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PUBLICATION TRANSMITTAL

The technical information contained in this document has been approved under the authority of – See Planning Information, Approval.

Date Aug.22/19

TRENT 1000 SERIES PROPULSION SYSTEM NON-MODIFICATION SERVICE BULLETIN

ALERT

This document transmits Revision 1 to Service Bulletin TRENT1000-72-AK313

Document History

Service Bulletin Revision Status	Supplement Revision Status
Initial Issue May 2/19	

Bulletin Revision 1

Remove	Incorporate	Reason for change
All pages of the Service Bulletin	Pages 1 to 12 of the Service Bulletin	Updated to amend inspection conditions and requirements.

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Customer Data Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 1 are as follows:

Page		Revision Number	Revision Date
	Bulletin		
R	1	1	Aug.22/19
R	2	1	Aug.22/19
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R	4	1	Aug.22/19
R	5	1	Aug.22/19
R	6	1	Aug.22/19
R	7	1	Aug.22/19
R	8	1	Aug.22/19
R	9	1	Aug.22/19
R	10	1	Aug.22/19
R	11	1	Aug.22/19
R	12	1	Aug.22/19

ENGINE - IP COMPRESSOR STAGE 1 BLADES, STAGE 2 BLADES AND IPC SHAFT STAGE 2 DOVETAIL POSTS - INSPECTION INTERVAL DEFINITION - NON-MODIFICATION SERVICE BULLETIN - NON - MOD.72-AK313

1. Planning Information

A. Effectivity

Boeing 787

TRENT1000-A2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-AE2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-C2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-CE2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-D2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-E2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-G2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-H2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-J2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-K2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

TRENT1000-L2 All Engines not incorporating Rolls-Royce Service Bulletin 72-J941

B. Reason

Problem

It has been identified that some Intermediate Pressure Compressor (IPC) stage 1 rotor blades (KH25729), IPC stage 2 rotor blades (KH25730) and IPC shaft stage 2 dovetail posts (part of the IPC shaft stage 1-8 rotor assembly (FW89043)) are cracking in-service on the Trent 1000 Pack C engines. These cracks could propagate and have the potential to lead to in-flight events.

C. Description

R This Non-Modification Service Bulletin (NMSB) defines the initial inspection
R threshold and repeat inspection intervals for Trent 1000 IPC stage 1 blade root
R (Front Face), stage 2 blade root (Front and Rear Face) and IPC shaft stage 2
R dovetail posts (Front Face). At the given initial threshold and repeat
R intervals (if previously found uncracked) this NMSB instructs the
R accomplishment of NMSB 72-AJ814 (or NMSB 72-J744 in-shop) on IPC stage 1 blade
R roots, 72-AJ819 on IPC stage 2 blade roots (Front Face) and IPC shaft stage 2
R dovetail posts (Front Face) and NMSB 72-AK092 on IPC stage 2 blade roots (Rear
R Face).

R Revision 1 of this NMSB is issued to amend 'Part D - Operational Events
R Requiring Action' to change the conditions and the applicable inspection
R requirements.

This NMSB will supersede NMSB 72-AK060 on Dec.15/19.

D. Compliance

This Non-Modification Service Bulletin is anticipated to be the subject of an EASA Airworthiness Directive and an FAA Airworthiness Directive.

General:

ETOPS refers to engines installed on twin-engine aeroplanes that operate on routes which, at some point, are more than 60 minutes flying time away from the nearest airport suitable for emergency landings.

All applicable Engines/IPC modules must comply with this NMSB (72-AK313) by no later than Dec.15/19.

Engines/IPC modules which are inspected in compliance to this NMSB (72-AK313), before Dec.15/19, must remain compliant and shall not revert to the inspection regime defined in NMSB 72-AK060.

There is no concurrency required between Parts A, B and C inspections.

(1) Part A - IPC Stage 1 Blade

(a) ON-WING

ALERT

Perform IPC stage 1 blade root (Front Face) inspection in accordance with the Accomplishment Instructions in Section 3.A.1 of this NMSB in accordance with the initial inspection threshold and repeat inspection interval as shown in Table 1.

Engines/IPC modules previously inspected in accordance with NMSB 72-AJ814 or 72-J744 can be considered to meet the requirements of the initial inspection of this NMSB (72-AK313 Part A).

Repeat inspections and intervals are to be counted and applied from the last inspection performed in accordance with NMSB 72-AJ814 or 72-J744 (if passed).

(b) IN-SHOP

OPTIONAL

Approved Maintenance Repair and Overhaul (MRO) facilities may embody this inspection on behalf of the operator during a shop visit when called out in the workscope. Inspection procedures in-shop shall be carried out in accordance with the procedures detailed in the In-Shop Accomplishment Instructions in Section 3.A.2 of this NMSB.

If the engine/IPC module is above the initial inspection threshold and is subject to ongoing repeat inspections and NMSB 72-J871 was not embodied during the shop visit, any applicable repeat inspection requirements for IPC stage 1 blades as defined in Table 1 of this NMSB must be recorded in the carry forward sheet.

If an inspection was completed In-Shop, it is the responsibility of the MRO facility to report the inspection results in accordance with the instructions using the feedback form (or similar) in the applicable NMSB.

(2) Part B - IPC Stage 2 Blade (Front Face) and IPC Shaft Stage 2 Dovetail Posts

(a) ON-WING

ALERT

Perform IPC stage 2 blade root (Front Face) and IPC shaft stage 2 dovetail post (Front Face) inspection in accordance with the Accomplishment Instructions in Section 3.B.1 of this NMSB in accordance with the initial inspection threshold and repeat inspection interval as shown in Table 2.

Engines/IPC modules previously inspected in accordance with NMSB 72-AJ819 can be considered to meet the requirements of the initial inspection of this NMSB (72-AK313 Part B).

Repeat inspections and intervals are to be counted and applied from the last inspection performed in accordance with NMSB 72-AJ819 (if passed).

(b) IN-SHOP

OPTIONAL

Approved Maintenance Repair and Overhaul (MRO) facilities may embody this inspection on behalf of the operator during a shop visit when called out in the workscope. Inspection procedures in-shop shall be carried out in accordance with the procedures detailed in the In-Shop Accomplishment Instructions in Section 3.B.2 of this NMSB.

If the engine/IPC module is above the initial inspection threshold and subject to ongoing repeat inspections and NMSB 72-J871 was not embodied during the shop visit, any applicable repeat inspection requirements for IPC stage 2 blades as defined in Table 2 of this NMSB must be recorded in the carry forward sheet.

If an inspection was completed In-Shop, it is the responsibility of the MRO facility to report the inspection results in accordance with the instructions using the feedback form (or similar) in the applicable NMSB.

(3) Part C - IPC Stage 2 Blades (Rear Face)

(a) ON-WING

ALERT

Perform IPC stage 2 blade root (Rear Face) inspection in accordance with the Accomplishment Instructions 3.C.1 of this NMSB in accordance with the initial inspection threshold and repeat inspection interval as shown in Table 2

Engines/IPC modules previously inspected in accordance with NMSB 72-AK092 can be considered to meet the requirements of the initial inspection of this NMSB (72-AK313 Part C).

Repeat inspections and intervals are to be counted and applied from the last inspection performed in accordance with NMSB 72-AK092 (if passed).

For engines that were previously subject to NON-ETOPS operation under NMSB 72-AK060 (No Rear Face inspection) - prior to any operation under this NMSB (72-AK313), compliance to this section (Part C) is required.

(b) IN-SHOP

OPTIONAL

Approved Maintenance Repair and Overhaul (MRO) facilities may embody this inspection on behalf of the operator during a shop visit when called out in the workscope. Inspection procedures in-shop shall be carried out in accordance with the procedures detailed in the in-shop Accomplishment Instructions in Section 3.C.2 of this NMSB.

If the engine/IPC module is above the initial inspection threshold and subject to ongoing repeat inspections and NMSB 72-J871 was not embodied during the shop visit, any applicable repeat inspection requirements for IPC stage 2 blades (Rear Face) as defined in Table 2 of this NMSB must be recorded in the carry forward sheet.

If an inspection was completed in-shop, it is the responsibility of the MRO facility to report the inspection results in accordance with the instructions using the feedback form (or similar) in the applicable NMSB.

(4) Part D - Operational Events Requiring Action

(a) ON-WING

ALERT

R Condition 1

R Following execution of any engine non-normal checklist procedure that
R results in an asymmetric power condition at an altitude of less than
R 28,000 feet (IFSD, single engine take-off, engine fault). Perform the
R inspections in accordance with Section 3.A, 3.B, 3.C and 3.D of this
R NMSB on the non-affected engine (no power reduction, no IFSD)
R Installed on the aircraft, in no more than 5 engine flight cycles.

R Condition 2

R Following a cabin depressurisation event, perform inspections in
R accordance with accomplishment instructions in Section 3.A, 3.B, 3.C
R and 3.D of this NMSB on both engines installed on the aircraft, in no
R more than 5 engine flight cycles.

R If this inspection is performed and the engine is not rejected and is
R not subject to a repeat inspection interval already, then this
R inspection is to be considered the initial inspection and repeat
R inspections shall continue in accordance with Tables 1 and 2.

R If this inspection is performed and the engine is not rejected and was
R subject to a repeat inspection interval already, then this inspection
R meets that requirement and subsequent repeat inspections shall
R continue in accordance with Table 1 and 2.

(b) IN-SHOP

Not applicable

E. Approval

The technical content of this Non-Modification Service Bulletin was approved
R under the authority of Design Organisation Approval EASA.21J.065 on May.01/19
R and was reapproved on Aug.22/19.

F. Manpower

(1) Time to gain access

Refer to 72-J744, 72-AJ814, 72-AJ819 and 72-AK092.

(2) Time to inspect

Refer to 72-J744, 72-AJ814, 72-AJ819 and 72-AK092.

(3) Time to restore to serviceable condition

Refer to 72-J744, 72-AJ814, 72-AJ819 and 72-AK092.

G. Material Price and Availability

Refer to 72-J744, 72-AJ814, 72-AJ819 and 72-AK092.

H. Tooling Price and Availability

Refer to 72-J744, 72-AJ814, 72-AJ819 and 72-AK092.

I. References

(1) Rolls-Royce Service Bulletin:

72-J941

Engine - IP Compressor blades - Introduction of revised IP Compressor stage 1 and 2 rotor blades featuring optimised manufacturing and geometry changes with associated changes to build and machining instructions

(2) Rolls-Royce Non-Modification Service Bulletins:

(a) 72-AJ814

Engine - Ultrasonic Inspection of Trent 1000 Intermediate Pressure Compressor Rotor 1 Blades Built Up Engine - Non-Modification Service Bulletin

(b) 72-AJ819

Engine - Visual Borescope Inspection of Trent 1000 Intermediate Pressure Compressor Rotor 2 Blades and Intermediate Pressure Compressor Shaft Stage 2 Dovetail Posts - Non-Modification Service Bulletin

(c) 72-J871

Engine Component - Replacement of the IP Compressor Rotor Stage 1 Blades and/or Stage 2 Blades and/or IPC Rotor - Non-Modification Service Bulletin

(d) 72-J744

Engine - Ultrasonic Inspection of Trent 1000 Intermediate Pressure Compressor Rotor 1 Blades with the Front Bearing Housing Removed - Non-Modification Service Bulletin

(e) 72-AK092

Engine - IP Compressor Stage 2 Rotor Blade Dovetail Root (Rear) - Ultrasonic Inspection - Non-Modification Service Bulletin

(f) 72-AK060

Engine - IP Compressor Stage 1 Blades, Stage 2 Blades and IPC Shaft Stage 2 Dovetail Posts - Inspection Interval Definition - Non-Modification Service Bulletin

(g) 72-AK290

Engine - IP Compressor Rotor 2 Blades - Inspection of the Dovetail Root Front and Rear Face - Non-Modification Service Bulletin

2. Material Information

Refer to 72-J744, 72-AJ814, 72-AJ819 and 72-AK092.

3. Accomplishment Instructions

A. Part A - IPC Stage 1 Blades

(1) On-Wing

(a) Perform NMSB 72-AJ814. Refer to NMSB 72-AJ814, 3.Accomplishment Instructions - On-wing.

(b) Accomplishment of NMSB 72-AK313 Part A shall be recorded in accordance with local SB Tracking Procedures.

(2) In-shop

(a) If instructed in the engine workscope, perform NMSB 72-AJ814, refer to NMSB 72-AJ814 Accomplishment Instructions - In-shop.

(b) NMSB 72-J744 is considered an in-shop equivalent to NMSB 72-AJ814 and where NMSB 72-J744 has been used to inspect rotor 1 blades, compliance to NMSB 72-AK313 Part A may be claimed.

(c) Accomplishment of NMSB 72-AK313 Part A shall be recorded in the engine logbook and module logcard.

B. Part B - IPC Stage 2 Blades (Front Face) and IPC Shaft Stage 2 Dovetail Posts

(1) On-wing

(a) Perform NMSB 72-AJ819. Refer to NMSB 72-AJ819, 3. Accomplishment Instructions - On-wing.

(b) Accomplishment of NMSB 72-AK313 Part B shall be recorded in accordance with local SB tracking system procedures.

(2) In-Shop

(a) If instructed in the engine workscope, perform NMSB 72-AJ819, refer to NMSB 72-AJ819 Accomplishment instructions - In-Shop.

(b) Accomplishment of NMSB 72-AK313 Part B shall be recorded in the engine logbook and module logcard.

C. Part C - IPC Stage 2 Blades (Rear Face)

(1) On-wing

(a) Perform NMSB 72-AK092. Refer to NMSB 72-AK092, 3. Accomplishment Instructions - On-Wing.

(b) Accomplishment of NMSB 72-AK313 Part C shall be recorded in accordance with local SB tracking system procedure.

(2) In-shop

(a) If instructed in the engine workscope, perform NMSB 72-AK092, refer to NMSB 72-AK092 Accomplishment instructions - In-Shop.

(b) Accomplishment of NMSB 72-AK313 Part C shall be recorded in the engine logbook and module logcard.

D. Part D - Operational Events Requiring Action

(1) Comply with Sections 3.A, 3.B and 3.C.

(2) Accomplishment of NMSB 72-AK313 Part A, Part B, Part C and Part D shall be recorded in the engine logbook and module logcard.

			Pre NMSB 72-J871		Post NMSB 72-J871	
Engine / IPC Module Group	Engines / IPC Modules effectivity	Description	Stage 1 Initial inspection threshold	Stage 1 repeat inspection interval (if crack free)	Stage 1 Initial inspection threshold	Stage 1 repeat interval (if crack free)
1	Engine / IPC module Pre NMSB 72-J871	IPC Stage 1 blades not reworked	800 EFC since new	200 EFC since last inspection	N/A	N/A
2	Engine / IPC module embodied with 72-J871 Part A	IPC Stage 1 SUM blades fitted	N/A	N/A	300 EFC since embodiment of 72-J871 Part A	200 EFC since last inspection
3	Engine / IPC module embodied with 72-J871 Part B	IPC Stage 1 SUM blades fitted	N/A	N/A	300 EFC since embodiment of 72-J871 Part B	200 EFC since last inspection
4	Engine / IPC module embodied with 72-J871 Part C	IPC Stage 1 blades replaced with new	N/A	N/A	800 EFC since embodiment of 72-J871 Part C	200 EFC since last inspection
5	Engine / IPC module embodied with 72-J871 Part D	IPC Stage 1 blades replaced with new with a new IPC Drum	N/A	N/A	800 EFC since embodiment of 72-J871 Part D	200 EFC since last inspection
6	Engine / IPC module embodied with 72-J871 Part E	IPC Module Swap	Dependent on the source of the IPC Module, the applicable initial inspection threshold and repeat inspection interval will be based on the module installed. (Refer to groups 1 thru 5 & 7)			
7	Engine / IPC module embodied with 72-J871 Part F	IPC Stage 1 blades replaced with matched set SUM blades	N/A	N/A	300 EFC since embodiment of 72-J871 Part F	200 EFC since last inspection

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Table 1
IPC Stage 1 Blade Root (Front Face) - Initial and Repeat Inspections

			Pre NMSB 72-J871		Post NMSB 72-J871	
Engine / IPC Module Group	Engines / IPC Modules effectivity	Description	Stage 2 Initial inspection threshold	Stage 2 repeat inspection interval (if crack free)	Stage 2 Initial inspection threshold	Stage 2 repeat interval (if crack free)
1	Engine / IPC module Pre NMSB 72-J871	IPC Stage 2 blades not reworked	300 EFC since new	100 EFC since last inspection	N/A	N/A
2	Engine / IPC module embodied with 72-J871 Part A	IPC Stage 2 blades not reworked	N/A	N/A	N/A	100 EFC since last inspection
3	Engine / IPC module embodied with 72-J871 Part B	IPC Stage 2 SUM blades fitted	N/A	N/A	200 EFC since embodiment of 72-J871 Part B	100 EFC since last inspection
4	Engine / IPC module embodied with 72-J871 Part C	IPC Stage 2 blades replaced with new	N/A	N/A	300 EFC since embodiment of 72-J871 Part C	100 EFC since last inspection
5	Engine / IPC module embodied with 72-J871 Part D	IPC Stage 2 blades replaced with new with a new IPC Drum	N/A	N/A	300 EFC since embodiment of 72-J871 Part D	100 EFC since last inspection
6	Engine / IPC module embodied with 72-J871 Part E	IPC Module Swap	Dependant on the source of the IPC Module, the applicable initial inspection threshold and repeat inspection interval will be based on the module installed. (Refer to groups 1 thru 5 & 7)			
7	Engine / IPC module embodied with 72-J871 Part F	IPC Stage 2 blades replaced with matched set SUM blades	N/A	N/A	200 EFC since embodiment of 72-J871 Part F	100 EFC since last inspection

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Table 2
IPC Stage 2 Blade Root (Front and Rear Face) and IPC Shaft Stage 2 Dovetail Posts (Front Face) - Initial and Repeat Inspections