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# V2500 A5/D5 SERIES PROPULSION SYSTEMS SERVICE BULLETIN



This document transmits Revision 7 to Service Bulletin EV2500-72-0302

Document History

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Bulletin Revision 7

| Remove | Incorporate | Reason for change |
|---|---|---|
| Pages 1 to 38 of the Service Bulletin | Pages 1 to 39 of the Service Bulletin | To correct Part Nos. in material and reidentification sections.<br>To correct Fig.2 (Sheet 7). |
| All pages of Appendix 1 | Pages 1 to 5 of Appendix 1 | To correct Part Nos. in material and reidentification sections.<br>To correct Fig.2 (Sheet 7). |



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

LIST OF EFFECTIVE PAGES

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Printed in Great Britain

# ENGINE - HP TURBINE ROTOR AND STATOR ASSEMBLY - INTRODUCE FIRST AND SECOND STAGE TURBINE BLADES WHICH HAVE PROTECTIVE COATING IN THE DAMPER POCKET AREA UNDER THE PLATFORM



## 1. Planning Information

### A. Effectivity

(1) Airbus A319

(For Stage 1 High Pressure Turbine Blades)

V2522-A5, V2524-A5, V2527M-A5 Engines Serial No.V10001 thru V10315

(For Stage 2 High Pressure Turbine Blades)

V2522-A5, V2524-A5, V2527M-A5 Engines Serial No.V10001 thru V10379, V10381 thru V10389 and V10420

(2) Airbus A320

(For Stage 1 High Pressure Turbine Blades)

V2527-A5, V2527E-A5 Engines Serial No.V10001 thru V10315

(For Stage 2 High Pressure Turbine Blades)

V2527-A5, V2527E-A5 Engines Serial No.V10001 thru V10379, V10381 thru V10389 and V10420

(3) Airbus A321

(For Stage 1 High Pressure Turbine Blades)

V2530-A5, V2533-A5 Engines Serial No.V10001 thru V10315

(For Stage 2 High Pressure Turbine Blades)

V2530-A5, V2533-A5 Engines Serial No.V10001 thru V10379, V10381 thru V10389 and V10420

(4) Boeing Longbeach Division MD-90

(For Stage 1 High Pressure Turbine Blades)

V2525-D5, V2528-D5 Engines Serial No.V20001 thru V20186

(For Stage 2 High Pressure Turbine Blades)

V2525-D5, V2528-D5 Engines Serial No.V20001 thru V20222

B. Concurrent Requirements

There are no concurrent requirements.

C. Reason

(1) Condition: Upon inspection of several sets of Stage 1 and 2 High Pressure Turbine (HPT) Blades after cleaning, blades have been found with corrosion under the platform in the damper pocket. The corrosion has been accompanied with blade base material cracking in several locations.

(2) Background: Corrosion results from the buildup of corrosive material under the blade root platform in the damper area.

(3) Objective: Supply new Stage 1 and 2 HPT Blade Assemblies with a protective coating to the damper pocket area under the platform to protect the blade base material from the effects of corrosion.

(4) Substantiation: Materials analysis has successfully proven that protective coating eliminates the corrosive reaction with base alloys. Successful experience in other engine models with under platform coating, including localized touch-ups have neutralized the effects of hot corrosion.The addition of the protective coating will protect the blade material from corrosion. A blade which is not corroded has sufficient margin to accommodate the fatigue debit associated with the application of the corrosion resistant coating.

(5) Effects of Bulletin on:

Removal/Installation: Not affected.

Disassembly/Assembly: Not affected.

Cleaning: Not affected.

Inspection/Check: Not affected.

Repair: Not affected.

Testing: Not affected.

(6) Supplemental Information

None

D. Description

Replace the Stage 1 and 2 HPT Blade Assemblies with new Stage 1 and 2 HPT Blade Assemblies that have protective coating in the damper pocket area under the blade platform. This configuration can be obtained by modification or by the purchase of new parts.

E. Compliance

Category 4

Accomplish at the first visit of an engine or module to a maintenance base capable of compliance with the accomplishment instructions regardless of the planned maintenance action or the reason for engine removal.

F. Approval Data

The part number changes and/or part modifications specified in the Accomplishment Instructions and Material Information sections of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model(s) given.

G. Manpower

Estimated man-hours to incorporate the full intent of this Bulletin: (for in service engines)

| Venue | Estimated Manhours |
|---|---|
| To gain access | 24 hours |
| To remove, rework and replace the stage 1 and Stage 2 HPT Blades | 82 hours |
| To return Engine to serviceable status | 24 hours |
| TOTAL (Stages 1 and 2 HPT Blades) | 130 hours |

NOTE: The parts affected by this Service Bulletin are accessible at overhaul.

Estimated man-hours to incorporate the full intent of this Bulletin: (for overhaul engines)

| Venue | Estimated Manhours |
|---|---|
| To make modification to 1 stage 1 or 2 HPT Blade | 30 minutes |
| To identify 1 Stage 1 or 2 HPT Blade | 30 minutes |
| TOTAL (64 Stage 1 HPT Blades) | 35 hours |
| TOTAL (72 Stage 2 HPT Blades) | 40 hours |

H. Weight and Balance

| | |
|---|---|
| Weight Change | None |
| Moment | No Effect |
| Datum | Engine Front Mount Centerline (Power Plant Station (PPS) 100) |

I. Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

J. Software Accomplishment Summary

Not Applicable.

K. References

1. IAE V2500 Service Bulletin V2500-ENG-70-0379 (Information - Engine - HP Turbine Rotor And Stator Assembly - To Announce The Availability Of A New Stage 1 HPT Blade With Improved Durability).

2. IAE V2500 Service Bulletin V2500-ENG-72-0046 (Engine - HP Turbine Rotor And Stator Assembly - Provide A New First Stage HPT Cooling Duct Assembly).

3. IAE V2500 Service Bulletin V2500-ENG-72-0146 (Engine - HP Turbine Rotor And Stator Assembly - Provide A New Stage 1 HPT Blade).

4. IAE V2500 Service Bulletin V2500-ENG-72-0187 (Engine - HP Turbine Rotor And Stator Assembly - Provide A New Stage 2 Turbine Blade For Various Parts Commonality).

5. IAE V2500 Service Bulletin V2500-ENG-72-0220 (Engine - HP Turbine Rotor And Stator Assembly - Introduce New First and Second Stage Turbine Blades With More Durable Tips and Improved Repairability).

6. IAE V2500 Service Bulletin V2500-ENG-72-0242 (Engine - HP Turbine Rotor And Stator Assembly - Provide New Stage 1 HPT Blades).

7. IAE V2500 Service Bulletin V2500-ENG-72-0267 (Engine - HP Turbine Rotor And Stator Assembly - Introduce New Second Stage Turbine Blades With More Durable Tips And Improved Repairability).

8. V2500 Engine Illustrated Parts Catalogs (S-V2500-2IA, S-V2500-2IB, S-V2500-3IA S-V2500-3IB, S-V2500-5IA S-V2500-5IB, S-V2500-6IA S-V2500-6IB, S-V2500-7IA S-V2500-7IB), Chapter/Section 72-45-14 and 72-45-32.

9. V2500 Standard Practices Manual (SPP-V2500-1I-A), 70-09-00, Marking of Parts.

10. The V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-45-10, 72-45-14, 72-45-30 and 72-45-32.

11. The V2500 Engine Manual (E-V2500-3IA), Chapter/Section 72-45-10, 72-45-14, 72-45-30 and 72-45-32.

12. Internal Reference No. - 97VA016, 97VA016-01, 97VA016-02, 97VA016A, 97VA016C, 97VA025.

13. ATA Locator - 72-45-00.

L. Other Publications Affected

1. The V2500 Engine Illustrated Parts Catalogs (S-V2500-2IA, S-V2500-2IB, S-V2500-3IA S-V2500-3IB, S-V2500-5IA S-V2500-5IB, S-V2500-6IA S-V2500-6IB, S-V2500-7IA S-V2500-7IB), Chapter/Section 72-45-14 and 72-45-32.

2. The V2500 Engine Manuals (E-V2500-1IA and E-V2500-3IA), Chapter/Section 72-45-14 and 72-45-32 Cleaning, Inspection and Repair, to add the new parts.

M. Interchangeability of Parts

Old and new parts are directly interchangeable.

N. Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (Yes)

Added Data (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

2. Material Information

A. Material - Price and Availability:

1. Part prices were not available at the time of Service Bulletin publication. Contact IAE's Spare Parts Sales Department for firm quotations.

2. There is no kit provided to do this Service Bulletin.

3. Part availability information is provided in material data Instructions-Disposition.

B. Industry Support Program:

Not Applicable.

C. The material data that follows is for each engine:

NOTE: The prices shown are for estimating purposes only and as such are given in good faith without commercial liability for advanced planning purposes only. Refer to IAE Spares and/or current Price Catalog for current prices.

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5 Engines:

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A9001 | 64 | * | .Blade, Stage 1 HPT | 2A8801 (72-45-14-01-010) | (S1)(A)(B) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0146

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A2621-002 | 64 | * | .Blade, Stage 1 HPT | 2A2621 (72-45-14-01-010) | (S1)(1D)(C) |

Printed in Great Britain

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0146 but incorporating Service Bulletin V2500-ENG-72-0220)

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A2621-003 | 64 | * | .Blade, Stage 1 HPT | 2A2621-001 (72-45-14-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-70-0379)

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A8321-002 | 64 | * | .Blade, Stage 1 HPT | 2A8321 (72-45-14-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-70-0379 but incorporating Service Bulletin 72-0220)

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A8321-003 | 64 | * | .Blade, Stage 1 HPT | 2A8321-001 (72-45-14-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0220)

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A8521-002 | 64 | * | .Blade, Stage 1 HPT | 2A8521 (72-45-14-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0220 but incorporating Service Bulletin V2500-ENG-72-0242)

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A8521-003 | 64 | * | .Blade, Stage 1 HPT | 2A8521-001 (72-45-14-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0242)

| | New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|---|
| | 2A8701-001 | 64 | * | .Blade, Stage 1 HPT | 2A8701 (72-45-14-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5 Engines:

| | New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|---|
| | 2A8521-003 | 72 | * | .Blade, Stage 2 HPT | 2A8521-001 (72-45-32-01-010) | (S1)(1D)(A)(B) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0267)

| | New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|---|
| | 2A9002 | 72 | * | .Blade, Stage 2 HPT | 2A8702 (72-45-32-01-010) | (S1)(1D)(A)(B) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0187)

| | New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|---|
| R | 2A2202-002 | 72 | * | .Blade, Stage 2 HPT | 2A2202 (72-45-32-01-010) | (S1)(1D)(C) |

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0187 but incorporating Service Bulletin V2500-ENG-72-0220)

| | New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|---|
| R | 2A2202-003 | 72 | * | .Blade, Stage 2 HPT | 2A2202-001 (72-45-32-01-010) | (S1)(1D)(C) |

Printed in Great Britain

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5, V2528-D5 Engines: (Prior to Service Bulletin V2500-ENG-72-0220)

| New PN | Qty | Estimate of Unit Price ($) | Keyword | Old PN | Insts-Disp |
|---|---|---|---|---|---|
| 2A2702-001 | 72 | * | .Blade, Stage 2 HPT | 2A2702 (72-45-32-01-010) | (S1)(1D)(C) |

D. Instructions/Disposition Code Statements:

Parts Modification Conditions
(S1) Old and New Parts are freely and fully interchangeable.
(1D) You can obtain the new part by modification of the old part and identification to the new part number.
Spare Parts Availability
(A) The new part is currently available.
(B) The old part will no longer be supplied.
(C) The new part is obtained by identification in the field and is not supplied by spares.

E. Tooling - Price and Availability

Special tools are not required to accomplish this Service Bulletin.

F. Reidentified Parts

Reidentified Parts Data (for 1st Stage Blades)

| New PN | Keyword | Old PN |
|---|---|---|
| 2A9001 | Blade, Stage 1 HPT | 2A8801 |
| 2A2621-002 | Blade, Stage 1 HPT | 2A2621 |
| 2A2621-003 | Blade, Stage 1 HPT | 2A2621-001 |
| 2A8321-002 | Blade, Stage 1 HPT | 2A8321 |
| 2A8321-003 | Blade, Stage 1 HPT | 2A8321-001 |
| 2A8521-002 | Blade, Stage 1 HPT | 2A8521 |
| 2A8521-003 | Blade, Stage 1 HPT | 2A8521-001 |
| 2A8701-001 | Blade, Stage 1 HPT | 2A8701 |

Reidentified Parts Data (for 2nd Stage Blades)

| New PN | Keyword | Old PN |
|---|---|---|
| 2A9002 | Blade, Stage 2 HPT | 2A8702 |
| R 2A2202-001 | Blade, Stage 2 HPT | 2A8702 |
| R 2A2202-002 | Blade, Stage 2 HPT | 2A2202 |
| R 2A2202-003 | Blade, Stage 2 HPT | 2A2202-001 |
| 2A2702-001 | Blade, Stage 2 HPT | 2A2702 |

G. Other Material Information Data

Not Applicable.

3. Accomplishment Instructions

(1) Accomplishment Instructions - Removal of the Stage 1 and 2 High Pressure Turbine Blades and Disassembly of the High Pressure Turbine Rotor and Stator Assembly for V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5 and V2533-A5 Engines

(a) Remove the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-00-45, Removal.

(b) Disassemble the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-45-00, Disassembly.

(c) Remove the Stage 1 HPT Blades (64 off) by the approved procedure given in Reference (10) Chapter/Section 72-45-10, Disassembly-01. See Figure 1.

(d) Remove the Stage 2 HPT Blades (72 off) by the approved procedure given in Reference (10) Chapter/Section 72-45-30, Disassembly-01. See Figure 3.

(2) Accomplishment Instructions - Installation of the Stage 1 and 2 High Pressure Turbine Blades and Installation of the High Pressure Turbine Rotor and Stator Assembly For V2525-D5 and V2528-D5 Engines

(a) Remove the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-00-45, Removal.

(b) Disassemble the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-45-00, Disassembly.

(c) Remove the Stage 1 HPT Blades (64 off) by the approved procedure given in Reference (11) Chapter/Section 72-45-10, Disassembly-01. See Figure 1.

(d) Remove the Stage 2 HPT Blades (72 off) by the approved procedure given in Reference (10) Chapter/Section 72-45-30, Disassembly-01. See Figure 3.

(3) Accomplishment Instructions - Modification of the Stage 1 High Pressure Turbine Blades

(a) Prerequisite Procedures

(i) Clean and stress relieve the blade by the procedure specified in Reference (10) or (11), Engine Manual, Chapter/Section 72-45-14 Inspection/Check-01, Subtask 72-45-14-230-053-001.

NOTE: Cleaning can be done before stress relief, but stress relief must be done before any other cleaning, inspection, or repair of turbine blades by this procedure.

(b) Modification Procedure for V2500-A5 and V2500-D5 Stage 1 Turbine Blades

NOTE: Whenever IAE Control No. 70-38-23 is specified in this Service Bulletin and in the under perform inspection procedure, CoMat 01-300 (trade name: Blue Gold Industrial Cleaner) may be used as an alternative cleaning solution.

NOTE: Engine-run blades should be returned by the operator in the "as removed" condition to permit analysis of the material under the blade platform by the procedure given in References (10) or (11), Chapter/Section 72-45-14, Repair 005 (VRS 3357).

NOTE: Sources wishing to perform Stage 1 Turbine Blade blend procedure (VRS 3484) must be approved by Pratt and Whitney. The names of approved source(s) are listed in the repair.

NOTE: This modification procedure is applicable to numerous blade part numbers. It is important to note that when statements are made to perform a step per one of many referenced repair procedures, the repair source must only select the repair procedure that is applicable to the specific blade part number being modified. See Table 1.

Stage 1 High Pressure Turbine Blade Configuration Table 1

| Blade Part Number | Blade Tip Configuration |
|---|---|
| 2A2621 | Sprayed Abrasive Tip |
| 2A2621-001 | Turbotip™ |
| 2A8321 | Sprayed Abrasive Tip |
| 2A8321-001 | Turbotip™ |
| 2A8521 | Sprayed Abrasive Tip |
| 2A8521-001 | Turbotip™ |
| 2A8701 | Turbotip™ |

| Blade Part Number | Blade Tip Configuration |
|---|---|
| 2A8801 | Turbotip™ |

(i) Do a modification of the Stage 1 High Pressure Turbine Blades 2A2621, 2A2621-001, 2A8321, 2A8321-001, 2A8521, 2A8521-001, 2A8701 and 2A8801 (64 off). See Reference (8), Chapter/Section 72-45-14 for the applicable engine model. See Figures 1 and 2.

(1) Do an inspection of the blades by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair 005 (VRS 3357).

A Overhauled and or repaired blades that have not accumulated additional service must be inspected by the procedure specified.

B Non-engine run blades do not have to be inspected by the procedure specified.

C Only blades that are acceptable by the inspection requirements specified can be modified by the procedure that follows.

(2) Blend under platform sulfidation by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair TBD (VRS 3484).

NOTE: The blade internal cavity cleaning repair may be performed either before or after the blade protective coating and tip restoration repairs.

(3) Clean the internal cavity, as necessary, by one of the procedures specified.

Refer to Reference (9), Chapter/Section 70-13-02, Ultrasonic Cleaning.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair 005, VRS 3357.

Refer to Reference (9), Chapter/Section 70-00 Surface Treating.

NOTE: Heat treatment of the airfoil and platform coating can be done at the same time as the heat treatment for under platform coating, if it is done in a dry argon or dry hydrogen atmosphere. See step (j).

NOTE: Airfoil and platform protective coating may be restored by either a strip and recoat repair or an overcoat repair.

(4) If necessary, remove the airfoil and platform coating by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair 009 (VRS 3042).

(5) If necessary, restore blade sprayed abrasive tip by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair 009 (VRS 3042).

(6) If necessary, restore blade sprayed Turbotip™ by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair 010 (VRS 3514).

(7) If necessary, restore airfoil and platform coating by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-14, Repair 009 (VRS 3042).

(8) Dry abrasive blast the under platform area by the procedure specified. Make sure that the areas which need protection are properly masked (root serrations, root openings and coated areas).

Refer to Reference (9), Chapter/Section 70-12-09, Abrasive Cleaning. See Figure 2.

NOTE: As an alternate procedure you can dry abrasive blast by the procedure given in Reference (9), Chapter/Section 70-00.

(9) Apply protective coat to the blade under platform area by the procedure specified.

Refer to Reference (9), Chapter/Section 70-38-26, Surface Treating.

NOTE: The procedure given in Reference (9), Chapter/Section 70-38-14, Surface Protection, cannot be used as an option for the procedure given in Reference (9), Chapter/Section, 70-38-26, Surface Treating.

A Use multiple coats to the blade under platform area to obtain the coating thickness requirement of 0.0005 - 0.0030 in. (0,013 - 0,076 mm) after diffusion heat treat.

NOTE: The coating thickness requirement includes the diffused zone.

B Diffusion heat treat for 4 hours at 1950 - 2000 deg. F (1065.6 - 1093.6 deg. C) in a dry argon or dry hydrogen atmosphere.

Refer to Reference (9), Chapter/Section 70-37-03, Heat Treating.

1 This can be done at the same time as step (c) as a part of the cleaning process.

2 The cooling rate must be 10 deg. F/minimum average to 1200 deg. F (648.9 deg. C) and cooling at any convenient rate thereafter.

(10) Do a check of the under platform area for the presence of coating by the procedure specified.

Refer to Reference (9) Chapter/Section 70-28-01, Special Inspection. See Figure 2.

NOTE: As an alternate procedure you can check by the procedure specified in Reference (9), Chapter/Section 70-00.

(11) Touch-up under platform areas that have insufficient coating by the procedure specified.

Refer to Reference (9) Chapter/Section 70-38-26, Surface Treating. See Figure 2.

(12) Diffusion heat treat for 1 to 4 hours at 1950 - 2000 deg. F (1065.6 - 1093.6 deg. C) in a dry argon or hydrogen atmosphere.

Refer to Reference (9) Chapter/Section 70-37-03 Heat Treating. See Figure 2.

A The cooling rate must be 10 deg. F/minutes minimum average to 1200 deg. F (648.9 deg. C) and cooling at any convenient rate thereafter.

(13) Precipitation heat treat the blade by heating to 1575 - 1625 deg. F (857.2 - 885 deg. C) and then holding for 32 hours.

A The cooling rate must be 10 deg. F/minutes minimum average to 1200 deg. F (648.9 deg. C) and cooling at any convenient rate thereafter.

(14) Mark the new part number adjacent to the existing part number. Use the vibration peen method. See Table 2.

Stage 1 High Pressure Turbine Blade Identification Table 2

| Existing Blade Part Number | New Blade Part Number |
|---|---|
| 2A8801 | 2A9001 |
| 2A2621 | 2A2621-002 |
| 2A2621-001 | 2A2621-003 |
| 2A8321 | 2A8321-002 |
| 2A8321-001 | 2A8321-003 |
| 2A8521 | 2A8521-002 |
| 2A8521-001 | 2A8521-003 |
| 2A8701 | 2A8701-001 |

(c) Postrequisite Procedures

(i) Shotpeen the blade root by the applicable step in the procedure specified in Reference (10) or (11), Chapter/Section 72-45-14, Inspection/Check-01, Subtask 72-45-14-230-053-001.

(ii) X-Ray inspect the blade internal cavity for foreign material by the procedure specified in Reference (10) or (11), Chapter/Section 72-45-14, Inspection/Check-01, Subtask 72-45-14-260-052.

(iii) Waterflow check the internal passages and airfoil cooling holes. Any obstructions must be cleared.

(iv) Airflow inspect the blade by the procedure specified in Reference (10) or (11), Chapter/Section 72-45-14, Inspection/Check-01, Task 72-45-14-280-059.

(4) Accomplishment Instructions - Modification of the Stage 2 High Pressure Turbine Blades

(a) Prerequisite Procedures

(i) Clean and stress relieve the blade by the procedure specified in Reference (10) or (11), Engine Manual, Chapter/Section 72-45-32 Inspection/Check-01, Control No./Task No. 72-45-32-230-053-001.

NOTE: Cleaning can be done before stress relief, but stress relief must be done before any other cleaning, inspection, or repair of turbine blades by this procedure.

(b) Modification Procedure for V2500-A5 and V2500-D5 Stage 2 Turbine Blades.

NOTE: Whenever IAE Control No. 70-13-02 is specified in this Service Bulletin and in the under platform inspection procedure, CoMat 01-300 (trade name: Blue Gold Industrial Cleaner) may be used as an alternative cleaning solution.

NOTE: Engine-run blades should be returned by the operator in the "as removed" condition to permit analysis of the material under the blade platform by the procedure given in Reference (10) or (11), Chapter/Section 72-45-32 Inspection/Check-01, Subtask 72-45-32-230-053-001.

NOTE: Sources wishing to perform Stage 2 Turbine Blade blend procedure (VRS 3517) must be approved by Pratt and Whitney. The names of approved source(s) are listed in this repair.

NOTE: This modification procedure is applicable to numerous blade part numbers. It is important to note that when statements are made to perform a step per one of many referenced repair procedures, the repair source must only select the repair procedure that is applicable to the specific blade part number being modified. See Table 3.

Stage 2 High Pressure Turbine Blade Configuration Table 3

| Blade Part Number | Blade Tip Configuration |
|---|---|
| 2A2202 | Sprayed Abrasive Tip |
| 2A2202-001 | Turbotip™ |
| 2A2702 | Turbotip™ |

| Blade Part Number | Blade Tip Configuration |
|---|---|
| 2A8702 | Turbotip™ |

(i) Do a modification of the Stage 2 High Pressure Turbine Blades 2A2202 and 2A2202-001 (72 off). See Reference (8), Chapter/Section 72-45-32 for the applicable engine model. See Figures 3 and 4.

(1) Do an inspection of the blades by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Inspection/Check-01.

A Overhauled and or repaired blades that have not accumulated additional service must be inspected by the procedure specified.

B Non-engine run blades do not have to be inspected by the procedure specified.

C Only blades that are acceptable by the inspection requirements specified can be modified by the procedure that follows.

(2) Blend under platform sulfidation by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair TBD (VRS 3517).

NOTE: The blade internal cavity cleaning repair may be performed either before or after the blade protective coating and tip restoration repairs.

(3) Clean the internal cavity, as necessary, by one of the procedures specified.

Refer to Reference (9), Chapter/Section 70-13-02, Ultrasonic Inspection.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair 005 (VRS 3360).

Refer to Reference (9), Chapter/Section 70-00.

NOTE: Heat treatment of the platform and airfoil coating can be done at the same time as the heat treatment for under platform coating, if it is done in a dry argon or dry hydrogen atmosphere. See step (j).

NOTE: Airfoil and platform protective coating may be restored by either a strip and recoat repair or an overcoat repair.

(4) If necessary, remove the airfoil and platform coating by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair 009 (VRS 3496).

(5) If necessary, restore blade sprayed abrasive tip by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair 010 (VRS 3496).

(6) If necessary, restore blade sprayed abrasive tip by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair 010, VRS 3496. See Table 2.

(7) If necessary, restore blade sprayed Turbotip™ by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair-014, VRS 3516.

(8) If necessary, restore airfoil and platform coating by the procedure specified.

Refer to Reference (10) or (11), Chapter/Section 72-45-32, Repair 010, VRS 3496.

(9) Dry abrasive blast the under platform area by the procedure specified. Make sure that the areas which need protection are properly masked (root serrations, root openings and coated areas).

Refer to Reference (9), Chapter/Section 70-12-09,Abrasive Blasting.

NOTE: As an alternate procedure you can dry abrasive blast by the procedure given in Reference (9), Chapter/Section 70-00.

(10) Apply protective coat to the blade under platform area by the procedure specified.

Refer to Reference (9) Chapter/Section 70-38-26, Surface Treating. See Figure 4.

NOTE: The procedure given in Reference (9), Chapter/Section 70-38-14, Surface Protection, cannot be used as an option for the procedure given in Reference (9), Chapter/Section, 70-38-26, Surface Treating.

A Use multiple coats to the blade under platform area to obtain the coating thickness requirement of 0.0005 - 0.0030 in. (0,013 - 0,076 mm) after diffusion heat treat.

Refer to Reference (9), Chapter/Section 70-37-03, Heat Treating.

NOTE: The coating thickness requirement includes the diffused zone.

B Diffusion heat treat for 4 hours at 1950 - 2000 deg. F (1065.6 - 1093.6 deg. C) in a dry argon or dry hydrogen atmosphere.

1 This can be done at the same time as step (c) as a part of the cleaning process.

2 The cooling rate must be 10 deg. F/minimum average to 1200 deg. F (648.9 deg. C) and cooling at any convenient rate thereafter.

(11) Do a check of the under platform area for the presence of coating by the procedure specified.

Refer to Reference (9) Chapter/Section 70-38-26, Surface Treating. See Figure 4.

(12) Touch-up under platform areas that have insufficient coating by the procedure specified.

Refer to Reference (9) Chapter/Section 70-37-03, Heat Treating. See Figure 4.

(13) Diffusion heat treat for 1 to 4 hours at 1950 - 2000 deg. F (1065.6 - 1093.6 deg. C) in a dry argon or hydrogen atmosphere.

Refer to Reference (9) Chapter/Section 70-37-03 Heat Treating. See Figure 4.

A The cooling rate must be 10 deg. F/minutes minimum average to 1200 deg. F (648.9 deg. C) and cooling at any convenient rate thereafter.

(14) Precipitation heat treat the blade by heating to 1575 - 1625 deg. F (857.2 - 885 deg. C) and then holding for 32 hours.

Refer to Reference (9) Chapter/Section 70-37-03, Heat Treating. See Figure 4.

A The cooling rate must be 10 deg. F/minutes minimum average to 1200 deg. F (648.9 deg. C) and cooling at any convenient rate thereafter

(15) Mark the new part number adjacent to the existing part number. Use the vibration peen method. See Table 4.

Stage 2 High Pressure Turbine Blade Identification Table 4

| Existing Blade Part Number | New Part Number |
|---|---|
| 2A2202 | 2A2202-002 |
| 2A2202-001 | 2A2202-003 |
| 2A2702 | 2A2702-001 |
| R 2A8702 | 2A9002 (Ref SB72-0220) |
| R 2A8702 | 2A9002 (Ref SB72-0267) |

(c) Postrequisite Procedures

(i) Shotpeen the blade root by the applicable step in the procedure specified in Reference (10) or (11), Chapter/Section 72-45-32, Inspection/Check-01, Subtask 72-45-14-230-053-001.

(ii) X-Ray inspect the blade internal cavity for foreign material by the procedure specified in Reference (10) or (11), Chapter/Section 72-45-32, Inspection/Check-01.

(iii) Waterflow check the internal passages and airflow cooling holes. Any obstructions must be cleared.

(iv) Airflow inspect the blade by the procedure specified in Reference (10) or (11), Chapter/Section 72-45-32, Inspection/Check-01, Task 72-45-14-280-058.

(5) Accomplishment Instructions - Installation of the Stage 1 and 2 High Pressure Turbine Blades and Installation of the High Pressure Turbine Rotor and Stator Assembly for V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5 and V2533-A5 Engines

(a) Replace the Stage 1 HPT Blades (64 off) by the approved procedure given in Reference (10), Chapter/Section 72-45-10, Assembly-01. See Figure 1.

(b) Replace the Stage 2 HPT Blades (72 off) by the approved procedure given in Reference (10), Chapter/Section 72-45-30, Assembly-01. See Figure 3.

(c) Assemble the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-45-00, Assembly.

(d) Install the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-45-00.

(6) Accomplishment Instructions - Installation of the Stage 1 and 2 High Pressure Turbine Blades and Installation of the High Pressure Turbine Rotor and Stator Assembly for V2525-D5 and V2528-D5 Engines

(a) Replace the Stage 1 HPT Blades (64 off) by the approved procedure given in Reference (11), Chapter/Section 72-45-10, Assembly-01. See Figure 1.

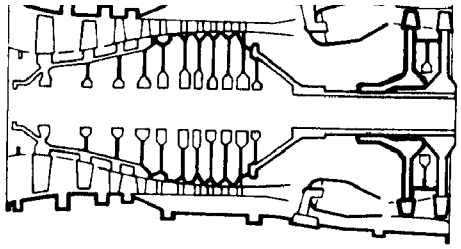
(b) Replace the Stage 2 HPT Blades (72 off) by the approved procedure given in Reference (11), Chapter/Section 72-45-30, Assembly. See Figure 3.

(c) Assemble the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-45-00, Assembly-01.

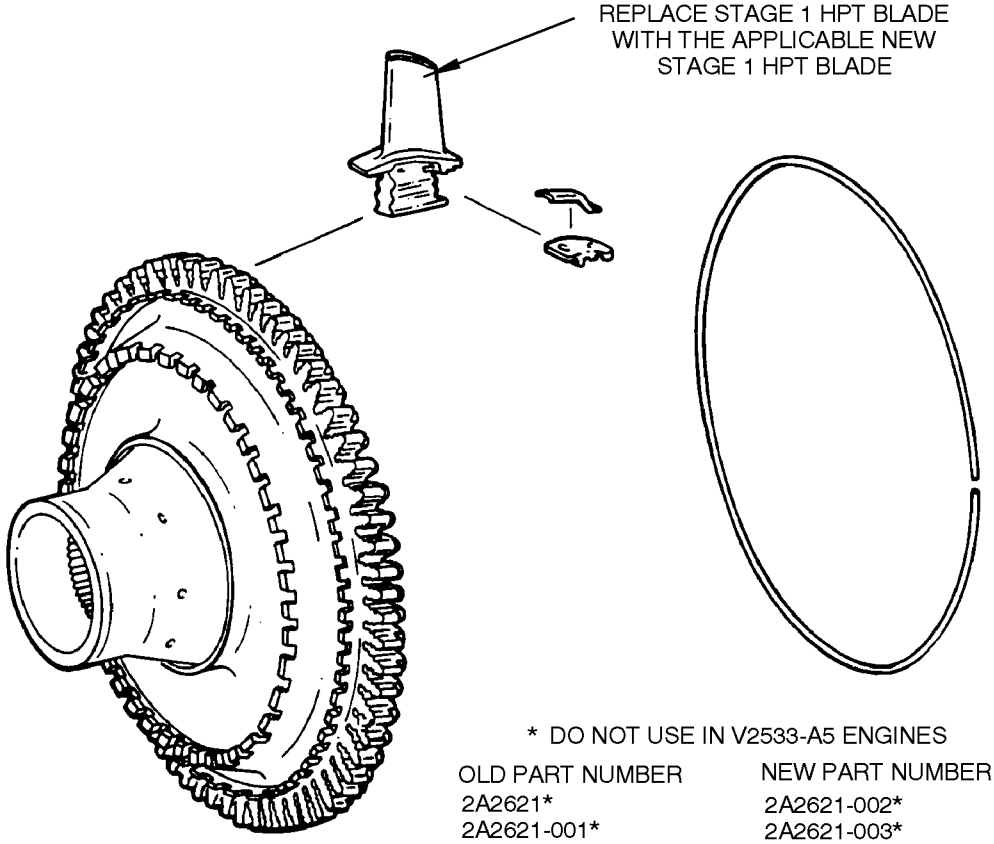
(d) Install the High Pressure Turbine Rotor and Stator Assembly by the approved procedure given in Reference (10), Chapter/Section 72-45-00.

(7) Recording Instructions

(a) A record of accomplishment is required.



MODULE 40

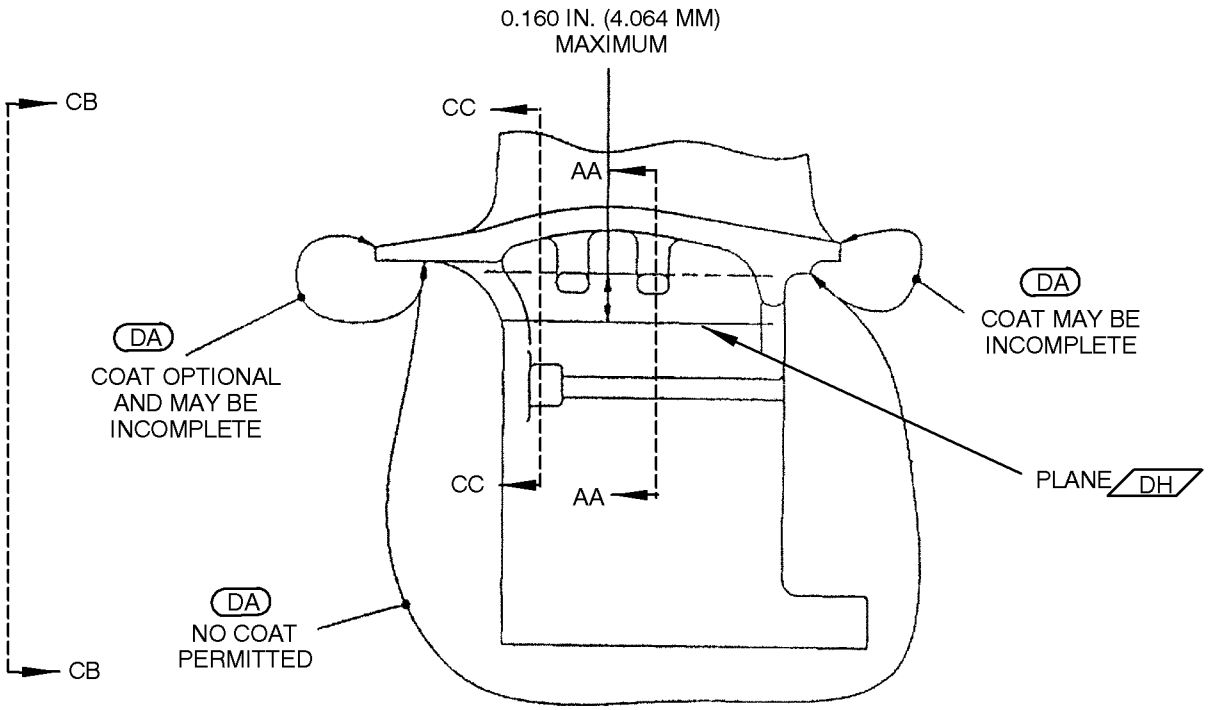



* DO NOT USE IN V2533-A5 ENGINES

| OLD PART NUMBER | NEW PART NUMBER |
|---|---|
| 2A2621* | 2A2621-002* |
| 2A2621-001* | 2A2621-003* |
| 2A8321* | 2A8321-002* |
| 2A8321-001* | 2A8321-003* |
| 2A8521* | 2A8521-002* |
| 2A8521-001* | 2A8521-003 |
| 2A8701* | 2A8701-001* |
| 2A8801 | 2A9901 |

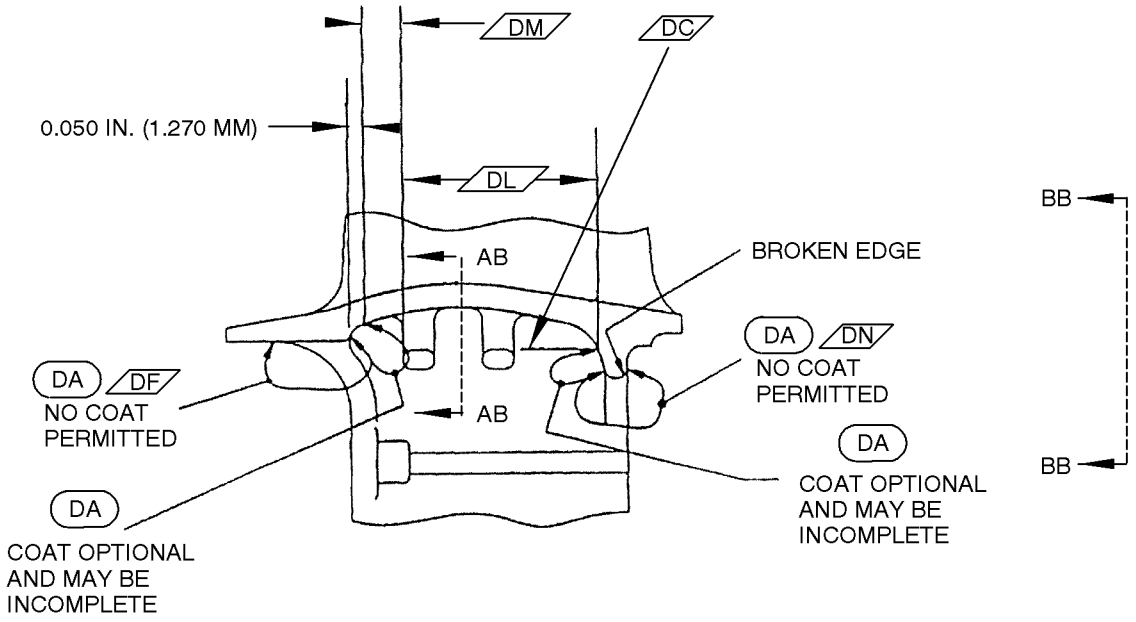
pw0b511854

Location of the Stage 1 High Pressure Turbine Blade Assembly
Figure 1




pw0b511855

Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 1)

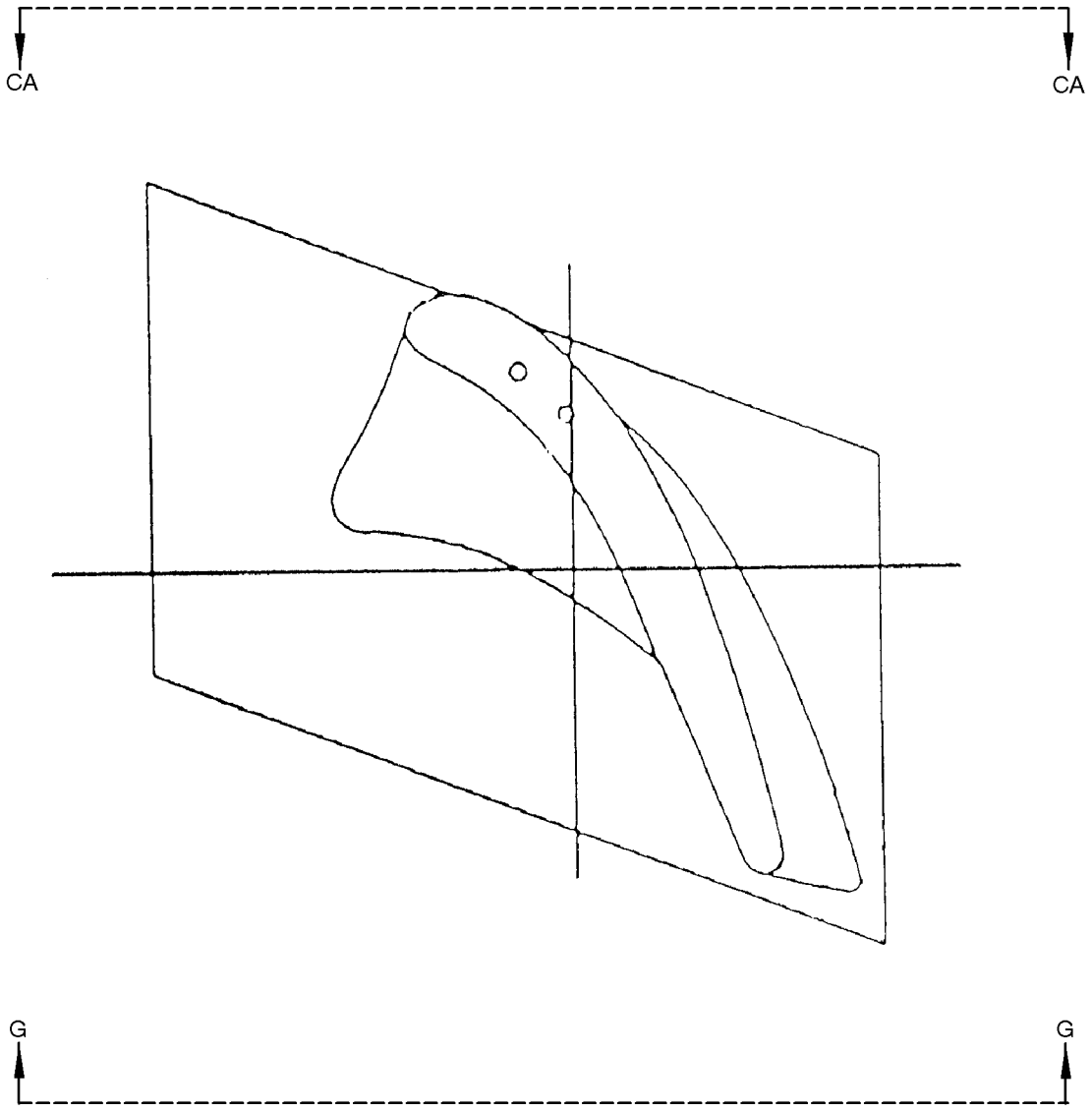



VIEW OF STAGE 1 HIGH PRESSURE
TURBINE BLADE ROOT

(DA) COAT IN THE APPLICABLE AREA BY THE PROCEDURE SPECIFIED IN THE TEXT

pw0b511856

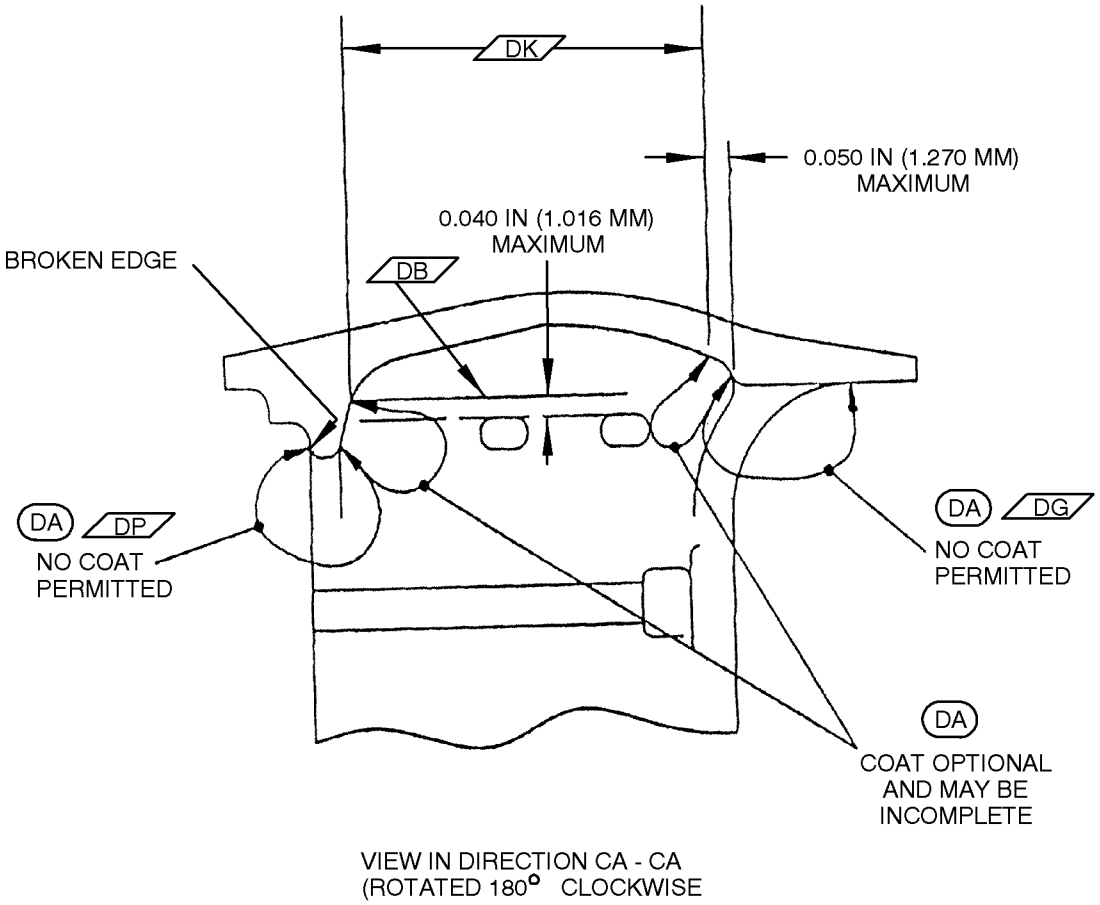
Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 2)




VIEW OF STAGE 1 HIGH PRESSURE
TURBINE BLADE WHEN YOU LOOK
FROM THE TOP

pw0b511857

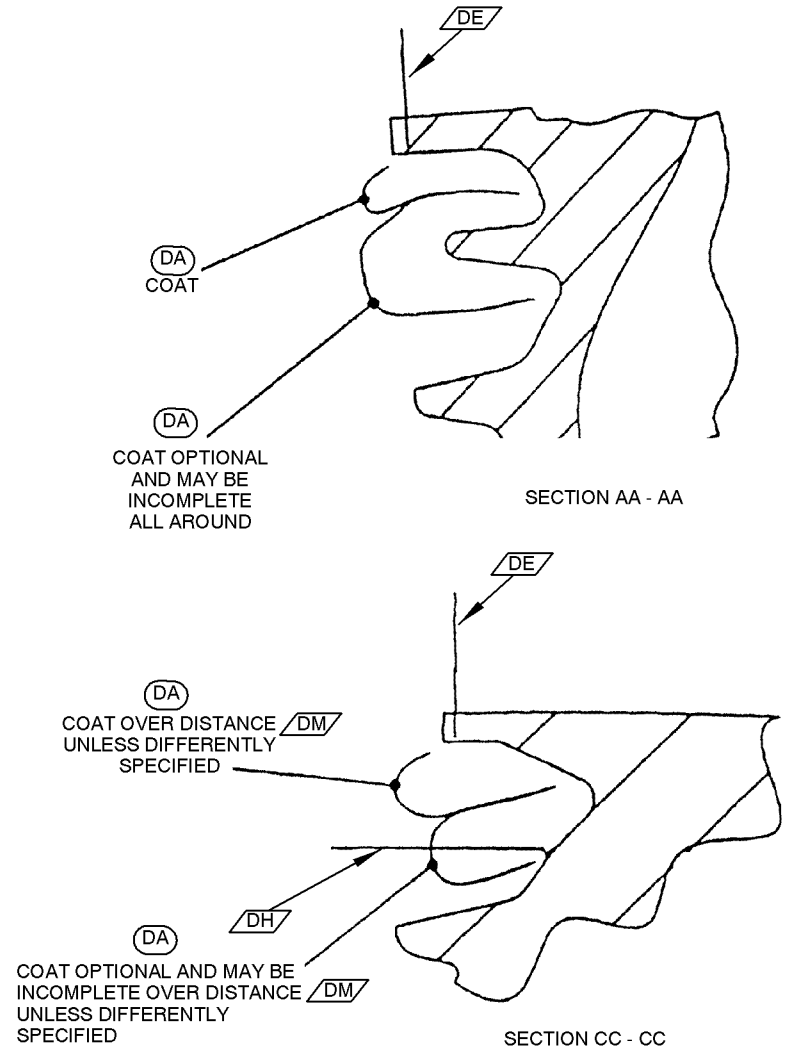
Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 3)




(DA) COAT IN THE APPLICABLE AREA BY THE PROCEDURE SPECIFIED IN THE TEXT

pw0b511858a

Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 4)

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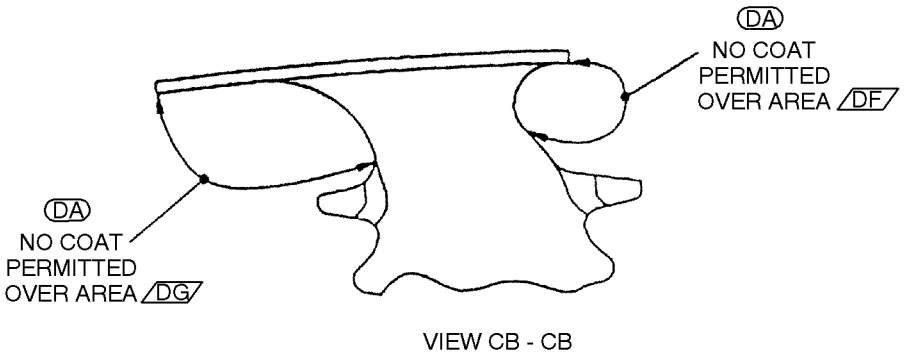
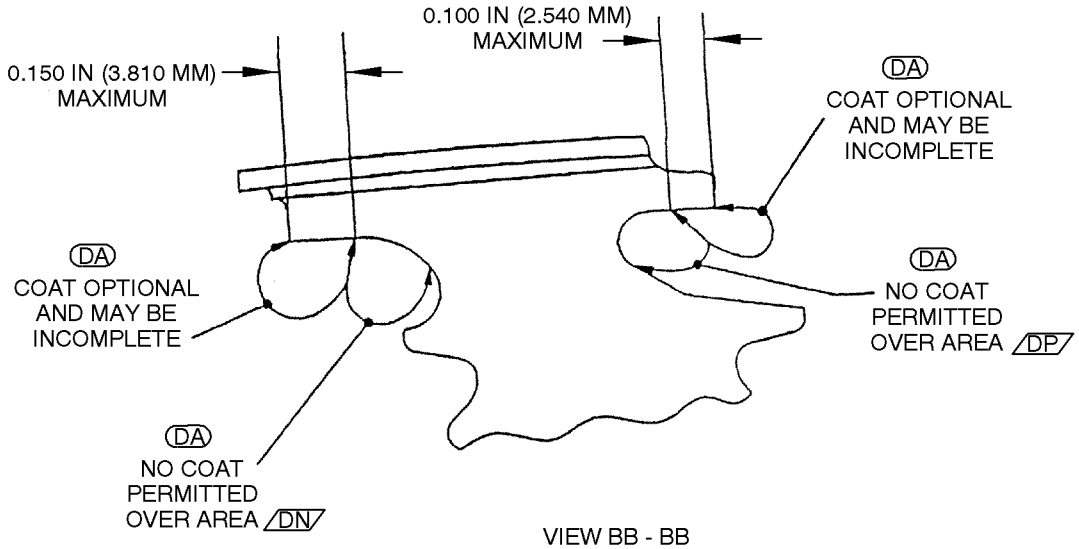
(DA) COAT IN THE APPLICABLE AREA BY THE PROCEDURE SPECIFIED IN THE TEXT

Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 5)




VIEW CB - CB

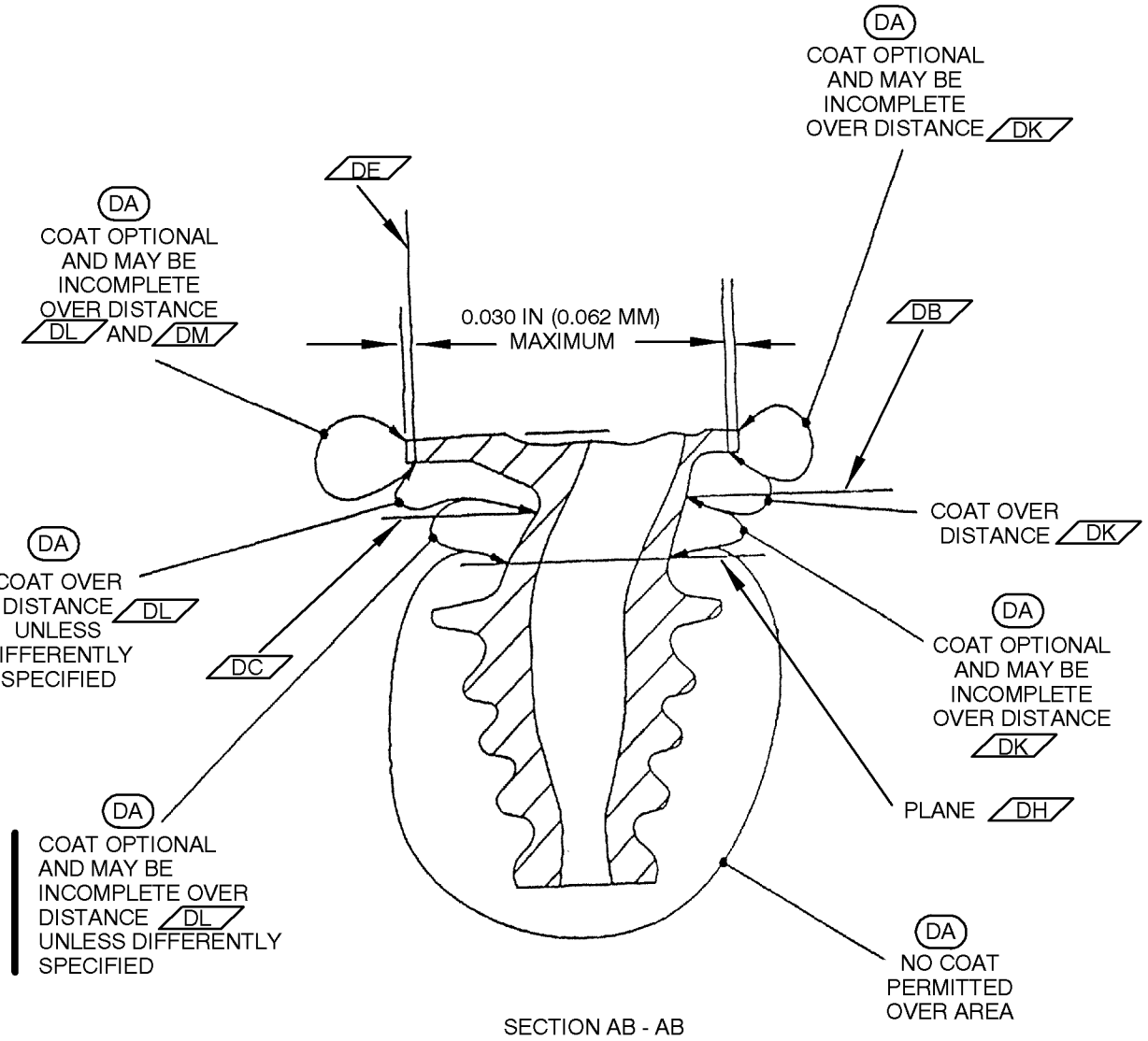



VIEW BB - BB

pw0b511860

DA COAT IN THE APPLICABLE AERA BY THE PROCEDURE SPECIFIED IN THE TEXT

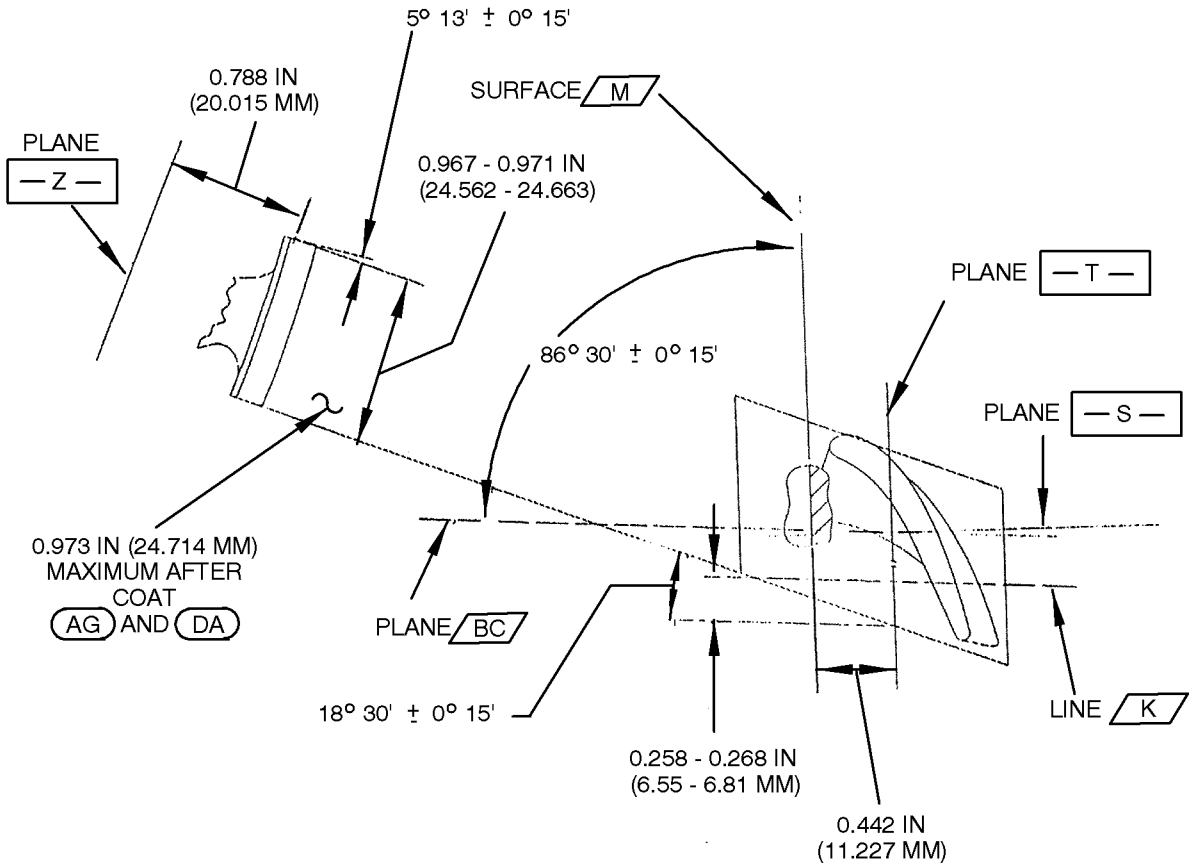
Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 6)




pw0b511861a

(DA) COAT IN THE APPLICABLE AREA BY THE PROCEDURE SPECIFIED IN THE TEXT

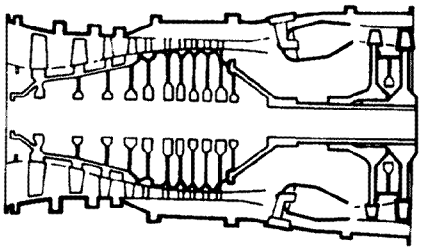
R Modification of the Stage 1 High Pressure Turbine Blade Assembly
R Figure 2 (Sheet 7)



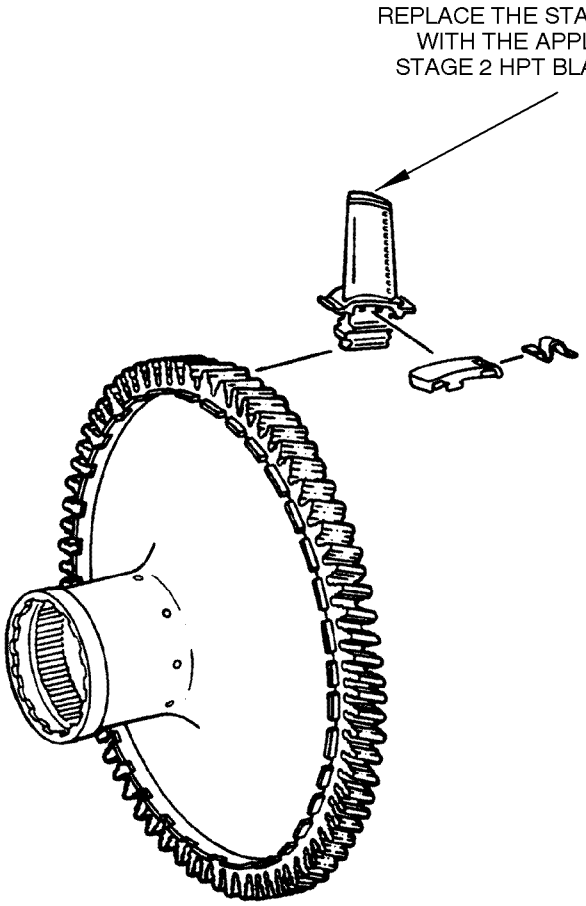

VIEW R - R

pa0b511862

Modification of the Stage 1 High Pressure Turbine Blade Assembly
Figure 2 (Sheet 8)



MODULE 40

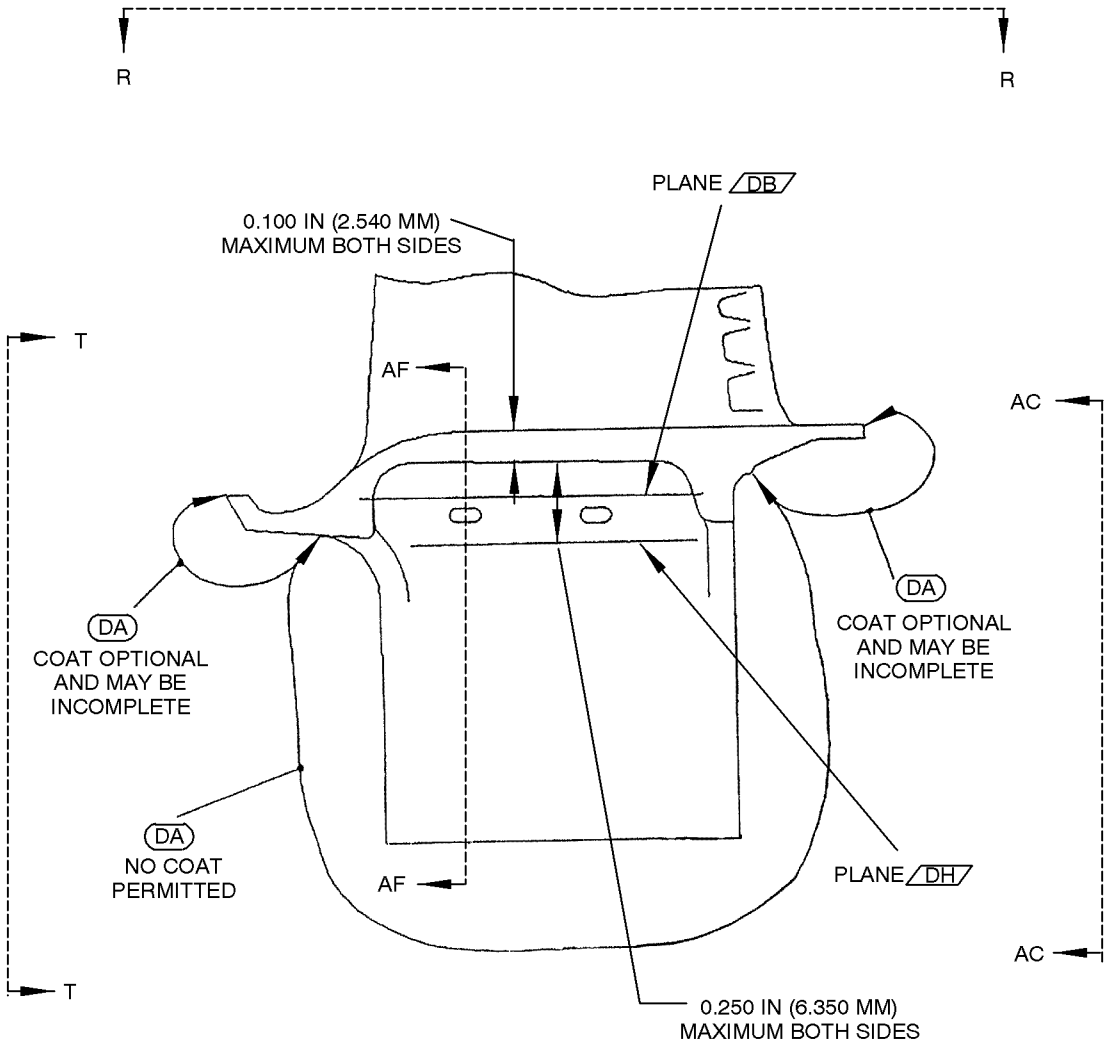



* DO NOT USE IN V2533-A5 ENGINE

| OLD PART NUMBER | NEW PART NUMBER |
|---|---|
| 2A2202* | 2A2202-002* |
| 2A2202-001* | 2A2202-003* |
| 2A2702 | 2A2702-001* |
| 2A8702 | 2A9002 |

pw0b511863

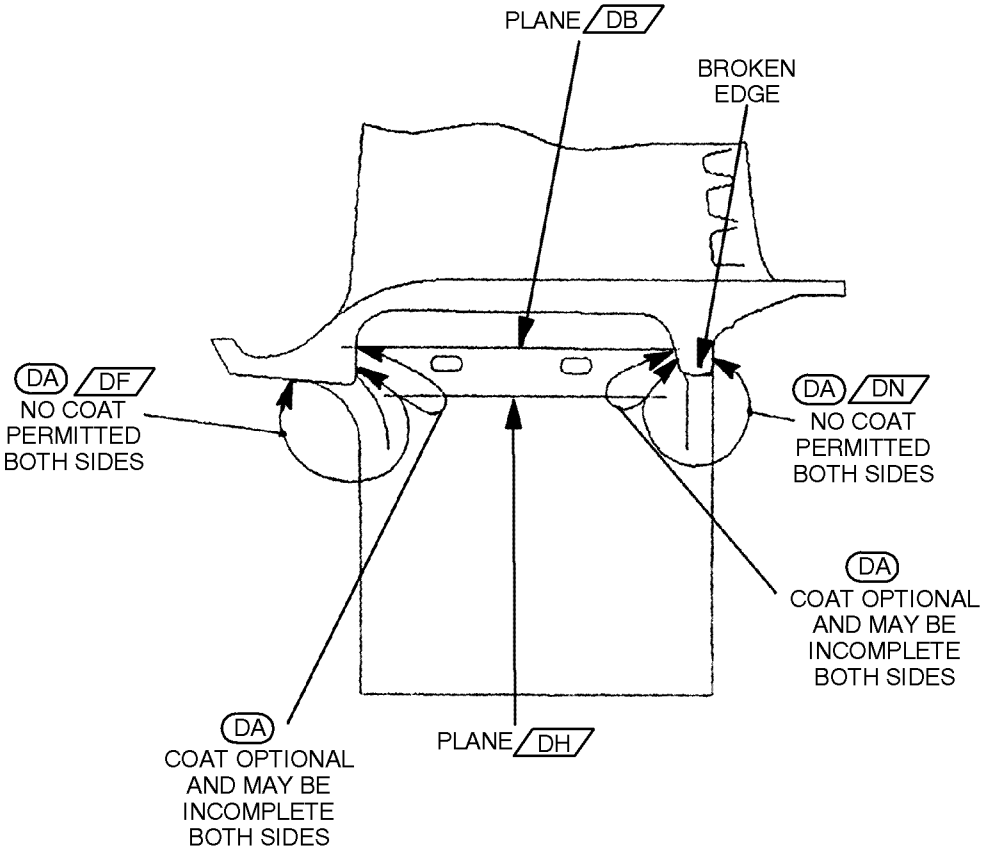
Location of the Stage 2 High Pressure Turbine Blade Assembly
Figure 3




pw0b511864

(DA) COAT IN THE APPLICABLE AREA BY THE PROCEDURE SPRCIFIED IN THE TEXT

Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 1)

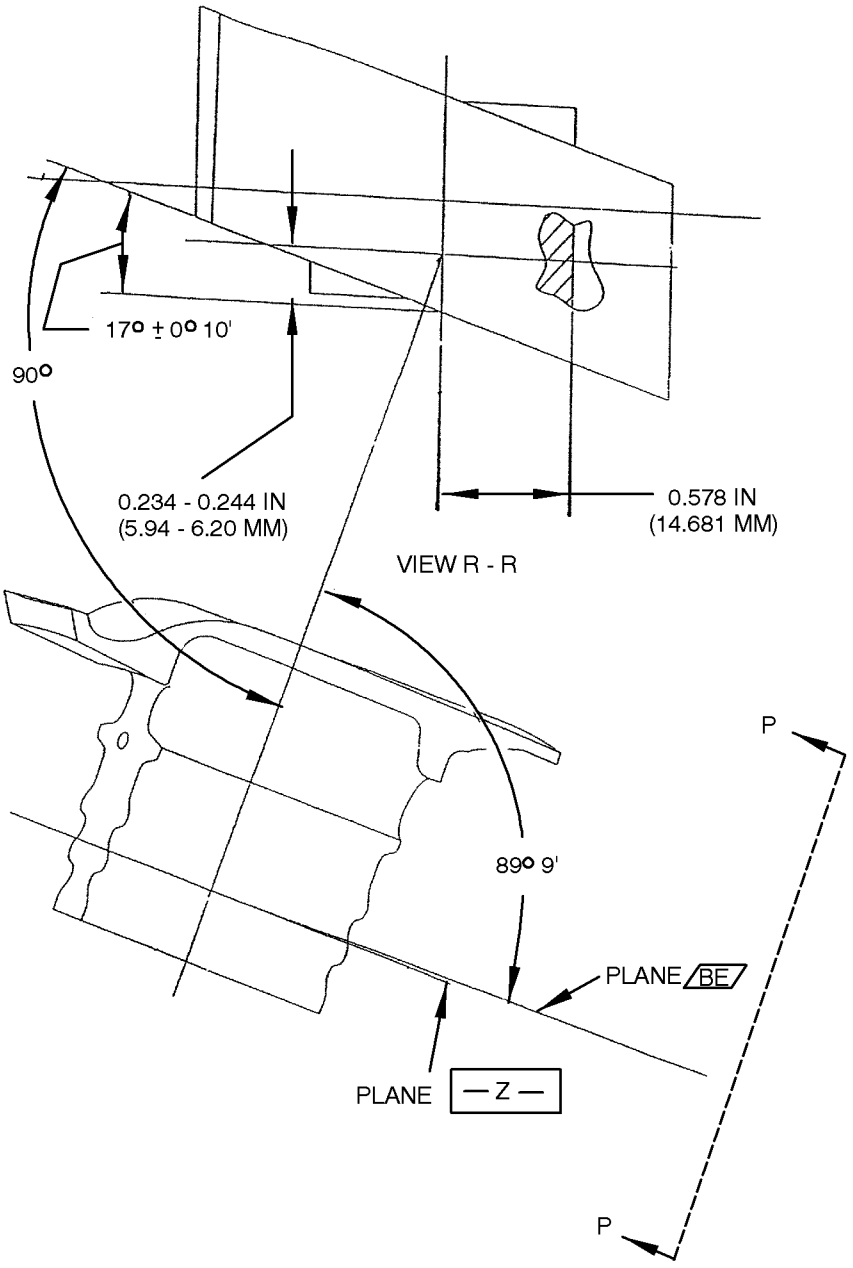



VIEW OF STAGE 2 HIGH PRESSURE TURBINE BLADE ROOT

(DA) COAT IN THE APPLICABLE AREA BY THE PROCEDURE SPECIFIED IN THE TEXT

pw0b511865

Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 2)

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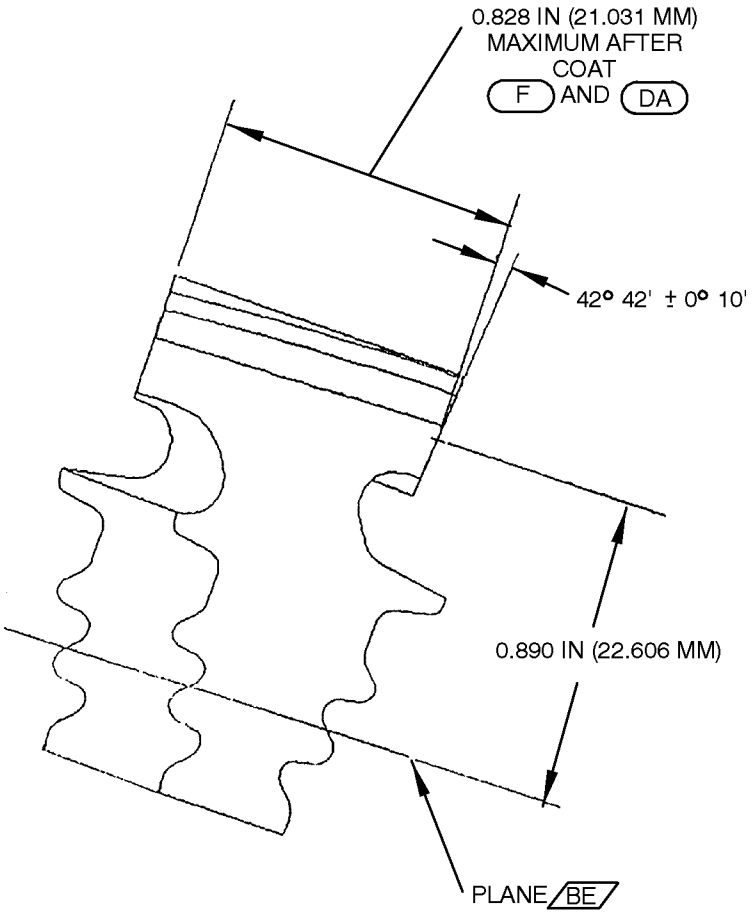
Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 3)

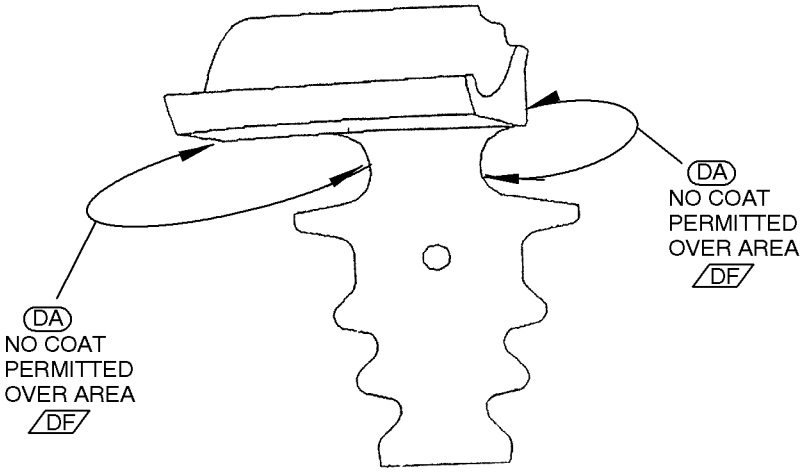



VIEW P - P



pw0b511867

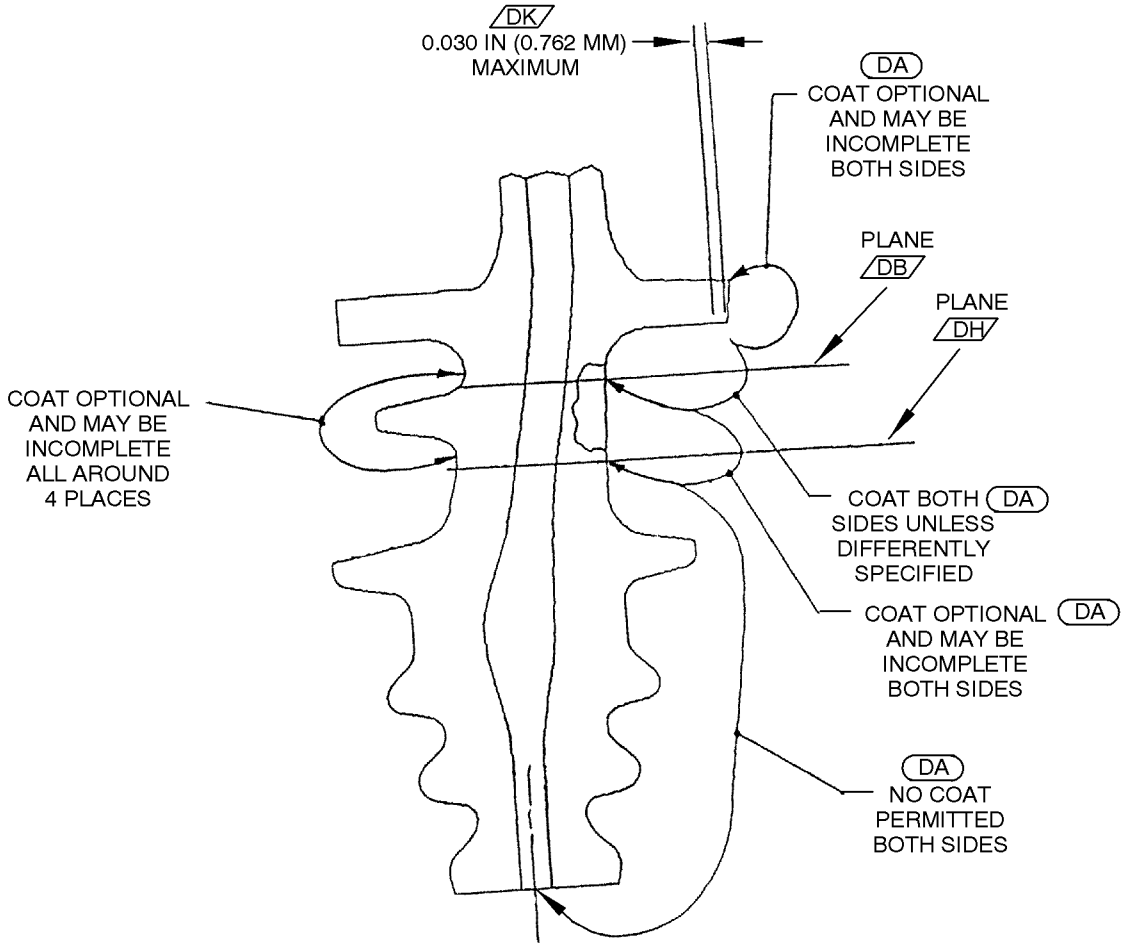
Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 4)




pw0b511868

VIEW T - T

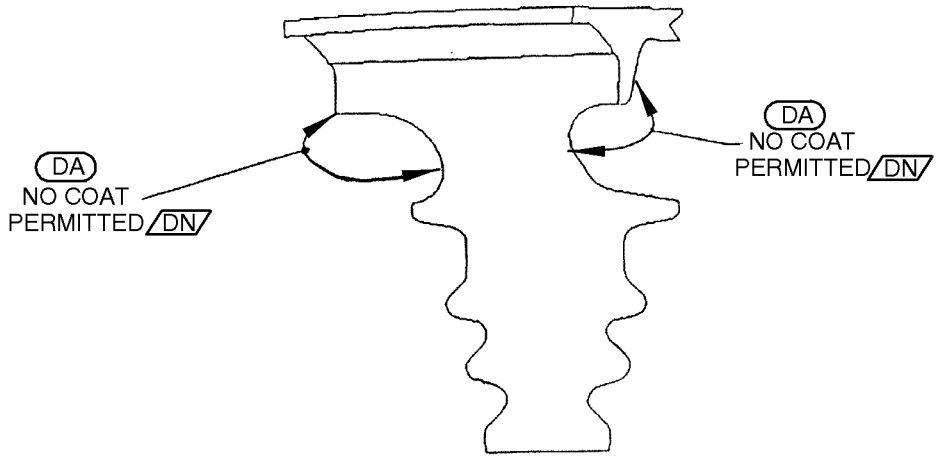
Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 5)




SECTION AF - AF

pw0b511869

Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 6)



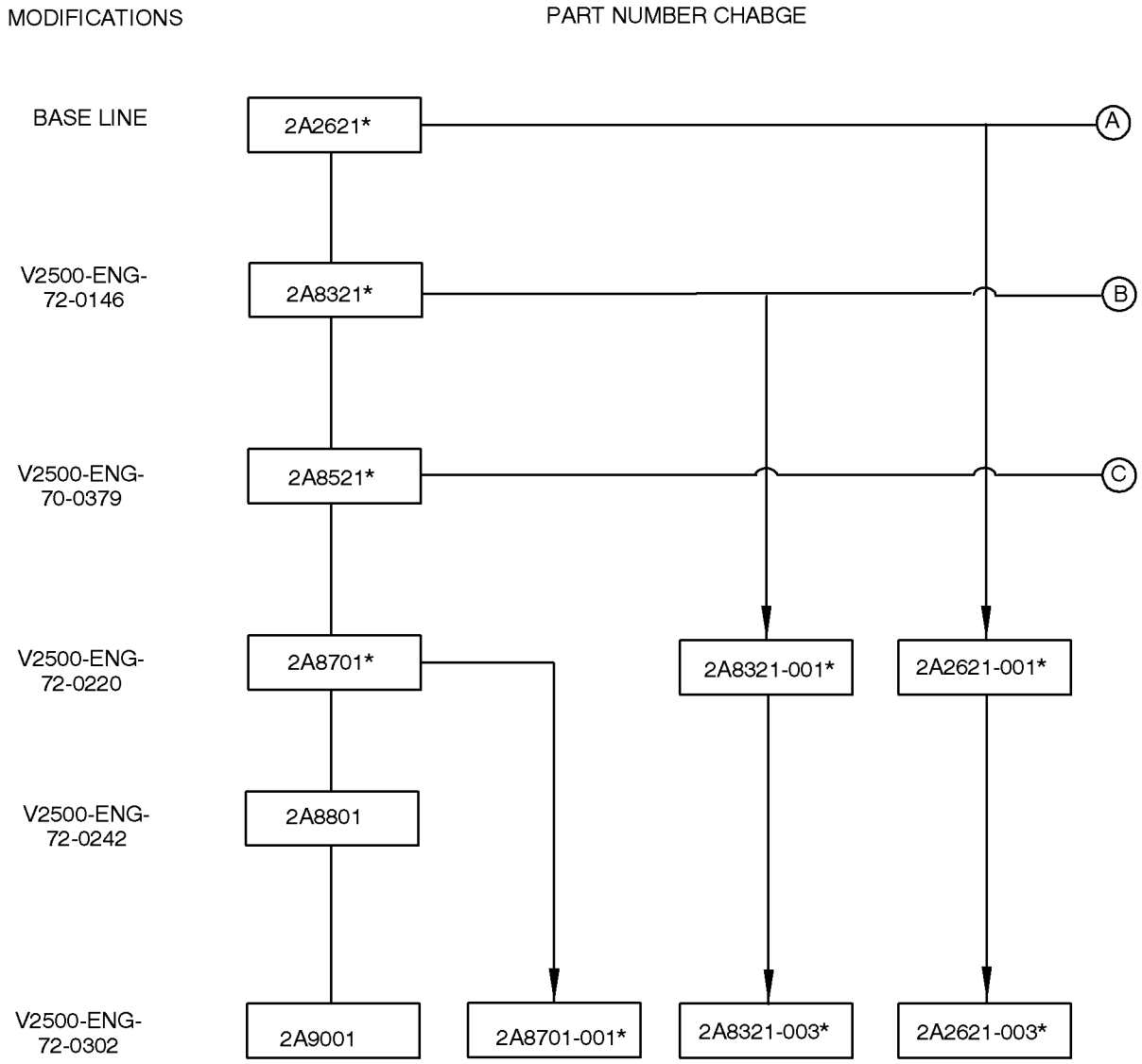

pw0b511870

VIEW AC - AC

Modification of the Stage 2 High Pressure Turbine Blade Assembly
Figure 4 (Sheet 7)

APPENDIX 1

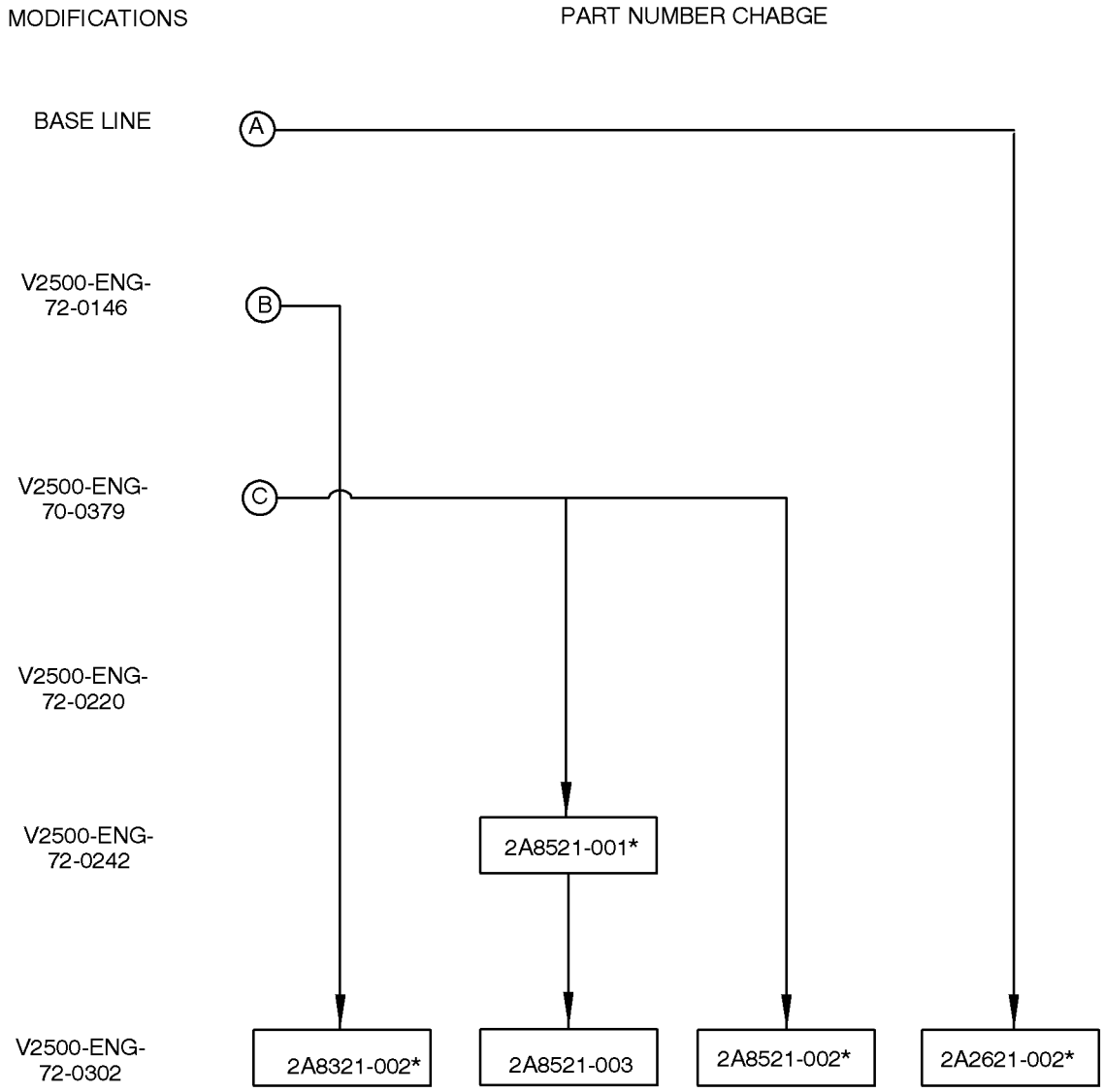
Parts progression to show the changed part in relation to other parts




* DO NOT USE IN V2533-A5 ENGINES

pw0b511871

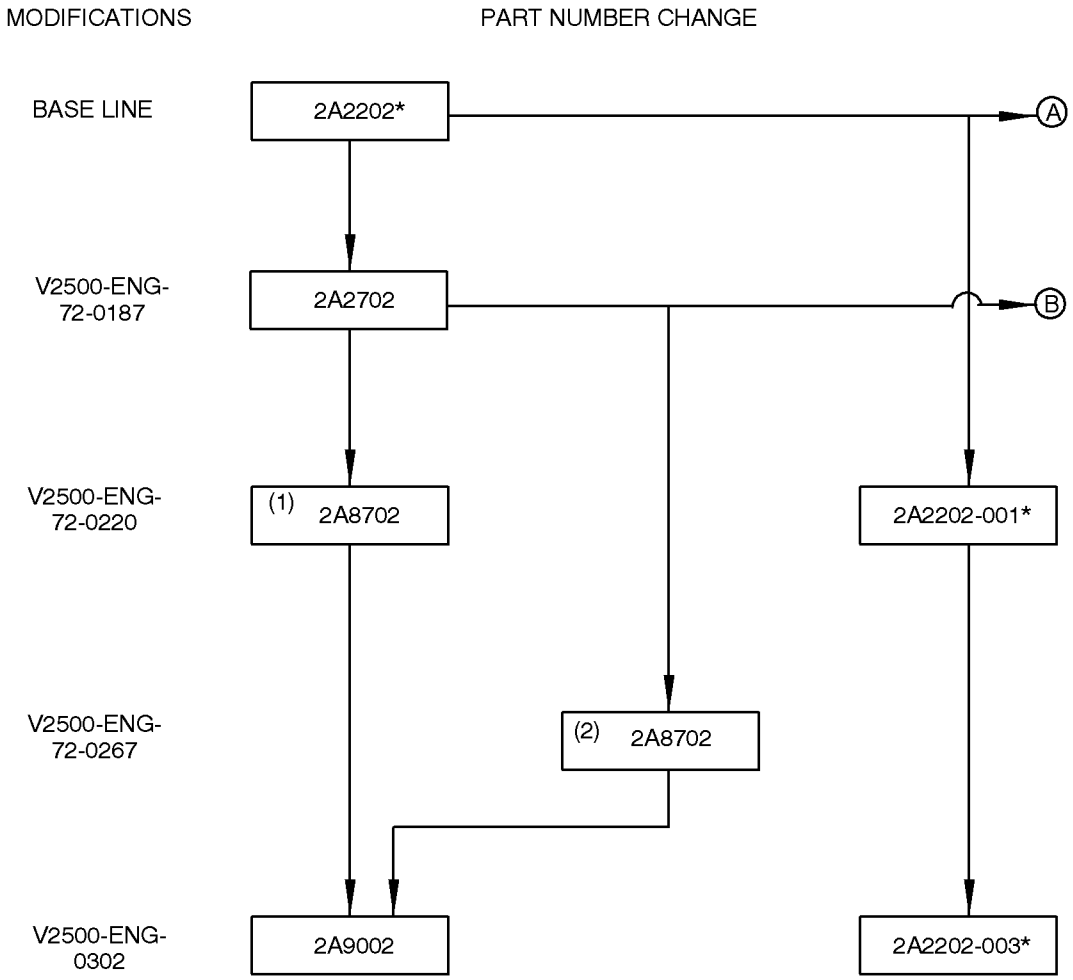
Family Tree - Stage 1 HPT Blade Ref Catalog Sequence No. 72-45-14. Fig.01 Item 010
Figure 5 (Sheet 1)




* DO NOT USE IN V2533-A5 ENGINES

pw0b511872

Family Tree - Stage 1 HPT Blade Ref Catalog Sequence No. 72-45-14. Fig.01 Item 010
Figure 5 (Sheet 2)



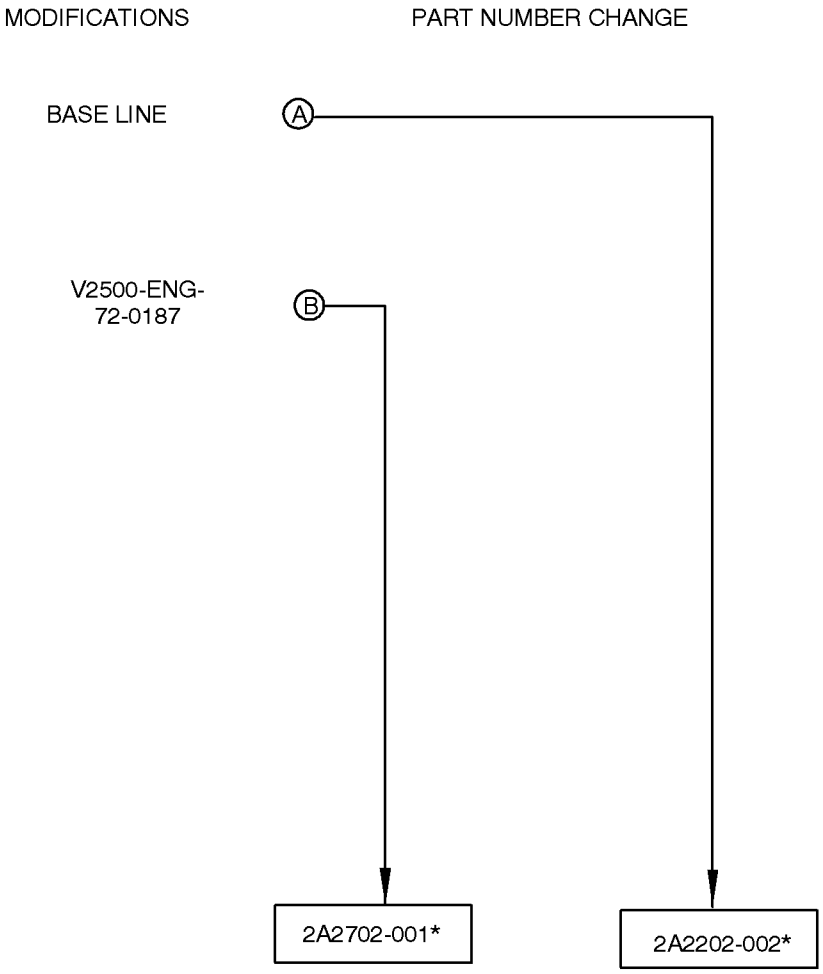

* DO NOT USE IN V2533-A5 ENGINES

(1) FOR MODELS V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5

(2) FOR MODEL V2533-A5

pw0b511873

Family Tree - Stage 2 HPT Blade Ref Catalog Sequence No. 72-45-32. Fig.01 Item 010
Figure 6 (Sheet 1)




* DO NOT USE IN V2533-A5 ENGINES

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Family Tree - Stage 2 HPT Blade Ref Catalog Sequence No. 72-45-32. Fig.01 Item 010
Figure 6 (Sheet 2)