

## Airworthiness Directive

**AD No.:** 2025-0021

**Issued:** 21 January 2025

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 &amp; Co KG

**Type/Model designation(s):**

Trent 7000 engines

**Effective Date:** 04 February 2025

**TCDS Number(s):** EASA.E.036

**Foreign AD:** Not applicable

**Supersedure:** This AD supersedes EASA AD 2021-0169R1 dated 24 May 2024.

### ATA 72 – Engine – High Pressure Turbine Blades – Inspection

**Manufacturer(s):**

Rolls-Royce plc

**Applicability:**

Trent 7000-72 and Trent 7000-72C engines, all serial numbers, except those on which modification (mod) 72-K336 has been embodied in production.

These engines are known to be installed on, but not limited to, Airbus A330 (NEO) 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-AK449 Revision 4. The NMSB has an 'A' (Alert) in the number, but an earlier or later revision may not have that 'A'. This kind of change does not effectively alter the publication references.

**The modification SB:** Rolls-Royce Service Bulletin (SB) TRENT 1000 72-K336.

**Affected part:** High pressure turbine (HPT) blades, having Part Number (P/N) KH64485.

Note 1: HPT blades, having P/N KH64485 can also be installed as a kit comprising a set of 66-off HPT blades in accordance with Rolls-Royce SB TRENT 1000 72-L043.

**Serviceable part:** HPT blades eligible for installation, which are not an affected part, or an affected part which is new (never previously installed).

**Reason:**

In-service experience has shown that the affected parts may deteriorate, and that the piece-part level inspections as specified in the Rolls-Royce Trent 7000 Time Limits Manual, (TLM) T-T7000-1RR, Chapter 05-20, Revision 9, and later revisions, might not timely detect their damage.

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 determined a flight cycle (FC) threshold and an on-wing borescope inspection method and issued Revision 2 of the NMSB TRENT 1000 72-AK449 accordingly. Consequently, EASA issued AD 2021-0169 to require initial and 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 required implementation of a reduced life limit for the affected parts.

Since EASA AD 2021-0169 (later revised) was issued, it was determined that the population of the serviceable parts can be expanded to include eligible HPT blades having P/Ns different from P/N KH64485. Rolls-Royce developed mod 72-K336 to introduce revised HPT blades featuring additional cooling holes in the blade aerofoil and shroud, geometry changes to the blade root inlet duct feature to increase the cooling air flow, and revised combustion rear inner case bypass case assembly featuring geometry changes to the top-up holes to increase the pre-swirl air flow to the blades. Further, Rolls-Royce issued the modification SB making this mod available for in-service engines. HPT blades introduced by mod 72-K336 are not affected by the unsafe condition addressed by this AD. Consequently, Rolls-Royce issued Revision 3 of Rolls-Royce NMSB TRENT 1000 72-AK449 excluding engines in post-mod 72-K336 configuration from the Effectivity.

Since EASA AD 2021-0169R1 was issued, Rolls-Royce issued the NMSB, as defined in this AD, to introduce instructions and corrective actions for inspection of the Convex surface (Area C4) and more detailed criteria for cracking identified within leading edge (LE) (Area A).

For the reasons described above, this AD retains the requirements of EASA AD 2021-0169R1, which is superseded and, additionally, requires inspection of the Convex surface (Area C4).

**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:

**Inspection(s):**

- (1) Before exceeding the compliance time as specified in Table 1 of this AD, as applicable, accomplish an on-wing borescope inspection of all affected parts in accordance with the instructions of Section 3.A of the NMSB.



Table 1 – Inspection Threshold(s) (see Note 2 of this AD)

| FC Accumulated   | Compliance Time   |
|------------------|---|
| Less than 475 FC | Before exceeding 500 FC   |
| 475 FC or more   | Within 25 FC after 02 August 2021 [the effective date of EASA AD 2021-0169 at original issue] |

Note 2: Unless indicated otherwise, the FC specified in Table 1 and Table 2 of this AD are those accumulated on 02 August 2021 [the effective date of EASA AD 2021-0169 at original issue] by the engine since first flight, or since last in-service HPT blade set replacement, as applicable.

- (2) Within the compliance time as specified in Table 2 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.A of the NMSB.

Table 2 – First Repeat Inspection Threshold(s) (see Note 2 of this AD)

| FC Accumulated   | Compliance Time   |
|------------------|---|
| Less than 725 FC | Before exceeding 750 FC   |
| 725 FC or more   | Within 25 FC after 02 August 2021 [the effective date of EASA AD 2021-0169 at original issue] |

- (3) From 02 August 2021 [the effective date of EASA AD 2021-0169 at original issue], before next flight after IFSD of an engine on an aeroplane, if the accumulated life of the affected parts installed on the not-affected (no IFSD) engine of that aeroplane have exceeded 450 FC, accomplish an on-wing borescope inspection of all affected parts on that not-affected (no IFSD) engine in accordance with the instructions of Section 3.A of the NMSB.
- (4) If, during any inspection as required by paragraph (1), (2) or (3) of this AD, an axial crack up to 2 mm (0.08 inch) inclusive, is found on the LE (Area A) of an affected part, as defined in the NMSB, within 10 FC and, thereafter, at intervals not to exceed 10 FC, re-inspect the affected part in accordance with the instructions of Section 3.A of the NMSB.

#### Corrective Action(s):

- (5) If, during any inspection as required by paragraph (1), (2), (3) or (4) of this AD, axial crack above 2 mm (0.08 inch) is found on the LE (Area A) of an affected part, within the compliance time specified in Table 3 of this AD, as applicable, remove the engine from service and, before release to service of that engine, replace all the affected parts with a full set of serviceable parts, as defined in this AD in accordance with approved Rolls-Royce maintenance instructions.



Table 3 – Engine Removal from Service – LE Area Cracking

| Cracking of the LE area (Area A)   | Compliance Time                                      |
|--|--|
| Axial crack exceeding 4 mm (0.16 inch) in length   | Before next flight                                   |
| Axial crack exceeding 2 mm (0.08 inch) but not exceeding 4 mm (0.16 inch) inclusive, in length | Within 10 FC after the inspection detecting crack(s) |

- (6) If, during any inspection as required by paragraph (1), (2), (3) or (4) of this AD, axial crack indication, as defined in the NMSB, is found on the Convex surface (Area C4) of an affected part, within the compliance time specified in Table 4 of this AD, as applicable, remove the engine from service and, before release to service of that engine, replace all the affected parts with a full set of serviceable parts, as defined in this AD in accordance with approved Rolls-Royce maintenance instructions.

Table 4 – Engine Removal from Service – Convex Surface Cracking

| Cracking of the LE area (Area A)                 | Compliance Time                                     |
|--|---|
| Axial crack exceeding 3 mm (0.12 inch) in length | Before next flight                                  |
| Axial crack 3 mm (0.12 inch) or less in length   | Within 6 FC after the inspection detecting crack(s) |

**Life Limitation:**

- (7) Before the affected parts on an engine exceed 1 000 FC since new (first installation on an engine), remove the engine from service and, before release to service of that engine, replace the affected parts with a full set of serviceable parts in accordance with approved Rolls-Royce maintenance instructions.

Note 3: The HPT blade life limit as required by paragraph (7) of this AD cancels the inspection intervals as currently defined in the TLM.

**Credit:**

- (8) Inspections and, depending on findings, corrective actions accomplished on an engine, before the effective date of this AD, in accordance with the instructions of the original issue, Revision 1, Revision 2 or Revision 3 of the NMSB TRENT 1000 72-AK449 are acceptable to comply with the requirements of this AD for that engine.

**Terminating Action:**

- (9) Modification of an engine in accordance with the instructions of the modification SB constitutes terminating action for the repetitive inspections as required by this AD for that engine.

**Ref. Publications:**

Rolls-Royce Alert NMSB TRENT 1000 72-AK449 Revision 1 dated 12 December 2019, or Revision 2 dated 05 July 2021, or Revision 3 dated 30 August 2023, or Revision 4 dated 19 December 2024.

Rolls-Royce SB TRENT 1000 72-K336 original issue 03 August 2022, or Revision 1 dated 03 October 2023.



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 06 January 2025 as PAD 25-002 for consultation until 20 January 2025. No comments were received during the consultation period.
3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: [ADs@easa.europa.eu](mailto: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**.

