

Airworthiness Directive

AD No.: 2022-0241

Issued: 07 December 2022

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 engines

Effective Date: 21 December 2022

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: None

ATA 72 – Engine – High Pressure Turbine 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 serial numbers, except those listed in Appendix 1 of the NMSB.

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) TRENT 1000 72-AK711.

Affected part: High pressure (HP) turbine triple seals, having Part Number FW34485.

Qualified engine shop visit: A shop visit where the HP module rework is at Level 2 (Check and Repair) or higher level. Refer to Rolls-Royce Engine Management Programme for rework package definition.

Reason:

Occurrences have been reported of finding wear on the seal fins of affected parts, the level of which is higher than expected. The secondary air system is affected by the resulting increased turbine cooling air leakage, which changes the air flow around the intermediate pressure (IP) turbine disc.

The Modulated Air System (MAS) was designed to optimise cooling air flow and intended to be active only during cruise conditions, but the design did not account for a high level of seal wear. Rolls-Royce issued NMSB TRENT 1000 75-AK642 to provide instruction for MAS deactivation, and consequently, EASA published AD 2021-0009 mandating to deactivate the MAS control valves. Despite this, a significantly worn affected part under flight conditions, while MAS was activated prior to the above action, could have reduced the safety margins.

This condition, if not detected and corrected, could lead to temperature increase at the IP turbine disc rim, possibly resulting in IP turbine disc failure and high energy debris release, with consequent damage to, and reduced control of, the aeroplane.

To address this potential unsafe condition, Rolls-Royce has issued the NMSB, providing instructions to inspect the affected part.

For the reasons described above, this AD requires a one-time inspection of the affected part and, depending on findings, replacement. This AD also requires reporting of the inspection results.

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

Required as indicated, unless accomplished previously:

Inspection:

- (1) During the next qualified engine shop visit, as defined in this AD, after the effective date of this AD, inspect the affected part in accordance with the instructions of section 3 of the NMSB. For an engine that, on the effective date of this AD, is in a qualified engine shop visit where the HP module re-assembly has not yet started, accomplish the inspection before release to service of the engine.

Corrective Action(s):

- (2) If, during the inspection as required by paragraph (1) of this AD, wear is found on the inner seal fins that is beyond the limits as defined in section 3.B of the NMSB, before release to service of the engine, replace (see Note 1 of this AD) the affected part and the IP turbine disc with serviceable parts. This can be accomplished by using the applicable Rolls-Royce Engine Manual instructions.

Note 1: Any removed and quarantined affected part or IP turbine disc may be reinstalled, provided the affected part and/or IP turbine disc has been re-assessed by Rolls-Royce to be a serviceable part, confirmed by a Technical Variance.

Reporting:

- (3) Within 30 days after the inspection as required by paragraph (1) of this AD, or within 30 days after the effective date of this AD, whichever occurs later, report the inspection results



(including no findings) to Rolls-Royce, contact details in the Remarks section of this AD.
Appendix 2 of the NMSB can be used for this reporting purpose.

Ref. Publications:

Rolls-Royce Alert NMSB TRENT 1000 72-AK711 original issue dated 01 August 2022.

The use of later approved revisions of the above-mentioned document 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 17 October 2022 as PAD 22-134 for consultation until 14 November 2022. 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**.

