



適航指令發布單

Airworthiness Directive Issuance Form

民航局AD編號 AD number	CAA-2021-07-004A	發布日期 Date issued	2024/05/29												
適用之航空產品 Applied to (models, serial numbers or part numbers, as applicable)	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.														
主旨摘要 Subject	Engine - High Pressure Turbine Blades - Inspection														
民航局 CAA <input type="radio"/> 本國產品 Native product <input type="radio"/> 其他個案 Other	設計國民航主管機構 Original Authority <table><tr><td><input type="radio"/> FAA</td><td><input type="radio"/> Germany LBA</td></tr><tr><td><input checked="" type="radio"/> EASA</td><td><input type="radio"/> CAA-NL</td></tr><tr><td><input type="radio"/> Brazil</td><td><input type="radio"/> UK CAA</td></tr><tr><td><input type="radio"/> Transport Canada Civil Aviation</td><td><input type="radio"/> Japan CAB</td></tr><tr><td><input type="radio"/> DGAC</td><td><input type="radio"/> CAA of Israel</td></tr><tr><td></td><td><input type="radio"/> Other_____</td></tr></table>			<input type="radio"/> FAA	<input type="radio"/> Germany LBA	<input checked="" type="radio"/> EASA	<input type="radio"/> CAA-NL	<input type="radio"/> Brazil	<input type="radio"/> UK CAA	<input type="radio"/> Transport Canada Civil Aviation	<input type="radio"/> Japan CAB	<input type="radio"/> DGAC	<input type="radio"/> CAA of Israel		<input type="radio"/> Other_____
<input type="radio"/> FAA	<input type="radio"/> Germany LBA														
<input checked="" type="radio"/> EASA	<input type="radio"/> CAA-NL														
<input type="radio"/> Brazil	<input type="radio"/> UK CAA														
<input type="radio"/> Transport Canada Civil Aviation	<input type="radio"/> Japan CAB														
<input type="radio"/> DGAC	<input type="radio"/> CAA of Israel														
	<input type="radio"/> Other_____														
	設計國AD編號 Original AD number	2021-0169R1													
	1. 直接採用原AD之內容? (Is the original AD directly adopted?) <input checked="" type="radio"/> 是(Yes) <input type="radio"/> 否(No)_ a. 生效日期另訂為(Re-specify the effective date as): b. 執行時限另訂為(Re-specify the compliance time or period as): 2. 使用人是否需要將AD執行結果向民航局提出報告? (Do users need to report the status of compliance to the CAA?) <input type="radio"/> 需要(Yes) <input checked="" type="radio"/> 不需要(No)														
備註 Note	This AD revises EASA AD 2021-0169 (CAA-2021-07-004) dated 19 July 2021.														

註： 1. AD內容後附。
2. 航空器產品使用人得向民航局提出豁免、替代符合方法、執行時限之展延之申請。
3. 如有任何問題，請聯絡交通部民用航空局初始適航科。Tel：(02)2349-6330 / 6332, Fax：(02)2545-8464,
adcaa@mail.caa.gov.tw

Note： 1. The AD text is enclosed.
2. Exemption, an alternative method of compliance or adjustment of the compliance time may be proposed to the CAA for approval.
3. For further information, please contact Civil Aeronautics Administration on Tel：(02)2349-6330 / 6332, Fax：(02)2545-8464, adcaa@mail.caa.gov.tw



Airworthiness Directive

AD No.: 2021-0169R1

Issued: 24 May 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 7000 engines

Effective Date: Revision 1: 31 May 2024
Original issue: 02 August 2021

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Revision: This AD revises EASA AD 2021-0169 dated 19 July 2021.

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 2. 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.



Serviceable part: HPT blades eligible for installation, which are not an affected part; or an affected part which is new (not previously installed).

Reason:

In-service experience has shown that the affected parts may deteriorate, despite being subject to piece-part level inspections as specified in the Rolls-Royce Trent 7000 Time Limits Manual, TLM T-77000-1RR, Revision 9, Chapter 05-20, and later revisions.

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 the NMSB 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 that AD 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 TRENT 1000 72-AK449 excluding engines in post-mod 72-K336 configuration from the Effectivity.

This AD is revised accordingly and is still considered to be an interim action which may be followed by further AD action.

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

Required as indicated by this AD, unless the actions 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 1 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 this AD at original issue]



Note 1: 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 this AD 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 1 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 this AD at original issue]

- (3) From 02 August 2021 [the effective date of this AD 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.

Corrective Action(s):

- (4) If, during any inspection as required by paragraph (1), (2) or (3) of this AD, as applicable, any crack indication (as specified in the NMSB) is found, 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 the affected parts with a full set of serviceable parts, as defined in this AD.

Table 3 – Engine Removal from Service

Affected Part Finding(s)	Compliance Time
Cracks exceeding 4 mm (0.16 inch) in length	Before next flight
Cracks up to 4 mm (0.16 inch) in length	Within 10 FC or 60 flight hours, whichever occurs first after the inspection detecting crack(s)

Life Limitation:

- (5) 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, as defined in this AD.

Note 2: The HPT blade life limit as required by paragraph (5) of this AD cancels the inspection intervals as currently defined in the TLM.



Credit:

- (6) Inspection(s) and corrective action(s) on an engine, accomplished before 02 August 2021 [the effective date of this AD at original issue] in accordance with the instructions of Rolls-Royce Alert NMSB TRENT 1000 72-AK449 at Revision 1, are acceptable to comply with the initial requirements of paragraphs (1), (2) and (3) of this AD, as applicable, for that engine.

Terminating Action:

- (7) 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.

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. The original issue of this AD was posted on 14 June 2021 as PAD 21-085 for consultation until 12 July 2021. 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 email through <https://www.rolls-royce.com/contact-us/civil-aerospace.aspx>
identifying the correspondence as being related to **Airworthiness Directives**.

