P U B L I C A T I O N T R A N S M I T T A L

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DATE: Aug.14/06

V2500-A1/A5/D5 SERIES PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits Revision 2 to Service Bulletin EV2500-72-0365 and the Initial Issue of the Supplement

Document History

Service Bulletin Revision Status		Supplement Revision Status
Initial Issue	Feb.23/00	
Revision 1	May 12/00	

Bulletin Revision 2

Remove	Incorporate	Reason for change
	Page 1 and 2 of the Summary	To revise the Effectivity, the Material Information and to bring the Service Bulletin in line with the new format.
Pages 1 to 19 of the Service Bulletin	Pages 1 to 19 and 21 of the Service Bulletin	To revise the Effectivity, the Material Information and to bring the Service Bulletin in line with the new format.

Supplement Initial Issue

Remove	Incorporate	Reason for change

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

Page 1	To revise the Effectivity, the Material Information and to bring the Service Bulletin in line with the new format.

Printed in Great Britain

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 2 to the Bulletin and the Initial Issue of the Supplement are as follows:

	Page	Revision Number	Revision Date
	Summary		
R	1	2	Aug.14/06
R	2	2	Aug.14/06
	Bulletin		
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	Supplement		
	1		Aug.14/06

International Aero Engines

SERVICE BULLETIN

ENGINE - PROVIDE PRETRENCHED SECOND STAGE HPT AIR SEALING RING SEGMENTS

SUMMARY

R 1. PLANNING

R A. EFFECTIVITY

R V2500-A1 Engines before Serial No. V0362.

R V2500-A5 Engines before Serial No. V10743 except V10715, V10717, V10719,
R V10721, V10723, V10725, V10727, V10729, V10731, V10733, V10735, V10737,
R V10739 and V10741.

R V2500-D5 Engines before Serial No. V20286.

R B. CONCURRENT REQUIREMENTS

R There are no concurrent requirements.

R C. REASON

R Problem:

R During some very specific engine operating conditions, high spool
R distortion can result in locally heavy rub between the HPT stage 2 rotating
R air seal knife edges and their mating stage 2 vane honeycomb. Heavy rubs
R typically can result in knife edge cracking which could be responsible for
R scrapping air seals.

R Evidence:

R High Spool Distortion, the result of a specific combination of factors,
R results in locally reduced clearances between the HP turbine stage 2
R rotating air seal knife edges and their mating honeycomb. The reduced
R clearances directly cause a locally heavy knife edge rub during low speed
R operation and the resultant cracking.

R Objective:

R Remove stage 2 vane honeycomb material at the locations where experience
R has shown the heavy rubs occur. Minimizing the knife edge rubs and the
R possibility of knife edge cracking.

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R Substantiation:

R Data was collected from 17 V2500-A1, -A5, -D5 engines to define the
R location and depth of the machined trenches. This change was successfully
R substantiated by engine test in engine 808-15 by completing 166 hours of
R testing which included 150 hours and 43 minutes of endurance testing. The
R first 150 hours of endurance testing represent 25 hours at takeoff thrust
R and 108.33 hours at maximum continuous thrust. Upon successful testing,
R parts were found to be crack free.

R D. DESCRIPTION

R Replace or modify the Stage 2 HPT Air Sealing Ring Segments with new
R assemblies featuring five pre-machined trenches.

R E. COMPLIANCE

R Category 6

R Accomplish when the subassembly (i.e. modules, accessories, components,
R build groups) is disassembled sufficiently to afford access to the affected
R part and to all affected spare parts.

R F. MANPOWER

R (1)In Service

R Not applicable

R (2)At Overhaul

R Not applicable

R G. INTERCHANGEABILITY OF PARTS

R Old and New Parts are freely and fully interchangeable.

R 2. MATERIAL INFORMATION

R Part Prices

R A. There is no new material cost to do this Service Bulletin when the part
R modification procedure is used.

International Aero Engines

SERVICE BULLETIN

ENGINE - PROVIDE PRETRENCHED SECOND STAGE HPT AIR SEALING RING SEGMENTS

1. Planning Information

A. Effectivity

R (1) Airbus A319.

R (a) V2522-A5, V2524-A5, V2527M-A5 Engines.

R Engines before Serial No. V10743 except V10715, V10717, V10719,
R V10721, V10723, V10725, V10727, V10729, V10731, V10733, V10735,
R V10737, V10739 and V10741.

R (2) Airbus A320.

R (a) V2500-A1 Engines.

R Engines before Serial No. V0362.

R (b) V2527-A5, V2527E-A5 Engines.

R Engines before Serial No. V10743 except V10715, V10717, V10719,
R V10721, V10723, V10725, V10727, V10729, V10731, V10733, V10735,
R V10737, V10739 and V10741.

R (3) Airbus A321.

R (a) V2530-A5, V2533-A5 Engines.

R Engines before Serial No. V10743 except V10715, V10717, V10719,
R V10721, V10723, V10725, V10727, V10729, V10731, V10733, V10735,
R V10737, V10739 and V10741.

R (4) Boeing - Long Beach Division MD-90.

R (a) V2525-D5, V2528-D5 Engines.

R Engines before Serial No. V20286.

B. Concurrent Requirements

None.

C. Reason

R (1) Problem:

During some very specific engine operating conditions, high spool distortion can result in locally heavy rub between the HPT stage 2 rotating air seal knife edges and their mating stage 2 vane honeycomb. Heavy rubs typically can result in knife edge cracking which could be responsible for scrapping air seals.

R (2) Evidence:

High Spool Distortion, the result of a specific combination of factors, results in locally reduced clearances between the HP turbine stage 2 rotating air seal knife edges and their mating honeycomb. The reduced clearances directly cause a locally heavy knife edge rub during low speed operation and the resultant cracking.

(3) Objective:

Remove stage 2 vane honeycomb material at the locations where experience has shown the heavy rubs occur. Minimizing the knife edge rubs and the possibility of knife edge cracking.

(4) Substantiation:

Data was collected from 17 V2500-A1, -A5, -D5 engines to define the location and depth of the machined trenches. This change was successfully substantiated by engine test in engine 808-15 by completing 166 hours of testing which included 150 hours and 43 minutes of endurance testing. The first 150 hours of endurance testing represent 25 hours at takeoff thrust and 108.33 hours at maximum continuous thrust. Upon successful testing, parts were found to be crack free.

(5) Effects of Bulletin on Workshop Procedures:

Removal/Installation: Not affected.

Disassembly/Assembly: Not affected.

Cleaning: Not affected.

Inspection/Check: Not affected.

Repair: Not affected.

Testing: Not affected.

R (6) Supplemental Information

R None.

D. Description

R Replace or modify the Stage 2 HPT Air Sealing Ring Segments with new assemblies
R featuring five pre-machined trenches.

R E. Compliance

R Category 6

R Accomplish when the subassembly (i.e. modules, accessories, components, build
R groups) is disassembled sufficiently to afford access to the affected part and
R to all affected spare parts.

F. Approval

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

R The compliance statement and the procedures described in this Service Bulletin
R have been shown to comply with the applicable Federal Aviation Regulations and
R are FAA-APPROVED for the Engine Model listed.

G. Manpower

Estimated Manhours to incorporate the full intent of this Bulletin:

(1) In Service

Not Applicable.

(2) At Overhaul

Not Applicable.

H. Material - Price and Availability

(1) Modification kit is not required. Parts are supplied as single line items.

(2) See "Material Information" section for prices and availability of future spares.

I. Tooling - Price and Availability

Special tools are not required to accomplish this Service Bulletin.

J. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

No Effect.

(3) Datum

Engine Front Mount Centerline (Power Plant Station (PPS) 100).

K. Electrical Load Data

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

L. References

(1) IAE V2500 Service Bulletins:

V2500-ENG-70-0428 - Information - Engine - HP Turbine Rotor And Stator Assembly - To Announce The Availability Of New Stage 2 HP Turbine Vanes.

V2500-ENG-70-0445 - Information - Engine - HP Turbine Rotor And Stator Assembly - To Announce The Availability Of New Stage 2 Turbine Vanes With Improved Airfoil Coating.

V2500-ENG-70-0450 - Information - Engine - HP Turbine Rotor And Stator Assembly - To Announce The Availability Of A New Turbine Case And Vane Assembly.

V2500-ENG-72-0002 - Engine - Stage 1 Turbine Nozzle Assembly And HP Turbine Rotor And Stator Assembly - Incorporation Of Offset Supports.

V2500-ENG-72-0092 - Engine - HP Turbine - Provide A Turbine Case And Vane Assembly That Will Allow Individual First Stage Duct Replacement.

R V2500-ENG-72-0122 - Engine - HP Turbine Rotor And Stator Assembly - Provide New Stage 2 HPT Vane Assemblies, Stage 2 Air Sealing Ring Assemblies And Stage 2 Seals.

V2500-ENG-72-0236 - Engine - HP Turbine Rotor And Stator Assembly - Provide A New Orifice Plate With An Increased Opening Size.

V2500-ENG-72-0237 - Engine - HP Turbine Rotor And Stator Assembly - Provide New Stage 2 HPT Vanes.

V2500-ENG-72-0310 - Engine - High Pressure Turbine - Provide New Stage 1 And 2 High Pressure Turbine Duct Segments.

V2500-ENG-72-0339 - Engine - HP Turbine Rotor and Stator Assembly - Provide New Stage 1 HPT Duct Segments, Band Segments, Supports, Seals and Bolts.

(2) V2500-A1 Engine Illustrated Parts Catalog (S-V2500-1IA), Chapter/Section
R 72-45-20 and 72-45-24.

(3) V2500-A5 Engine Illustrated Parts Catalog (S-V2500-2IA, S-V2500-2IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA and
R S-V2500-71B), Chapter/Section 72-45-20 and 72-45-24.

(4) V2500-D5 Engine Illustrated Parts Catalog (S-V2500-3IA and S-V2500-3IB),
R Chapter/Section 72-45-20 and 72-45-24.

R (5) V2500 Engine Manual (E-V2500-1IA), 72-45-20.

R (6) V2500 Engine Manual (E-V2500-3IA), 72-45-20.

(7) V2500 Standard Practices/Processes Manual (SPP-V2500-1IA), 70-09-00, Marking Of Parts.

R (8) Internal Reference No.

R Engineering Change No. 98VC012 and 98CV012A

R (9) ATA Locators 72-45-20 and 72-45-24.

M. Other Publications Affected

R (1) For effect on Illustrated Parts Catalog (IPC), refer to 2. Material
R Information.

(2) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-45-24, Cleaning to add the new part number.

(3) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-45-24, Inspection to add the new part number.

(4) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-45-24, Repair to add the new part number.

(5) V2500 Engine Manual (E-V2500-3IA), Chapter/Section 72-45-24, Cleaning to add the new part number.

(6) V2500 Engine Manual (E-V2500-3IA), Chapter/Section 72-45-24, Inspection to add the new part number.

(7) V2500 Engine Manual (E-V2500-3IA), Chapter/Section 72-45-24, Repair to add the new part number.

R N. Interchangeability of Parts

R Old and New Parts are freely and fully interchangeable.

R O. Information in the Appendix

R Alternate Accomplishment Instructions (No)

R Progression Charts (Yes)

R Added Data (Yes)

R Revision to Table of Limits (No)

R Inspection Procedures (No)

2. Material Information

A. Kit associated with this bulletin

None.

B. Parts affected by this bulletin

	New Part No. (ATA No.)	Qty	Keyword	Old Part No. (IPC No.)	Instructions Disposition
	Applicability: For each V2500-A1 Engine to incorporate this Service Bulletin				
R	2A3468 (72-45-20)	1	Case and Vane Assy-Turb	2A3304 (01-005)	(S1)(1D)(A)(C)
	2A4902CL37 (72-45-24)	2	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A3172CL37 (02-295)	(1D)(B)(E)
R	2A3431-01 (72-45-24)	1	..Ring Seg Assy of - Air Slg, HPT, 2 Stg	2A1106-01 (02-320)	(1D)(B)(E)
	2A5002CL37 (72-45-24)	17	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg, Select	2A3272CL37 (02-095)	(1D)(B)(E)
R	2A3431-01 (72-45-24)	1	..Ring Seg Assy of - Air Slg, HPT, 2 Stg	2A1106-01 (02-120)	(1D)(B)(E)
	Applicability: For each V2500-A1 Engine prior to SB V2500-ENG-70-0445 to incorporate this Service Bulletin				
	2A2640-001 (72-45-20)	1	Case and Vane Assy-Turb	2A2640 (01-005)	(S1)(1D)(A)(D)
R	2A2172-001CL37 (72-45-24)	2	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A2172CL37 (02-295)	(1D)(A)(D)
R	2A3431-01 (72-45-24)	1	..Ring Seg Assy of - Air Slg, HPT, 2 Stg	2A1106-01 (02-320)	(1D)(B)(E)
R	2A5002-001CL37 (72-45-24)	17	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg, Select	2A3272CL37 (02-095)	(1D)(A)(D)

	New Part No. (ATA No.)	Qty	Keyword	Old Part No. (IPC No.)	Instructions Disposition
R	2A3431-01 (72-45-24)	1	..Ring Seg Assy of - Air Slg, HPT, 2 Stg	2A1106-01 (02-120)	(1D)(B)(E)

Applicability: For each V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5 and V2528-D5 Engine to incorporate this Service Bulletin

	2A3469 (72-45-20)	1	Case and Vane Assy-Turb	2A3364 (01-005)	(S1)(1D)(A)(C)
R					
	2A2372-002 (72-45-24)	2	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A2372 (02-260)	(1D)(A)(D)
			or		
R	2A3472-001 (72-45-24)	2	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A3472 (02-260)	(1D)(A)(D)
			or		
	2A5202 (72-45-24)	2	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A3822 (02-260)	(1D)(A)(B)
R	2A3431-01 (72-45-24)	1	..Ring Seg Assy of - Air Slg, HPT, 2 Stg	2A1106-01 (02-320)	(1D)(A)(B)
	2A2272-002 (72-45-24)	17	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A2272 (02-050)	(1D)(A)(D)
			or		
R	2A3372-001 (72-45-24)	17	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A3372 (02-050)	(1D)(B)(E)
			or		
	2A5102 (72-45-24)	17	.Ring Seg and Vane Cluster Assy of - HPT, 2 Stg	2A3812 (02-050)	(1D)(A)(B)
R	2A3431-01 (72-45-24)	1	..Ring Seg Assy of - Air Slg, HPT, 2 Stg	2A1106-01 (02-120)	(1D)(A)(B)

C. Consumable Materials

None.

D. Instructions/Disposition Code Statements:

(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.

(A) The old part will no longer be supplied.

(B) The new part is currently available.

(C) The new part will be supplied on a lead time quotation basis only.

(D) The new part is obtained by identification in the field and is not supplied by spares.

(E) The old part will be retained for engines prior to serial number V0256.

R E. Reidentified Parts Data

	NEW PART NUMBER	KEYWORD	OLD PART NUMBER
R	2A2172-001CL37	Ring Segment & Vane Cluster	2A2172CL37
R	2A2272-002	Ring Segment & Vane Cluster	2A2272
R	2A2372-002	Ring Segment & Vane Cluster	2A2372
R	2A2640-001	Case & Vane Assy	2A2640
R	2A3372-001	Ring Segment & Vane Cluster	2A2372
R	2A3431-01	Ring Segment Assy	2A1106-01
R	2A3468	Case & Vane Assy	2A3304
R	2A3469	Case & Vane Assy	2A3364
R	2A3472-001	Ring Segment & Vane Cluster	2A3472
R	2A4902CL37	Ring Segment & Vane Cluster	2A3172CL37
R	2A5002CL37	Ring Segment & Vane Cluster	2A3272CL37
R	2A5002-001CL37	Ring Segment & Vane Cluster	2A3272CL37
R	2A5102	Ring Segment & Vane Cluster	2A3812
R	2A5202	Ring Segment & Vane Cluster	2A3822

3. Accomplishment Instructions

A. The procedures that follow are to be used to make a modification to the Turbine Case And Vane Assembly, part number 2A3304, 2A3364 or 2A2640

(1) Follow the procedures as specified in Reference 5. and 6., Chapter/Section 72-45-20, Disassembly, to gain access to the Ring Segment And Vane Cluster, HPT 2 Stage Assemblies.

(2) Machine the Ring Segment And Vane Cluster, HPT 2 Stage Assemblies, as specified on Figure 1, Sheets 1 and 2.

(3) Identify the Ring Segment And Vane Cluster, HPT 2 Stage Assembly as shown below and by the procedures as specified in Reference 7., Chapter/Section 70-09-00, marking of parts. See Figure 1 Sheet 1

OLD PART NUMBER	NEW PART NUMBER
2A2272	2A2272-002
2A2372	2A2372-002
2A3172	2A4902
2A3272	2A5002
R 2A2372	2A3372-001
2A3472	2A3472-001
2A3812	2A5102
2A3822	2A5202

(4) Assemble the Turbine Case And Vane Assemblies by the procedures as specified in Reference 5. and 6.

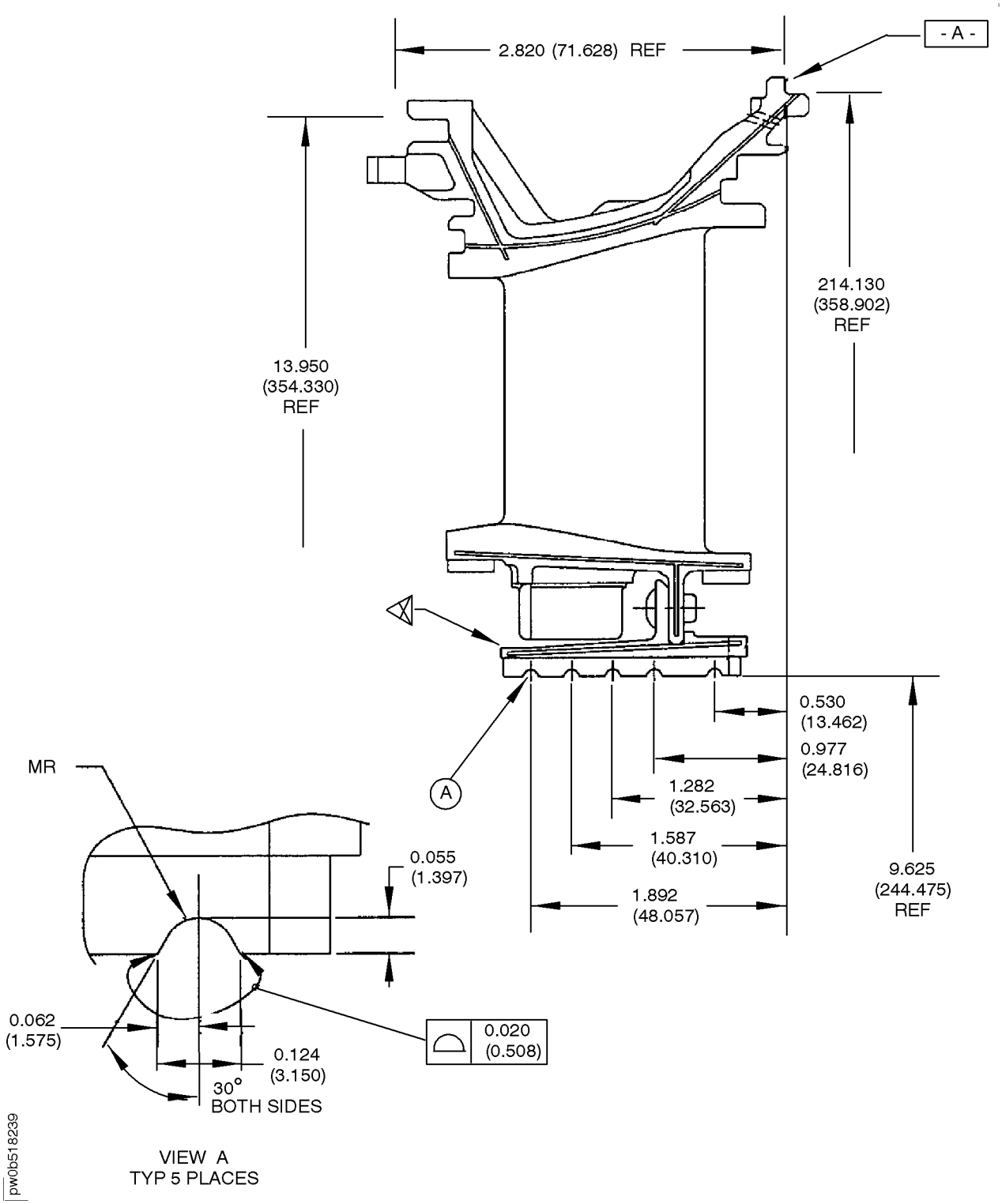
(5) Identify the Turbine Case And Vane Assemblies as shown below by the procedures as specified in Reference 7., Chapter/Section 70-09-00, marking of parts. See Figure 1 Sheet 2

OLD PART NUMBER	NEW PART NUMBER
2A3304	2A3468
2A3364	2A3469
2A2640	2A2640-001

B. Recording Instructions

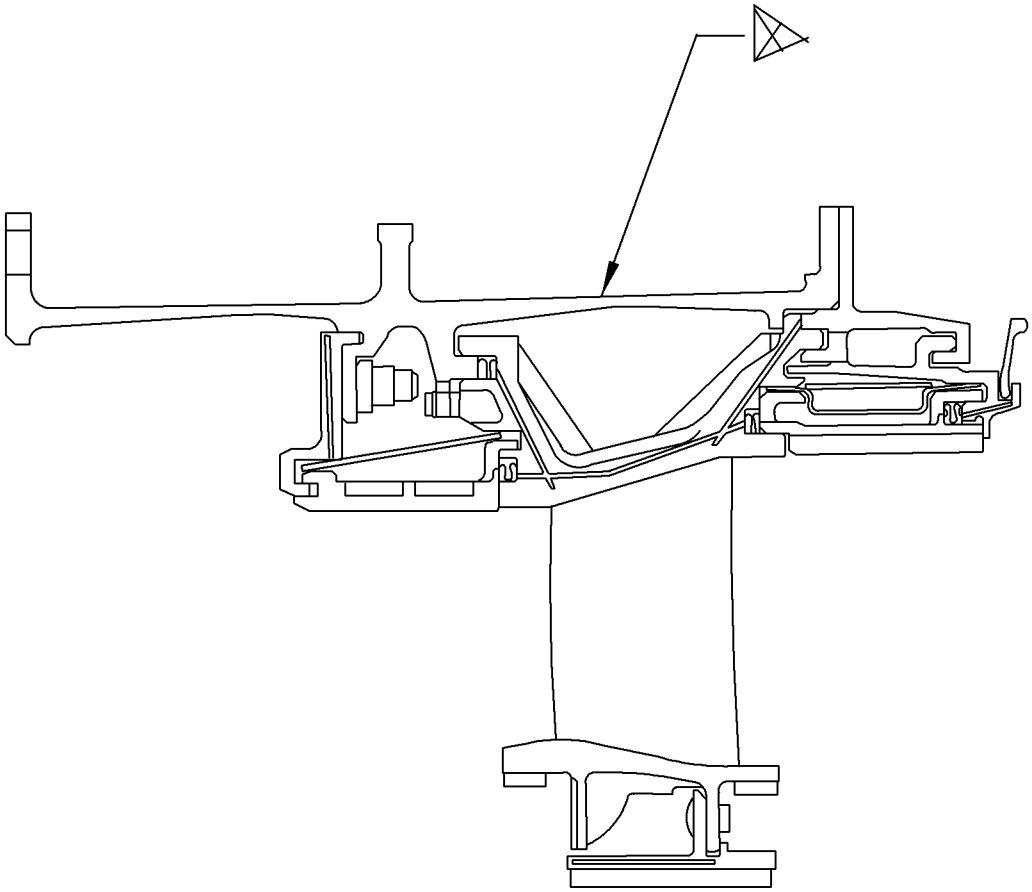
(1) A record of accomplishment is necessary.

R



R Modification of Turbine Case and Vane Assemblies
R Figure 1 (Sheet 1)

R



SURF TEXTURE REQTS WAIVED

MARK IDENT PER REFERENCE 6.

MAY BE FINISHED PER IAE 70-32-03 (REF SPEC PWA 97-20)

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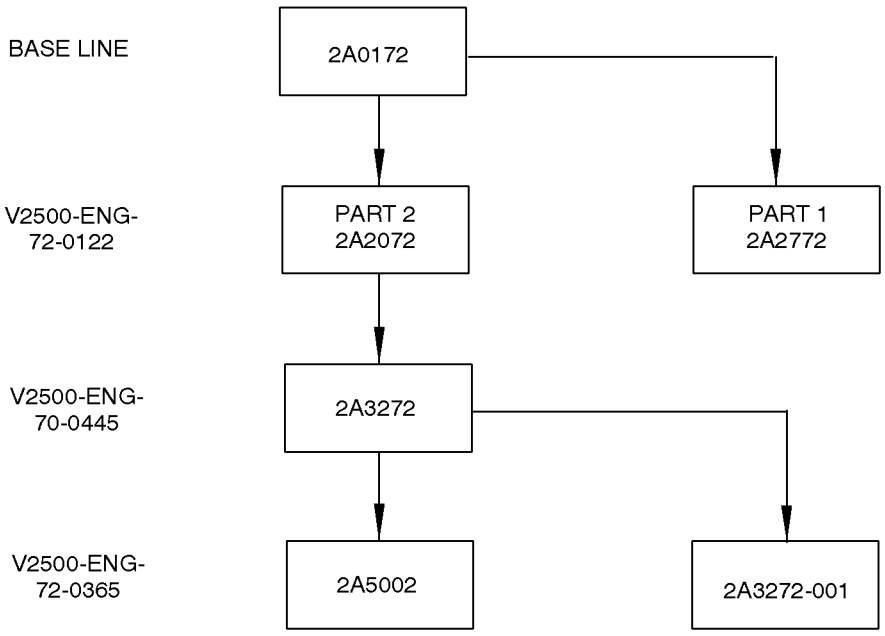
R Modification of Turbine Case and Vane Assemblies
R Figure 1 (Sheet 2)

R Parts Progression To Show the Changed Part in Relation to Other Parts



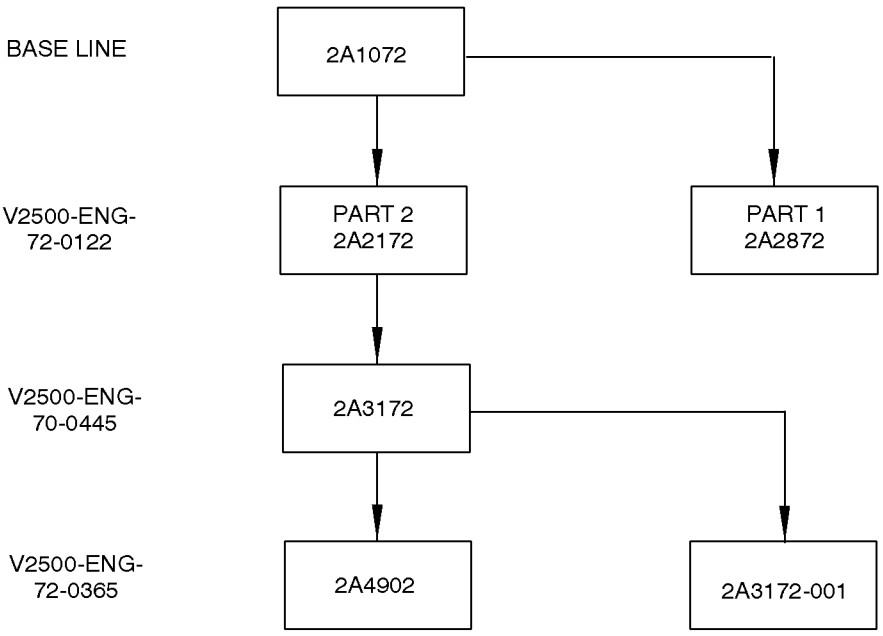
R

PART 1
A NEW ONE PIECE STAGE 2HPT SEAL (Featherseal)
A NEW LONGER STAGE 2 HPT SEALING RING SEGMENT ASSEMBLY AND SEAL (Featherseal)

PART 2
A NEW ONE PIECE STAGE 2 HPT SEAL (Featherseal)
A NEW LONGER STAGE 2 HPT SEALING RING SEGMENT ASSEMBLY AND SEAL
A NEW STAGE 2 VANE COVER WITH A DIRECTIONAL FLOW CAVITY
A NEW SMALLER METERING HOLE IN THE REAR OUTER LEG OF THE VANE

pw0b518241

R Family Tree - V2500-A1 - Ring Segment and Vane Cluster Assembly Ref. Catalog
Sequence No. 72-45-24, Fig. 02, Item 050 (Non Borescope)
R Chart A (Sheet 1 of 2)

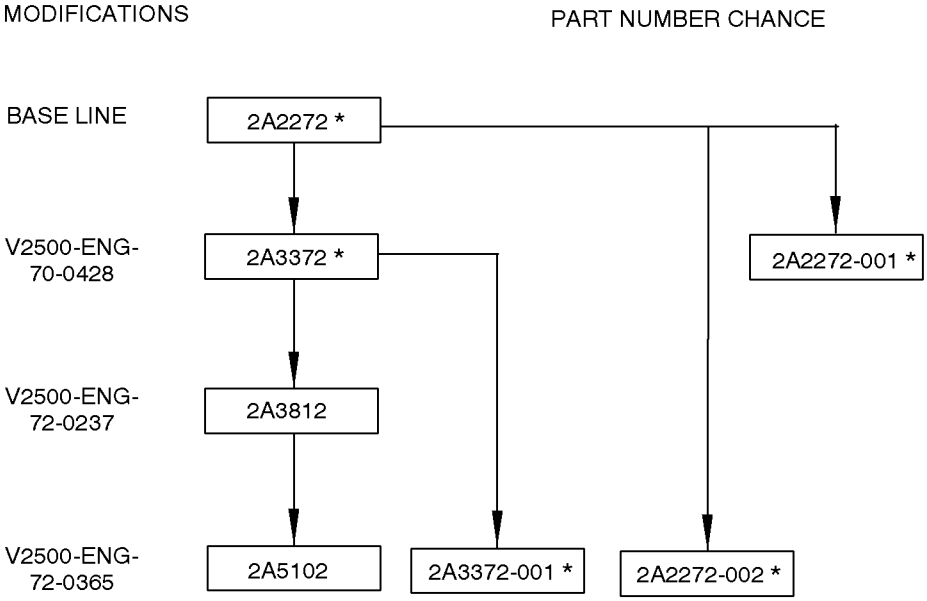


PART 1
A NEW ONE PIECE STAGE 2HPT SEAL (Featherseal)
A NEW LONGER STAGE 2 HPT SEALING RING SEGMENT ASSEMBLY AND SEAL (Featherseal)

PART 2
A NEW ONE PIECE STAGE 2 HPT SEAL (Featherseal)
A NEW LONGER STAGE 2 HPT SEALING RING SEGMENT ASSEMBLY AND SEAL
A NEW STAGE 2 VANE COVER WITH A DIRECTIONAL FLOW CAVITY
A NEW SMALLER METERING HOLE IN THE REAR OUTER LEG OF THE VANE

pw0b518242

Family Tree - V2500-A1 - Ring Segment and Vane Cluster Assembly Ref. Catalog Sequence No. 72-45-24, Fig. 02, Item 260 (Borescope)
Chart A (Sheet 2 of 2)

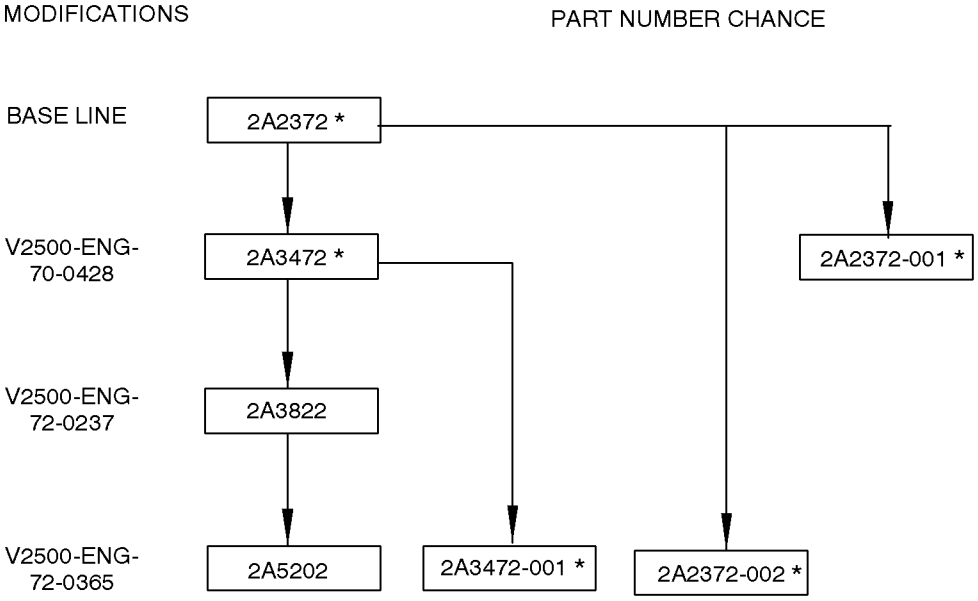


R

* DO NOT USE IN V2533-A5 ENGINES

pw0b518243

R Family Tree - V2500-A5/-D5 - Ring Segment and Vane Cluster Assembly Ref. Catalog Sequence No. 72-45-24, Fig. 02, Item 050 (Non Borescope)
R Chart B (Sheet 1 of 2)

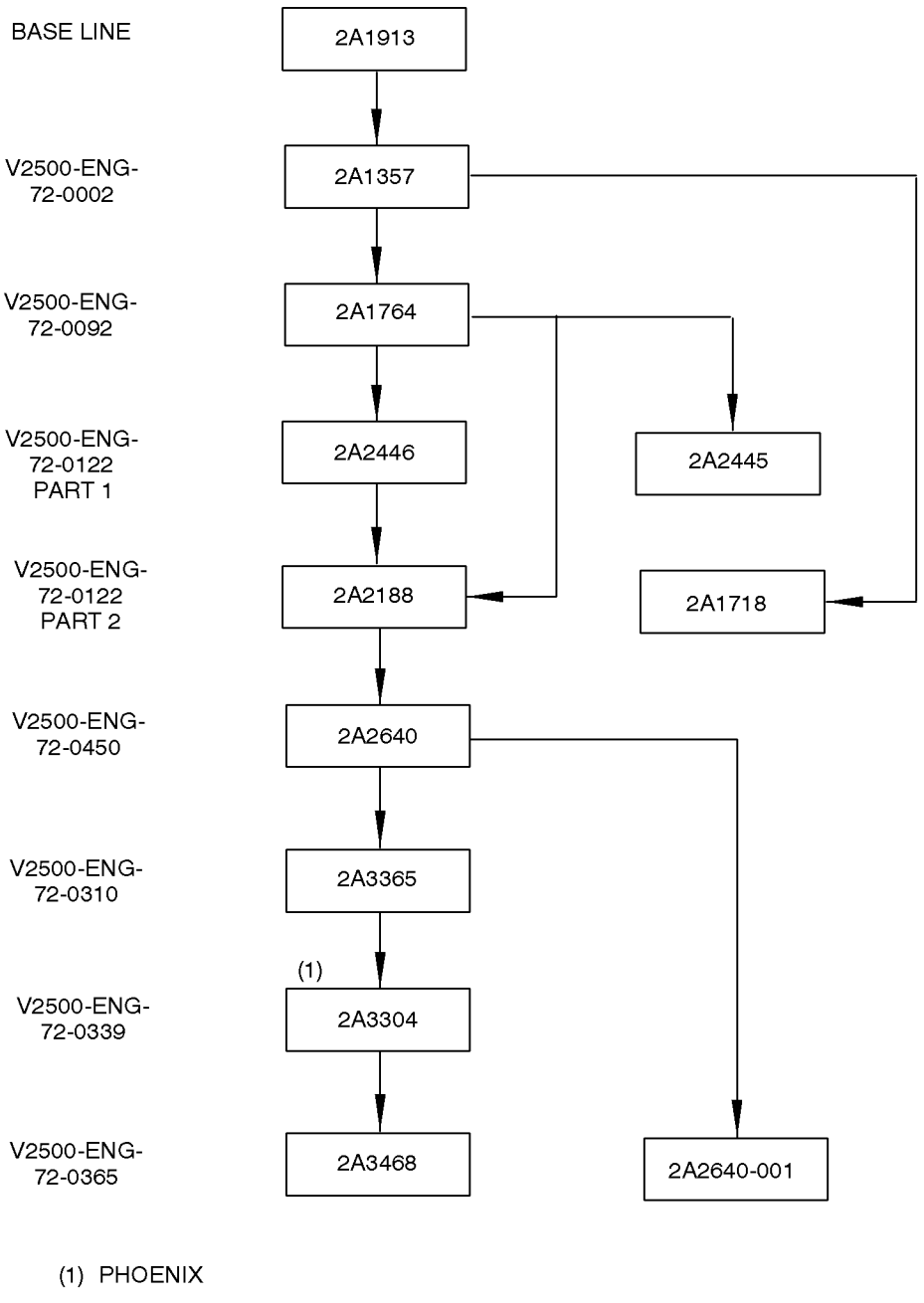


R

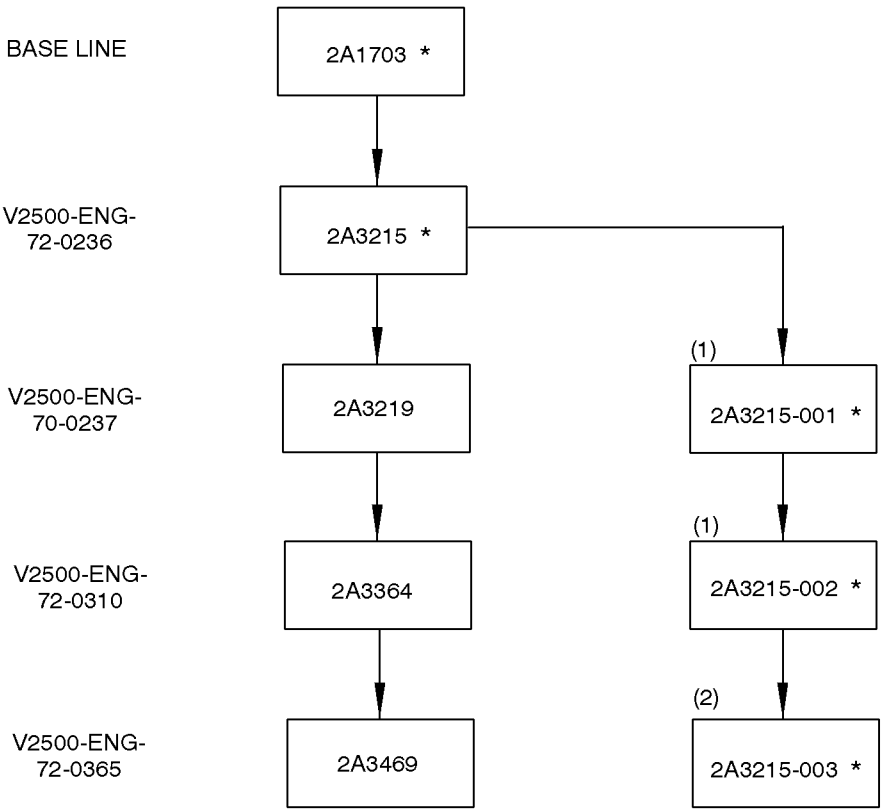
* DO NOT USE IN V2533-A5 ENGINES

pw0b518244

R Family Tree - V2500-A5/-D5 - Ring Segment and Vane Cluster Assembly Ref. Catalog
R Sequence No. 72-45-24, Fig. 02, Item 260 (Borescope)
R Chart B (Sheet 2 of 2)



R Family Tree - V2500-A1 - High Pressure Turbine Case and Vane Assembly Ref. Catalog Sequence No. 72-45-20, Fig. 01, Item 050
R Chart C



R

* DO NOT USE IN V2533-A5 ENGINES

(1) THIS ASSEMBLY MAY CONTAIN A MIXTURE OF NON-PRETRENCHED VANE CLUSTERS 2A2272, 2A2272-001, 2A2372, 2A2372-001, 2A3372, 2A3472, 2A3812 OR 2A2A3822.

(2) THIS ASSEMBLY MAY CONTAIN A MIXTURE OF PRETRENCHED VANE CLUSTERS 2A2272-002, 2A2372-002, 2A3372-001, 2A3472-001, 2A5102, OR 2A5202.

pw0b518246

R Family Tree - V2500-A5/-D5 - High Pressure Turbine Case and Vane Assembly Ref. Catalog Sequence No. 72-45-20, Fig. 01, Item 050

R Chart D

R Added Data

R Number values shown in parentheses adjacent to U.S. values are International System
R of units (SI) equivalents.

R To calculate part life, include the hours and/or cycle since the part was made, use
R the total hours or cycles to calculate life limits that are result of part
R modification, a part used in an engine with different thrust, or for some other
R reason.

International Aero Engines

SERVICE BULLETIN

ENGINE - PROVIDE PRETRENCHED SECOND STAGE HPT AIR SEALING RING SEGMENTS

Printed in Great Britain

R SUPPLEMENT - PRICES AND AVAILABILITY

R The year 2000 prices (if shown) are for estimating purposes only and as such are
R given in good faith, without commercial liability for advanced planning purposes
R only. Refer to IAE Spares and/or current price catalogue for current prices.

R There is no new material cost to do this Service Bulletin when the part modification
R procedure is used.

R 1. Modification Kit:

R Not applicable.

R 2. New Production Parts::

R	Part No.	Description	Unit Price US Dollars
R	2A3431-01	Ring Seg Assy of - Air Slg, HPT, 2 Stg	1095.00

Feb.23/00
R Aug.14/06

V2500-ENG-72-0365