirements of paragraph (1) of this AD, provided that the applicable compliance time and intervals as defined in paragraph (1) of this AD are not exceeded and found discrepancies are corrected, as applicable, in accordance with the instructions of the NMSB or Rolls-Royce NMSB Trent 1000 72-K618 Revision 2 before release to service of that engine.

Corrective Action(s):

- (3) If, during any on-wing inspection as required by paragraph (1) of this AD, any cracked affected part is detected, before next flight, remove the engine from service in accordance with the instructions of the NMSB and, before release to service of that engine, replace the affected part with a serviceable part, as defined in this AD, in accordance with approved Rolls-Royce maintenance instructions.

Acceptable Method:

- (4) For Group 1 engines: Inspection(s) and corrective action accomplished in-shop or on-wing on an engine in accordance with the instructions of Rolls-Royce Technical Variance (TV) 277059 are acceptable to comply with the initial requirements of the paragraphs (1) and (3) of this AD for that engine.



- (5) The IPC shaft assemblies listed (by P/N and serial number) in Appendix 3 of the NMSB are known to have been already inspected (before the effective date of this AD) in accordance with applicable maintenance instructions equivalent to those of the NMSB, and are therefore considered compliant with the initial inspection requirement of paragraph (1) of this AD. The repetitive inspections must however be accomplished on these parts as required by paragraph (1) of this AD. Appendix 3 of the NMSB provides the number of EFC accumulated by each listed affected part at the time of initial inspection.

Terminating Action:

- (6) None.

Modification (optional):

- (7) For Group 2 engines: From the effective date of this AD, modification of an engine in accordance with the instructions of Rolls-Royce SB Trent 1000 72-K571 (Trent 1000 engines) or SB Trent 1000 72-K570 (Trent 7000 engines), as applicable, is allowed, provided that, after modification, that engine is inspected and, depending on findings, corrected as required by this AD.

After modification the engine becomes a Group 1 engine which must be inspected and, depending on findings, corrected in accordance with the requirements of this AD.

Ref. Publications:

Rolls-Royce Alert NMSB Trent 1000 72-AL139 original issue dated 05 July 2024.

Rolls-Royce NMSB Trent 1000 72-K618 Revision 2 dated 13 June 2024.

Rolls-Royce SB Trent 1000 72-K570 original issue dated 23 November 2020.

Rolls-Royce SB Trent 1000 72-K571 original issue dated 23 November 2020.

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. This AD was posted on 05 August 2024 as PAD 24-100 for consultation until 02 September 2024. 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. 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 E-mail through <https://www.rolls-royce.com/contact-us/civil-aerospace.aspx>,

identifying the correspondence as being related to **Airworthiness Directives**.

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