



## Notification of a Proposal to issue an Airworthiness Directive

**PAD No.: 24-131**

**Issued: 31 October 2024**

Note: This Proposed Airworthiness Directive (PAD) 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.

In accordance with the EASA Continuing Airworthiness Procedures, the Executive Director is proposing the issuance of an EASA Airworthiness Directive (AD), applicable to the aeronautical product(s) identified below.

All interested persons may send their comments, referencing the PAD Number above, to the e-mail address specified in the 'Remarks' section, prior to the consultation date indicated.

**Design Approval Holder's Name:** **Type/Model designation(s):**

ROLLS-ROYCE DEUTSCHLAND Ltd & Co KG Trent 1000 engines

**Effective Date:** [TBD - standard: 14 days after AD issue date]

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

**Foreign AD:** None

**Supersedure:** Not applicable

### ATA 72 – Engine – Intermediate Pressure Compressor / Variable Inlet Guide Vane – Inspection(s)

#### Manufacturer(s):

Rolls-Royce plc

#### Applicability:

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, all serial numbers.

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) TRENT1000-72-AK841 Revision 3.

Where, in this AD, reference is made to a Rolls-Royce modification (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.

**Affected part:** Intermediate pressure (IP) compressor variable inlet guide vane (VIGV) having Part Number (P/N) FW54936.

**Serviceable part:** An IP compressor VIGV eligible for installation in accordance with Rolls-Royce maintenance instructions which is new (never installed); or an affected part which passed an inspection in accordance with the instructions of the NMSB and complies with the airworthiness and serviceability criteria for that part specified in Rolls-Royce Cleaning, Inspection and Repair Manual CIR-TRENT-10RRC.

**Asymmetric power conditions:** Single engine take-off, engine fault (leading to reduced power on one engine), or engine in-flight shut-down (IFSD), accomplished or occurred at an altitude of less than 28 000 feet.

**Reason:**

Cracking of affected part on Trent 1000 Pack C engines were reported. Subsequent investigation attributed the cracking to high-cycle fatigue propagation phenomena.

This condition, if not detected and corrected, could lead to release of fractured parts with a steady state surge, subsequent uncommanded IFSD and, in case of dual-engine IFSD, reduced control of the aeroplane.

To address this potential unsafe condition, Rolls-Royce issued the NMSB providing instructions for borescope inspections and, depending on findings, either removal of engine from service or repetitive inspections within reduced inspection intervals.

For the reasons described above, this AD requires repetitive borescope inspections of each affected part and introduces specific requirements for engines following operation in asymmetric power conditions.

This AD is considered to be an interim action and further AD action is expected.

**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(s):**

- (1) Within the compliance time as defined in Table 1 of this AD and, thereafter at intervals not exceeding 2 000 engine flight hours (EFH) or 500 engine flight cycles (EFC), whichever occurs first, inspect each affected part in accordance with the instructions of section 3.A of the 'Accomplishment Instructions' of the NMSB.



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

IP Compressor Module P/N M32100604 (Service life since new on the effective date of this AD)	Compliance Time (see paragraph (6) of this AD)
20 000 EFH or more	Within 2 000 EFH or 500 EFC, whichever occurs first since the latest inspection in accordance with the instructions of Rolls-Royce NMSB TRENT1000-72-K841, or 60 days after the effective date of this AD, as applicable
18 000 EFH or more but less than 20 000 EFH	Within 2 000 EFH or 500 EFC, whichever occurs first after accumulating 18 000 EFH by an IP compressor module since new, or since the latest inspection in accordance with the instructions of Rolls-Royce NMSB TRENT1000-72-K841, as applicable, or 112 days after the effective date of this AD, whichever occurs later
Less than 18 000 EFH	Within 2 000 EFH or 500 EFC, whichever occurs first, after accumulating 18 000 EFH by an IP compressor module since new, or since the latest inspection in accordance with the instructions of Rolls-Royce NMSB TRENT1000-72-K841, as applicable

Note 1: The EFH and EFC as specified in Table 1, Table 2 and Table 3 of this AD are those accumulated by the IP compressor module P/N M32100604.

#### Inspection following Asymmetric Power Operation:

- (2) From the effective date of this AD, after each operation of an aeroplane in asymmetric power conditions, as defined in this AD, within 5 EFC accumulated by the not-affected engine (no power reduction, no IFSD) installed on that aeroplane, accomplish an on-wing inspection of the not-affected engine (no power reduction, no IFSD) in accordance with the instructions of section 3.A of the 'Accomplishment Instructions' of the NMSB.
- (3) If, during any inspection as required by paragraph (1) or (2) of this AD, any crack is detected on an affected part of an engine, as defined in Table 2 of this AD, accomplish the follow-on inspections of the full set of the affected parts installed on that engine within the reduced interval(s) as defined in Table 2 of this AD, as applicable, in accordance with the instructions of section 3.A of the 'Accomplishment Instructions' of the NMSB (see Note 2 of this AD).

Table 2 – Follow-on inspection

Crack Length	Reduced Interval (EFH or EFC, whichever occurs first)
Longest crack less than 10 mm	400 EFH or 100 EFC
Longest crack 10 mm or more but less than 15 mm	150 EFH or 40 EFC

Note 2: Following the replacement of the full set of affected parts of an engine with parts which are not cracked, the follow-on inspections of the affected parts of that engine can be accomplished at intervals as defined in paragraph (1) of this AD.



**Corrective Action(s):**

- (4) If, during any inspection, as required by paragraph (1), (2) or (3) of this AD, any crack is detected as defined in Table 3 of this AD, within the compliance time as defined in Table 3 of this AD, remove the engine from service and, before release to service of that engine, replace the cracked affected part(s) with serviceable parts, in accordance with approved Rolls-Royce maintenance instructions.

Table 3 – Engine Removal from Service

Crack Length	Compliance Time (EFH or EFC, whichever occurs first)
Longest crack 15 mm or more but less than 20 mm	100 EFH or 25 EFC
Longest crack 20 mm or more	Before next flight

**In-shop Inspection instead of On-wing:**

- (5) Accomplishment of an in-shop inspection on an engine in accordance with the instructions of section 3.B of the 'Accomplishment Instructions' of the NMSB is acceptable to comply with an on-wing inspection as required by paragraph (1) or (2) of this AD for that engine.

**Credit:**

- (6) Inspection(s) and corrective action(s) accomplished on an engine before the effective date of this AD in accordance with the instructions of original issue, Revision 1, or Revision 2 of Rolls-Royce NMSB TRENT1000-72-K841 is/are acceptable to comply with the requirements of paragraphs (1) and (2) of this AD for that engine.

**Terminating Action:**

- (7) None.

**Ref. Publications:**

Rolls-Royce NMSB TRENT 1000-72-K841 original issue dated 23 May 2022, or Revision 1 dated 30 June 2022, Revision 2 dated 08 August 2023, or Alert NMSB TRENT1000-72-AK841 Revision 3 dated 07 October 2024.

Rolls-Royce Cleaning, Inspection and Repair Manual CIR-TRENT-10RRC Revision 88 dated 12 August 2024.

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

**Remarks:**

1. This Proposed AD will be closed for consultation on 28 November 2024.
2. Enquiries regarding this PAD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu).
3. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this PAD, and which may occur, or have occurred



on a product, part or appliance not affected by this PAD, 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 PAD 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.

4. For any question concerning the technical content of the requirements in this PAD, 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](http://www.rolls-royce.com/contact/civil_team.jsp) identifying the correspondence as being related to **Airworthiness Directives**.

