



## Airworthiness Directive

**AD No.:** 2024-0185

**Issued:** 23 September 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):**

RB211 Trent 900 engines

**Effective Date:** 07 October 2024

**TCDS Number(s):** EASA.E.012

**Foreign AD:** Not applicable

**Supersedure:** This AD supersedes EASA AD 2020-0208 dated 05 October 2020.

### ATA 72 – Engine – Intermediate Pressure Compressor Rotor Shaft – Inspection

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**Manufacturer(s):**

Rolls-Royce plc

**Applicability:**

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

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:

**Affected part:** Intermediate pressure compressor (IPC) rotor shafts, having Part Number (P/N) FW20677.

**The NMSB:** Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) RB.211-72-AK493 Revision 2. The NMSB has an 'A' (Alert) in the number, but a later revision may not have that 'A'. This kind of change does not effectively alter the publication references.

**CSSV:** Cycles since last shop visit (CSSV), where a Level 4 overhaul (CSSV L4) was completed on module 32 (the IPC module 32); or a Level 2 check and repair (CSSV L2) was completed on the IPC module 32.



**CSN:** Cycles since new (CSN), i.e. those accumulated by an affected part or module since its first installation on an engine.

**Reason:**

An occurrence was reported where in the engine shop, during a visual inspection of the IPC rotor shaft, defined in this AD as affected part, a crack was found in an interstage spacer between the stage 2 and stage 3 IPC discs. During a subsequent shop inspection of another affected part, a similar crack was found in the same location. While investigation was on-going to identify the cause of these cracks, it was determined that more engines (IPC modules 32) could be affected by this cracking phenomenon.

This condition, if not detected and corrected, could lead to IPC rotor shaft failure, possibly resulting in release of high-energy debris, with consequent damage to, and reduced control of, the aeroplane.

To address this potential unsafe condition, Rolls-Royce published Alert NMSB RB.211-72-AK493 (original issue), providing inspection instructions. Consequently, EASA issued AD 2020-0041 to require for certain engines a one-time on-wing borescope inspection and a repetitive in-shop inspections of the affected parts for all engines and, depending on findings, accomplishment of applicable corrective action(s). Prompted by the collected data, Rolls-Royce published Alert NMSB RB.211-72-AK493 at Revision 1 introducing repetitive on-wing inspections, including acceptance criteria, for all engines. In consequence, EASA issued AD 2020-0208 to require accomplishment of those inspections.

Since EASA AD 2020-0208 was issued, Rolls-Royce published the NMSB, as defined in this AD, introducing in addition an on-wing borescope-fluorescent penetrant inspection to be used in case the standard borescope inspection and subsequent cleaning do not allow an unambiguous identification of IPC rotor shaft cracking. The NMSB also introduces instructions for replacement of the affected part and the stage 3 rotor blade set in case a cracked IPC rotor shaft is found.

For the reasons described above, this AD retains the requirements of EASA AD 2020-0208, which is superseded, and, depending on findings, replacement of the affected part and the stage 3 rotor blade set.

**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) Depending on the condition of the affected part or IPC module 32 on 19 October 2020 [the effective date of EASA AD 2020-0208], within the compliance time as specified in Table 1 of this AD, as applicable, and, thereafter, at intervals not to exceed 500 flight cycles (FC) or 5 000 flight hours (FH), whichever occurs first, accomplish an on-wing borescope inspection of the affected part in accordance with the instructions of the NMSB.



Table 1 – Compliance Times, depending on Engine / IPC module 32 Condition

Condition (see Note 1 of this AD)	Compliance Time
Section 1.D.(1)(a)(i)	Within 500 FC or 5 000 FH, whichever occurs first since the last visual inspection of the affected part in accordance with the instructions of Rolls-Royce Alert NMSB RB.211-72-AK493
Section 1.D.(1)(a)(ii)	Within 200 FC or 2 000 FH, whichever occurs first after 19 October 2020 [the effective date of EASA AD 2020-0208]
Section 1.D.(1)(b)(i)	
Section 1.D.(1)(b)(ii)	Before the affected part exceeds 2 500 CSN, or before the IPC module 32 exceeds 2 500 CSN, whichever occurs first
Section 1.D.(1)(b)(iii)	Before the affected part exceeds 2 500 CSN, or before the IPC module 32 exceeds 2 500 CSSV L4, whichever occurs first
Section 1.D.(1)(c)(i)	Before the affected part exceeds 2 500 CSN, or before the IPC module 32 exceeds 2 500 CSN, whichever occurs first
Section 1.D.(1)(c)(ii)	Before the affected part exceeds 2 500 CSN, or before the IPC module 32 exceeds 2 500 CSSV L4, whichever occurs first
Section 1.D.(1)(c)(iii)	Before the IPC module 32 exceeds 500 CSSV L2

Note 1: The conditions of an affected part or IPC module 32 referenced in Table 1 of this AD are those as specified in the referenced section of the NMSB.

#### In-Shop Inspections:

(2) For all engines: From 13 March 2020 [the effective date of EASA AD 2020-0041], during each engine shop visit, inspect the affected part in accordance with the instructions of the NMSB.

For an engine that on 19 October 2020 [the effective date of EASA AD 2020-0208], was in a shop visit as specified in Section 1.D.(2)(a) of the NMSB, before release to service of that engine, inspect the affected part in accordance with the instructions of the NMSB.

#### Corrective Action(s):

(3) If, during any inspection as required by paragraph (1) of this AD, any crack is detected, as defined in the NMSB, before next flight, remove the engine from service and, before release to service of the engine, replace the affected part and the stage 3 rotor blade set with serviceable parts in accordance with the instructions of the NMSB.

(4) If, during any inspection as required by paragraph (2) of this AD, any crack is detected, as defined in the NMSB, before release to service of that engine, replace the affected part and the stage 3 rotor blade set with serviceable parts in accordance with the instructions of the NMSB.

#### Alternative Method(s):

(5) Inspection of an engine and, depending on findings, correction or modification of an engine, as applicable, accomplished in accordance with an inspection method or an SB embodiment as identified in Section 1.D.(1) "Note:" of the NMSB, is an acceptable alternative method to



comply with the on-wing inspection requirements of paragraph (1) of this AD, and the correction requirements of paragraph (3), respectively, of this AD for that engine.

- (6) An in-shop inspection of an engine in accordance with the instructions of the NMSB, as required by paragraph (2) of this AD, is an acceptable alternative method in lieu of an on-wing inspection, as required by paragraph (1) of this AD, for that engine, provided that the compliance time specified in Table 1 of this AD for that engine is not exceeded.

**Credit:**

- (7) Inspections of and corrective actions on an engine, accomplished before the effective date of this AD in accordance with the instructions of Rolls-Royce Alert NMSB RB.211-72-AK493 at original issue or Revision 1, are acceptable to comply with the initial inspection requirements of this AD for that engine.
- (8) An in-shop inspection of an engine, accomplished before 19 October 2020 [the effective date of EASA AD 2020-0208] in accordance with the instructions of Rolls-Royce Trent 900 NMSB RB.211-72-K497, is acceptable to comply with the in-shop inspection as required by paragraph (2) of this AD.

**Terminating Action:**

- (9) None.

**Parts Installation:**

- (10) From the effective date of this AD it is allowed to install on any engine an affected part or a stage 3 rotor blade set provided that these parts meet the requirements as required by paragraphs (10.1) and (10.2) of this AD.
- (10.1) The affected part is new (not previously installed on any engine), or the part has passed, prior to installation, an inspection (no defect found) in accordance with the instructions of the NMSB.
- (10.2) The stage 3 rotor blade set is new (not previously installed on any engine) or has not been rejected during the inspection of the affected part in accordance with the instructions of the NMSB.

**Engine Installation:**

- (11) From 19 October 2020 [the effective date of the EASA AD 2020-0208], it is allowed to install on any aeroplane an engine, provided that, following installation, the affected part installed on that engine, within the applicable compliance time as specified in Table 1 of this AD, depending on engine or IPC module 32 condition, is inspected in accordance with the instructions of the NMSB and, thereafter, as required by the paragraphs (1) and (2) of this AD.

**Ref. Publications:**

Rolls-Royce Alert NMSB RB.211-72-AK493 original issue dated 03 February 2020, or Revision 1 dated 14 September 2020, or Revision 2 dated 10 July 2024.

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



Rolls-Royce Trent 900 NMSB RB.211-72-K497 original issue dated 23 January 2020.

**Remarks:**

1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.
2. Based on the required actions and the compliance time, EASA have decided to issue a Final AD with Request for Comments, postponing the public consultation process until after publication. All interested persons may send their comments, referencing the AD Number, to the E-mail address specified in below Remark 3, prior to 21 October 2024. Only if any comment is received during the consultation period, a Comment Response Document will be published in the [EASA Safety Publications Tool](#), in a 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](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 E-mail through <https://www.rolls-royce.com/contact-us/civil-aerospace.aspx>, identifying the correspondence as being related to **Airworthiness Directives**.

