

Airworthiness Directive

AD No.: 2019-0230

Issued: 12 September 2019

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, 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 agreed with the Authority of the State of Registry [Regulation (EU) 2018/1139, Article 71 exemption].

Design Approval Holder's Name:

ROLLS-ROYCE plc

Type/Model designation(s):

RB211 Trent 900 engines

Effective Date: 26 September 2019

TCDS Number(s): EASA.E.012

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA AD 2018-0199 dated 06 September 2018, including its Correction dated 26 September 2018.

ATA 72 – Engine – Oil Service Pipe Sealing Rings – Inspection / Replacement / Modification / Rework

Manufacturer(s):

Rolls-Royce plc

Applicability:

RB211 Trent 970-84, 972-84 and 972E-84 engines, all serial numbers (ESN).

These engines are known to be installed on, but not limited to, Airbus A380 aeroplanes.

Definitions:

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

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

The NMSB: Rolls-Royce Trent 900 Alert NMSB RB.211-72-AJ868 Revision 1.

The SB: Rolls-Royce Trent 900 SB RB.211-72-J589 Revision 1, or SB RB.211-72-J395.

Affected part: High pressure / intermediate pressure (HP/IP) support structure oil service tube buffer sealing rings, having Part Number (P/N) FW64487. These sealing rings are installed on HP/IP support structure assemblies, identified by P/N FW64481, P/N KH13661, P/N KH13811, P/N KH57620, P/N KH57797 and P/N KH66347.

Serviceable part: An affected part that is new (not previously installed); or an affected part that has not exceeded the applicable life limit as specified in Table 1 of this AD.

Groups: Group 1 engines are those identified by ESN as Population 1 in Appendix 1 of the NMSB. Group 2 engines are those identified by ESN as Population 2 in Appendix 2 of the NMSB. Group 3 engines are those that have embodied Rolls-Royce modification (mod) 72-J395 in production, or have embodied Rolls-Royce SB RB.211-72-J395 or SB RB.211-72-J589 in service.

Qualified shop visit: Scheduled shop visit for M51 - IPT Module rework level of Module Refurbishment, or Module Overhaul, or Engine Refurbishment.

Reason:

Occurrences were reported of finding wear on certain HP/IP support structure oil service tube buffer sealing rings on in-service RB211 Trent 900 engines. Investigation showed the wear rate to be higher than expected. It was also determined that this was most likely due to a large pressure drop across the outer hub sealing ring, and consequent increased wear as a result of movement of the sealing ring across the hub surface.

This condition, if not corrected, could lead to cracking of the sealing ring, allowing high pressure air into the bearing chamber, consequent over-heating and failure of the IP shaft, possibly resulting in IP turbine disc burst and high-energy debris release, with consequent damage to, and reduced control of, the aeroplane.

To address this potential unsafe condition, Rolls-Royce initially published NMSB RB.211-72-AJ299, providing in-shop instructions for 11 ESN which were considered to have a high-wear risk. Consequently, EASA issued AD 2016-0061, to require removal of those engines from service for corrective action.

Since that AD was issued, Rolls-Royce published NMSB RB.211-72-AJ868 (original issue) to provide instructions to replace the affected sealing rings on all pre-mod/SB 72-J395 engines. Consequently, EASA issued AD 2018-0199 (later corrected), superseding EASA AD 2016-0061, to require implementation of a life limit for the affected parts. That AD also prohibited installation of affected parts on Group 3 engines.

Since that AD was issued, Rolls-Royce developed mod 72-J589 and issued the SB to provide instructions for in-service rework. Prompted by information obtained during development of mod 72-J589, Rolls-Royce also issued the NMSB, reducing the replacement interval for the affected parts installed on Group 2 engines. Finally, the NMSB also introduces on-wing borescope inspections of the affected parts.

For the reasons described above, this AD partially retains the requirements of EASA AD 2018-0199, which is superseded, and requires a modification which constitutes terminating action for the



repetitive replacements (life limit) as required by this AD. This AD also reduces the replacement interval for affected parts installed on Group 2 engines and introduces on-wing inspections of the affected parts on Group 1 and Group 2 engines.

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

Required as indicated, unless accomplished previously:

Replacement (Life Limitation):

- (1) Within the compliance time specified in Table 1 of this AD, as applicable, or within 100 flight cycles (FC) after the effective date of this AD, whichever occurs later, and thereafter, before each affected part exceeds the limit as specified in Table 1 of this AD, replace each affected part in accordance with the instructions of the NMSB.

Table 1 – Affected Parts Replacement (see Notes 1 and 2 of this AD)

Group	Compliance Time / Life Limitation (not to exceed)
1	2 800 FC
2	3 300 FC

Note 1: The FC specified in Table 1 of this AD are those accumulated by the affected part since its first installation on an engine. Consequently, the FC of the affected part may be less than the FC of the HP/IP support structure assembly on which it is installed, accumulated since its first installation on an engine.

Note 2: The Trent 900 Time Limits Manual (TLM), T-TRENT-9RR, contains a life limit of 2 000 FC for the affected parts when installed on RB211 Trent 972E-84 engines (part of Group 1 engines, as defined in this AD) that have not embodied mod 72-J589 or mod 72-J395 in production, and have not been modified per SB RB.211-72-J589 or SB RB.211-72-J395 in service. For those engines, the TLM limit applies, rather than the 2 800 FC limit as specified in Table 1 of this AD.

Inspection(s):

- (2) For Group 1 and Group 2 engines operated using Rolls-Royce Engine Health Monitoring (EHM) service: After receipt of an EHM notification (see Appendix 1 of this AD) to inspect the seal rings, within the time specified in that notification, inspect each affected part in accordance with the instructions of the NMSB.
- (3) For Group 1 and Group 2 engines operated without using Rolls-Royce EHM service: Within 100 FC after the effective date of this AD and, thereafter, at intervals not to exceed 100 FC, inspect each affected part in accordance with the instructions of the NMSB.

Corrective Action(s):

- (4) If, during any inspection as required by paragraph (2) or (3) of this AD, as applicable, an affected part does not meet the 'pass' criteria as defined in the NMSB, before next flight, remove the engine from service and, before release to service of that engine, replace that affected part with a serviceable part, as defined in this AD, in accordance with the instructions of the NMSB.



Modification:

- (5) For Group 1 and Group 2 engines: During the next qualified shop visit (as defined in this AD) after the effective date of this AD, but not later than 31 December 2027, modify the engine in accordance with the instructions of the SB.

Terminating Action:

- (6) Modification of an engine as required by paragraph (5) of this AD constitutes terminating action for the life limitation and repetitive inspections as required by this AD for that engine. For the purpose of paragraphs (8.2) and (9) of this AD, this modification effectively redefines the engine as a Group 3 engine – see also section Definitions of this AD.

Part Installation:

- (7) For Group 1 and Group 2 engines: From 20 September 2018 [the effective date of EASA AD 2018-0199], until modification as required by paragraph (5) of this AD, it is allowed to install an affected part on an engine, provided the part is a serviceable part, as defined in this AD.
- (8) Do not install an affected part on an engine, as required by paragraph (8.1) or (8.2) of this AD, as applicable.
- (8.1) For Group 1 and Group 2 engines: After modification of the engine as required by paragraph (5) of this AD.
- (8.2) For Group 3 engines: From 20 September 2018 [the effective date of EASA AD 2018-0199].

Engine Installation:

- (9) From the effective date of this AD, except as required by paragraph (8) of this AD, it is allowed to install a Group 1 or Group 2 engine on any aeroplane, provided the affected part installed on that engine is a serviceable part, as defined in this AD.

Ref. Publications:

Rolls-Royce Trent 900 NMSB RB.211-72-AJ868 original issue dated 18 July 2018, and Revision 1 dated 23 August 2019.

Rolls-Royce Trent 900 SB RB.211-72-J395 original issue dated 20 April 2017.

Rolls-Royce Trent 900 SB RB.211-72-J589 Revision 1 dated 29 January 2019.

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 23 July 2019 as PAD 19-136 for consultation until 20 August 2019. 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 Programming and Continued Airworthiness 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](#).
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 http://www.rolls-royce.com/contact/civil_team.jsp identifying the correspondence as being related to **Airworthiness Directives**.



Appendix 1 – Example EHM Alert

Engine: #1/91xxx on aircraft X-XXXX

This Alert is the subject of an EASA Airworthiness Directive.

Possible Causes

Failure of the HP/IP support structure sealing rings.

Possible Outcome

Oil firing.

Reaction Time

Before next flight.

Recommended Troubleshooting

It is mandated to perform the following upon receiving this EHM Alert:

1. Carry out a borescope inspection of the HP/IP buffer sealing rings in accordance with AMM TASK 72-00-00-290-810-A.
2. If the inspection confirms the integrity of the buffer sealing rings then the engine may be returned to unrestricted service.

