International Aero Engines
NON-MODIFICATION SERVICE BULLETIN

Date: Feb.17/2003

ENGINE –INSPECTION OF HPC STAGE 6 METCO 313 ROTOR PATH CONDITION AFTER INACTIVE PERIOD WITHOUT ADHERENCE TO AMM STORAGE PROCEDURES ON AIRCRAFT WITH BOTH ENGINES POST ENG SB 72-0235 AND PRE ENG SB 72-0369

V2500-A5/D5 SERIES PROPULSION SYSTEM NON-MODIFICATION SERVICE BULLETIN

This document transmits Revision 2 of Non-Modification Service Bulletin V2500-ENG-72-0437

Document History

Service Bulletin Revision Status

Initial Issue	Nov.29/2002
Revision 1	Jan.31/2003

Bulletin Revision 2

Remove	Incorporate	Reason for change
All pages	Pages 1 to 13 of the Service Bulletin	To improve the quality of Appendices 3 and 4

List of Effective Pages

The effective pages to this Service Bulletin are as follows:

Page	Revision Number	Revision Date
Bulletin		
1	Revision 2	Feb.17/2003
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1. Planning Information

A. Effectivity

1) Airbus A319-A320-A321

V2500-A5 - Aircraft with both engines prior to S/N V10799 incorporating SB 72-0235 (Ref 1), but not incorporating SB 72-0369 (Ref 2)

2) Boeing Long Beach Division MD-90

V2500-D5 - Aircraft with both engines incorporating SB 72-0235, but not incorporating SB 72-0369

B. Concurrent Requirements

None

C. Reason

The purpose of this Non-Modification Service Bulletin is to introduce an inspection of the HPC stage 6 rotor path lining on aircraft with both engines post SB 72-0235 and pre SB 72-0369, which have been inactive for a period exceeding five days and where Ref 3 relating to engine storage could not be adhered to.

Metco 313 is known to react with atmospheric moisture. During normal engine utilisation, moisture levels are suppressed and Metco corrosion development rates are minimal.

During periods of engine inactivity of exceeding 36 hours the requirements of Ref 3 should be followed. This will prevent ingress of water droplets.

If compliance with Ref 3 cannot be achieved on aircraft having both engines post SB 72-0235 and pre SB 72-0369, then there is potential for an increase in the corrosion rate of the stage 6 rotor path Metco 313 lining.

To mitigate against a dual engine event, inspections detailed in Section 3, Accomplishment Instructions are required.

D. Compliance

1) Aircraft with one or both engines Post SB 72-0369. No action required.

2) Aircraft having both engines post SB 72-0235 and pre SB 72-0369, which have been inactive for a period exceeding five days, where Ref 3 relating to engine storage could not be adhered to, effect Section 3, Accomplishment Instructions of this NMSB. Cat 1 - To be actioned prior to next flight.

3) Uninstalled engines post SB 72-0235 and pre SB 72-0369. Effect Section 3, Accomplishment Instructions of this NMSB. Prior to installation.

E. Action

For engines which require inspection, perform a borescope examination of the HP compressor Stage 6 rotor path lining and the Stage 6 blades as detailed in Section 3, Accomplishment Instructions.

F. Approval

The Compliance Statement at 1 D and the procedures in Section 3, Accomplishment Instructions of this Non-Modification Service Bulletin comply with the Federal Aviation Regulations and are FAA approved for the engine models listed.

G. References

1. SB: ENG-72-0235 ENGINE - HP COMPRESSOR - NEW STAGES 6, 7 AND 8 ROTOR PATH RINGS WITH IMPROVED ABRADABLE LININGS

2. SB: ENG-72-0369 MODIFICATION SERVICE BULLETIN - ENGINE - HP COMPRESSOR RING CASES - INTRODUCTION OF HP COMPRESSOR STAGE 6, 7 AND 8 ROTOR PATHS WITH REVISED ABRADABLE LINING

3. AMM 71-00-00-201 - This task lists the tasks required to preserve the V2500 engine (Refer to chart in Appendix 4)

AMM 71-00-00-501

4. Task…Test No.11: High Power Assurance Test

5. Task…Test No.14: Untested Replacement Engine Test

6. Task…Test No.13: Pre-tested Replacement Engine Test

AMM Subtask 72-00-00-601 - Inspection of HP Compressor

7. …3) Job Set up…B – Open fan cowls

8. …C – Deactivate the thrust reverser

9. …D – Open the thrust reverser halves

10. …E – Remove borescope access port covers

11. …4) Procedure…A – Install the borescope probe

12. …H – Stage 6 Tip damage and discolouration

13. …5) Close Up …B – Install the borescope access port covers

14. …D – Close Access

15. …E – Activate Thrust Reverser HCU

16. …F – Close Access

17. Internal Reference Number – 02VR886.

H. Manpower

Estimated man hours to embody this Service Bulletin in full:

In Service	Est. Manhours
To gain access	1 hour
To embody	2 hours
To close up	0.5 hour
Total	3.5 hours

2. Material Information

None

3. Accomplishment Instructions

A. Tools and Equipment

The standard of borescope equipment should be at least equivalent to the following specification

Part No	Description
IV6-C6	Borescope probe (flexible tip)
V66 120DN	Borescope tip (120 degrees near focus)

B. For installed engines (Refer to flowchart in Appendix 2)

1) Check N2 system is free to rotate.

2) Perform Ref 4 - High Power Assurance Test run on both engines to shakedown unstable Metco 313 lining material.

3) If high power ground run is not possible, perform low power ground run on both engines

C. Pre-Requisite Actions

1) Put a warning in the cockpit to tell persons not to start the engine.

2) Make sure that the engine has been shut down not less than 60 minutes before you do this Procedure.

3) On the overhead maintenance panel 50VU

a. Make sure that the ON legend of the ENG/FADEC GND PWR/1 (2) push button switch is off.

b. Put a warning notice to tell persons not to energise the FADEC 1 (2).

4) Open the fan cowls (Ref 7).

5) Deactivate the Thrust Reverser

WARNING: THE THRUST REVERSER HYDRAULIC CONTROL UNIT (HCU) MUST BE DEACTIVATED BEFORE WORKING ON OR AROUND THE THRUST REVERSER FAILURE TO DEACTIVATE THE HCU CAN RESULT IN INADVERTENT THRUST REVERSER OPERATION AND INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

Deactivate the Thrust Reverser HCU (Ref 8).

6) Open the Thrust Reverser halves (Ref 9).

D. Borescope Inspection

1) Perform an inspection of the HPC stage 6 rotor path lining and stage 6 blades in accordance with the Procedure and Acceptance limits detailed in Appendix 1.

2) Inspect first engine rotor path and blades according to limits detailed in Appendix 1.

   a. If rotor paths and blades acceptable, then other engine need not be inspected. Refer to Para 4).

   b. If the blades only are acceptable, inspect second engine. Refer to Para 3).

   c. If blades not acceptable, reject engine or apply for OTC.

3) Inspect second engine rotor path and blades according to limits detailed in Appendix 1.

   a. If rotor paths and blades acceptable, Refer to Para 4).

   b. If the blades only are acceptable, reject engine with the worst rotor path condition.

   c. If the blades not acceptable, reject engine or apply for OTC.

4) If high power ground run was performed as in B. 2) above, aircraft may be released for service. If high power ground run was not performed prior to inspection, aircraft may be released for one flight, then Para C. and D. must be repeated.

E. Close Up Actions

1) Perform Ref 13 – Install the borescope access port covers

2) Make sure area tidy. Perform Ref 14 – Close Thrust Reverser halves

3) Perform Ref 15 – Activate Thrust Reverser HCU

4) Perform Ref 16 – Close Fan Cowls

5) Remove warning notice(s)

F. For uninstalled engines (Refer to flowchart in Appendix 3)

6) Prior to installation check N2 system is free to rotate.

7) Perform an inspection of the HPC stage 6 rotor path lining and stage 6 blades in accordance with the Procedure and Acceptance limits detailed in Appendix 1.

8) If the engine is acceptable according to the limits detailed in Appendix 1, then proceed with engine installation.

9) If engine is not acceptable according to the limits detailed in Appendix 1, then the engine must be rejected.

10) Perform Ref 5 or 6 - Replacement engine Test.

G. Pre-Requisite Actions

Refer to Para C

H. Borescope Inspection

1) Perform a repeat inspection of the HPC stage 6 rotor path lining in accordance with the Procedure and Acceptance limits detailed in Appendix 1.

2) If the engine is acceptable according to the limits detailed in Appendix 1, then aircraft may be released for service.

3) If engine is not acceptable according to the limits detailed in Appendix 1, then reject engine or apply for OTC.

I. Close Up Actions

Refer to Para E.

APPENDIX 1

1) Inspection Procedure

A. Inspect the HPC stage 6 rotor path abradable lining through Port C.

B. Perform Ref 10 – Remove borescope port covers

C. Perform Ref 11 – Install borescope probe

D. For the best viewing of the stage 6 rotor path lining, a flexible borescope is recommended. However, it is acceptable to use a rigid borescope. Port C is positioned between the stage 5 VSVs to provide a view of the trailing edge of the stage 5 blades and the leading edge of the stage 6 blades and stage 6 rotor path. Depending on the borescope equipment used, it will be possible to view an arc approximately between 15° and 60° either side of the borescope port.

E. Inspect HPC stage 6 blades in accordance with Ref 12.

F. Remove borescope probe.

G. Perform Ref 13 - Re-install borescope port C blanking plug.

2) Acceptance Limits

A. Lining material sound and grey in colour or with light surface deposits, white in colour (Refer to Fig 1) – Acceptable.

B. Missing topcoat not exposing basecoat. Remaining topcoat sound, without blistering or flaking (Refer to Fig 2) – Acceptable.

C. Missing topcoat exposing basecoat (Refer to Fig 3). Any areas of missing top coat up to 1 in^2 (645 mm^2) each – Acceptable. Any areas of missing topcoat more than 1 in^2 (645 mm^2) each – Unacceptable.

D. Surface craze cracks with no missing material or lifting (Refer to Fig 4) - Acceptable. Large, open cracks – Unacceptable.

E. Surface corrosion resulting in topcoat, lifting, blistering, bulging or swelling (Refer to Fig 5) – Unacceptable

F. Lifting/delamination. If there is evidence of delamination between the topcoat and bondcoat interface (Refer to Fig 6) up to 1” (25 mm) circumferentially – Acceptable. More than 1” (25 mm) circumferentially – Unacceptable

Fig 1 – Uniformly sound topcoat surface

Fig 2 – Missing topcoat not exposing basecoat

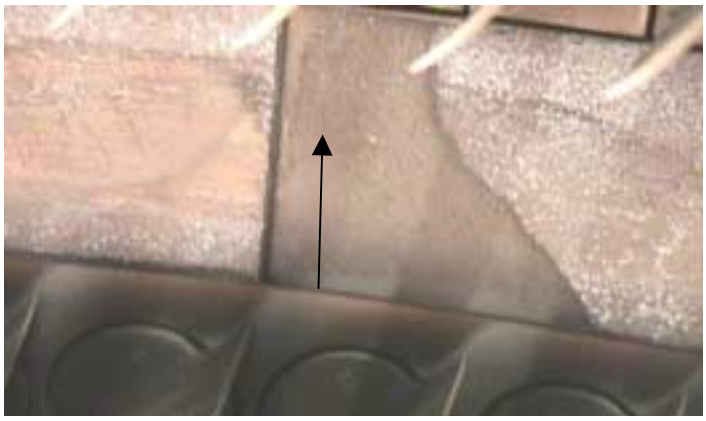


Fig 3 – Missing topcoat exposing basecoat

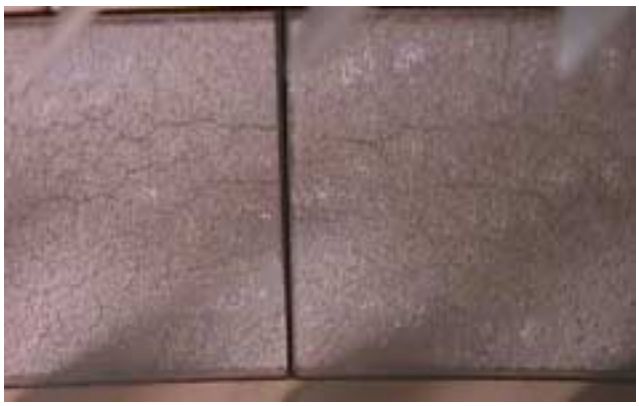


Fig 4 – Cracking of topcoat surface

Fig 5 – Examples of corrosion related, lifting, blistering, bulging or swelling of topcoat surface

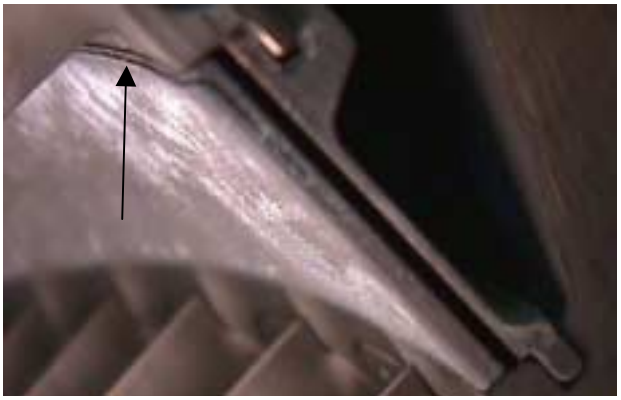
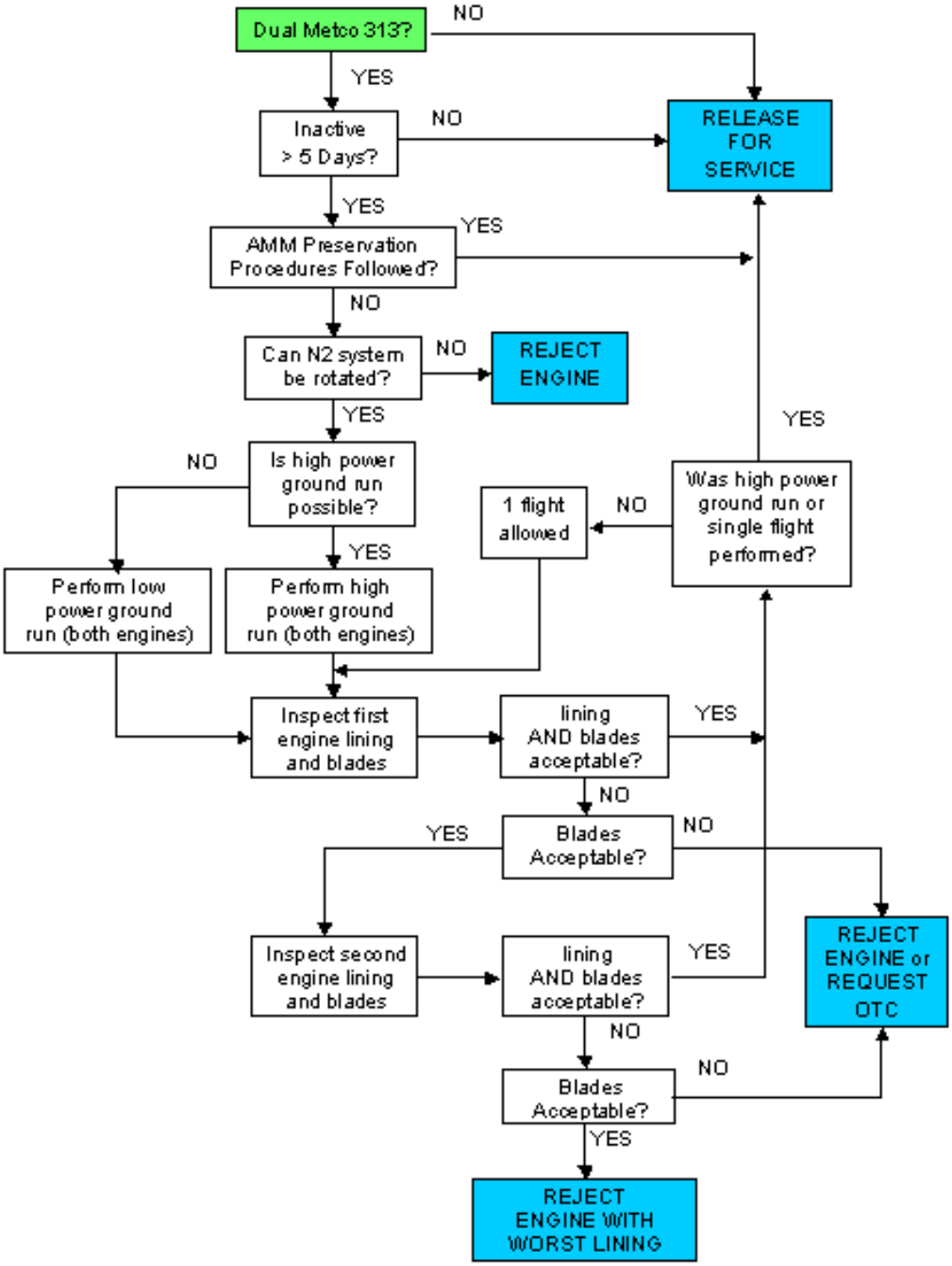


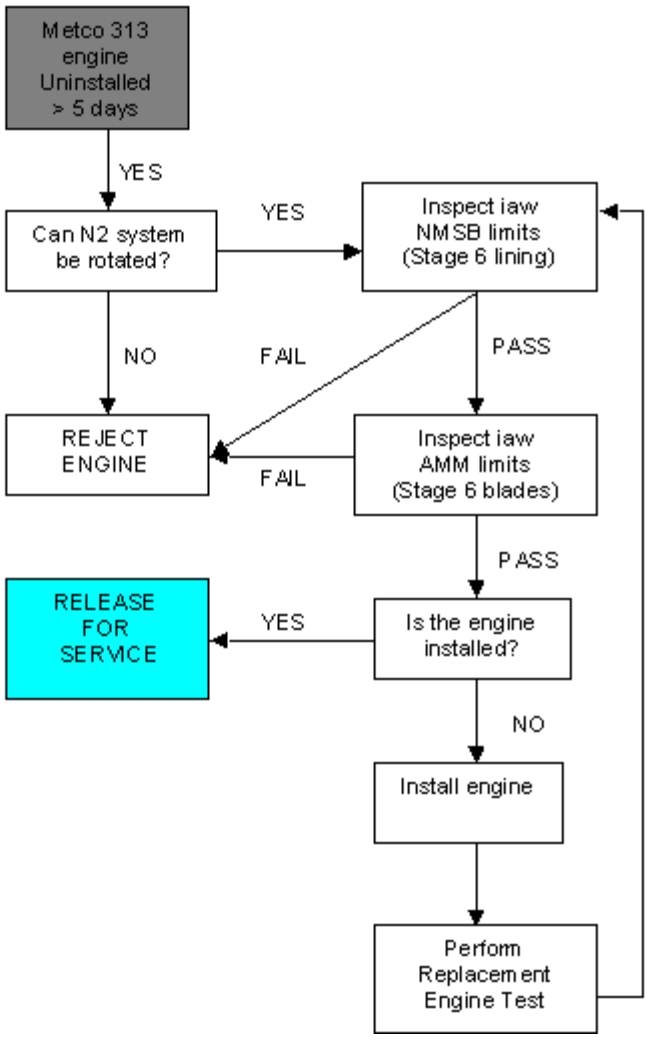
Fig 6– Delamination of topcoat/bondcoat interface

APPENDIX 2



Flow chart for stage 6 inspections prior to resuming service for A/C with both engines to Metco 313 standard following more than 5 days inactivity without adherence to AMM preservation procedures.

APPENDIX 3



Flow chart for stage 6 inspections prior to installing engines to Metco 313 standard

APPENDIX 4

	Environmental Conditions	Storage Period	Preserve Mainline Bearings	Attach covers and blanks	Add dessicant to the engine	Preserve the Thrust Reverser Halves	Inhibit the fuel system
Inside	Climate Controlled or Non-Climate Controlled. Maximum Relative Humidity 40% or less	Up to 7 Days		*			
		7 Days to 30 Days		*	*		
		31 days to 3 months		*	*		*
		Over 3 months	*	*	*	*	*
	Non-Climate Controlled Environment. High (>40%) Relative Humidity	Up to 7 Days		*	#		
		7 Days to 30 Days		*	*		
		31 days to 3 months		*	*	*	*
		Over 3 months	*	*	*	*	*
Outside	Arid	Up to 7 Days		*			
		7 Days to 30 Days		*	*		
		31 days to 3 months		*	*		*
		Over 3 months	*	*	*	*	*
	Non-Arid	Up to 7 Days		*	#		
		7 Days to 30 Days		*	*		
		31 days to 3 months		*	*	*	*
		Over 3 months	*	*	*	*	*
#	It is not required that an engine stored on wing for up to 7 days must have dessicant added, but if the engine has pre-SB72-0369 HPC stage 6 rotorpath lining then it is recommended						

Chart showing summary of tasks required to preserve the V2500 engine