ENGINE - HP COMPRESSOR DISCS - INTRODUCTION OF A REWORKED STAGE-3 TO 8 DISC ASSEMBLY WITH REVISED L SHAPED SEALING WIRES - CATEGORY CODE 6 - MOD.ENG-72-0304

1. Planning Information

A. Effectivity

(1) Aircraft:
(a) Airbus A319
(b) Airbus A320
(c) Airbus A321
(d) Boeing-Douglas Product Division MD-90

(2) Engines:
(a) V2500-A1 Engines prior to Serial No.V0362
(b) V2522-A5 Engines prior to Serial No.V10368
(c) V2524-A5 Engines prior to Serial No.V10368
(d) V2527-A5 Engines prior to Serial No.V10368
(e) V2527E-A5 Engines prior to Serial No.V10368
(f) V2530-A5 Engines prior to Serial No.V10368
(g) V2533-A5 Engines prior to Serial No.V10368
(h) V2525-D5 Engines prior to Serial No.V20215
(i) V2528-D5 Engines prior to Serial No.V20215

B. Concurrent Requirements

None.

C. Reason

(1) Condition

Frettage on the side faces of the Stage-7 rear and Stage-8 front sealing slots of the HP Compressor Stage 3-8 drum assembly, can occur.

The problem is caused by too much tolerances of the axial positions of the slots, together with circumferential movement of the wires. This results in too much wear of the slot side faces.

(2) Background

The problem has been found on engines in service.

(3) Substantiation

Satisfactory engineering assessment, finite element stress analysis and a successful trial build, have been done on the changes introduced by this Service Bulletin.

(4) Objective

The purpose of this Service Bulletin is to maintain engine reliability.

(5) Effect of Bulletin on:-

(a) Operation

Not affected.

(b) Maintenance

Affected.

(c) Overhaul

Affected.

(d) Repair Schemes

Not affected.

(e) Interchangeability

Not affected.

(f) Fits and Clearances

Not affected.

D. Description

(1) The changes introduced by this Service Bulletin are as follows:

(a) The sealing wires for the Stage-7 rear and Stage-8 front have changed as follows:

(i) The sealing wires are 'L' shaped. This gives an increased contact area between the wire and the bottom of the blade platform.

(b) The HP Compressor Stage 3-8 disc assembly has changed as follows:

(i) The slots for the Stage-7 rear and Stage-8 front sealing-wires have changed so that the new sealing wires can be installed.

(2) The HP Compressor Stage-3 to 8 disc assemblies can be reworked (Refer to Figures 1 through to 4).

(3) For the effect on declared life, refer to the Time Limits Manual (TLM), Chapter/Section 5-10-01.

E. Compliance

Category Code 6.

Do this Service Bulletin when the subassembly (That is modules, accessories, components and build groups) is disassembled sufficiently to get access to the affected parts.

F. Approval

The part number changes and/or part modification are given in section 2 and 3 of this Service Bulletin. They obey the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model listed.

G. Manpower

Estimate of man-hours necessary to do this Service Bulletin in full:

	Venue	Estimated Man-Hours
(1)	In Service	Not applicable
(2)	At Overhaul	
	(a) To remove the HP Compressor	14 Hours 45 Minutes
	(b) To disassemble the HP Compressor assembly	14 Hours 15 Minutes
	(c) To disassemble the HP Compressor rotor	4 Hours 30 Minutes
	(d) To Machine the disc	8 Hours 20 Minutes
	(e) To assemble the HP Compressor rotor	5 Hours 30 Minutes
	(f) To assemble the HP Compressor	33 Hours 30 Minutes
	(g) To install the HP Compressor	13 Hours 35 Minutes
	TOTAL	94 Hours 35 Minutes

NOTE: It is possible to get access to the parts affected by this Service Bulletin at overhaul

H. Material Price and Availability

(1) A Modification kit is not necessary.

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

I. Tooling Price and Availability

Special tools are not necessary

J. Weight and Balance

(1) Weight Change

(a) None.

(2) Moment Arm

(a) Not affected.

(3) Datum

(a) Engine front mount centreline (Power Plant Station - PPS 100).

K. Electrical Load Data

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

L. References

(1) Internal Reference No.

EC97VR024

M. Other Publications Affected

(1) Engine Manual (EM), Chapter/Section 72-00-41 Removal/Installation, Chapter/Section 72-41-00 and 72-41-10 Disassembly/Assembly and. (A1/A5/D5).

(1) Illustrated Parts Catalogue (IPC), Chapter Section 72-41-11.

(3) Time Limits Manual (TLM), Chapter/Section 05-10-01

2. Accomplishment Instructions

A. Prepare the HP Compressor.

(1) Remove the HP Compressor assembly from the engine. (Refer to the applicable Engine Manual (EM) Chapter/Section 72-00-41, Removal/Installation.

(2) Disassemble HP Compressor assembly. (Refer to the applicable Engine Manual (EM), Chapter/Section 72-41-00, Removal/Installation.

(3) Disassemble HP compressor rotor. (Refer to the applicable Engine Manual (EM) Chapter/Section 72-41-10, Removal/Installation.

B. Rework instructions (A1 Models).

(1) Rework the parts that follow:

6A6473, 6A5594, 6A5592, 6A5659 or 6A5467, HP. Compressor Stage-3 to 8 Disc Assembly. (Refer to the Illustrated Parts Catalogue (IPC) Chapter/Section 72-41-11, Fig/Item 01-200).

Standard Equipment

Centre lathe
Dial test indicator
Standard turning tool
Standard workshop tools
Vibro-engraving tool

CAUTION 1 TITANIUM COMPONENT - USE SILICON CARBIDE TYPE ABRASIVE WHEELS, STONES AND PAPERS TO DRESS, BLEND AND POLISH THIS COMPONENT.

CAUTION 2 TITANIUM COMPONENT - DO NOT USE FORCE WITH MECHANICAL CUTTERS OR THE MATERIAL WILL BECOME TOO HOT.

CAUTION 3 TITANIUM COMPONENT - IF THE COLOR OF THE MATERIAL BECOMES DARKER THAN A LIGHT STRAW COLOR, THE COMPONENT MUST BE REJECTED.

Procedure	Supplementary Information
(a) Clean the disc assembly.	Use the overhaul process facility (Refer to SPM Manual, TASK 70-11-34-300-503).

(b) Set up the disc assembly for machining.	Use IAE 3R18735 turning arbour, 1 off, with centre lathe. Use a dial test indicator to make sure the disc assembly runs true. Make sure datum's A, B and C run true. (Refer to Figures 1 and 2).
(c) Set up the dimension from Datum A within the tolerance band of 1.098 in. (+/- 0.004 in.) (27,89 mm (+/- 0,1 mm)). This is to clean up the front face of the Stage-7 rear damping wire slot. Do not remove more than 0.002 in. 0,05 mm) of material from this face.	
(d) Machine the new profile at the front of the Stage-7 rear damping wire slot and the rear of the Stage-8 front damping wire slot.	Use a standard turning tool (Refer to Figures 1, 2, 3 and 4).

CAUTION: YOU MUST TAKE CARE WHEN YOU MACHINE THE STAGE-7 REAR AND THE STAGE-8 FRONT DAMPING WIRE LOCATION SLOTS.

(e) Machine the damping wire location slots at the rear of the Stage-7 and the front of the Stage-8 blade root location.

(i) Rough machine the front face of the Stage-7 rear damping wire slot.	Use IAE 3R19079 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. (Refer to Figures 1, 2 and 3)

NOTE: Do not machine to the full dimensions of the slots. An allowance of 0.005 to 0.010in. (0,127 to 0,254mm.) for the final machining is necessary.

(ii) Do the final machine of the front face of the Stage-7 rear damping wire slot.	Use IAE 3R19079 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. Finish machine to the dimensions given. (Refer to Figures 1, 2 and 3).
(iii) Rough machine the rear face and 60 degree angle of the Stage-7 rear damping wire slot.	Use IAE 3R19314 rear groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. (Refer to Figures 1, 2 and 3).

NOTE: Do not machine to the full dimensions of the slots. An allowance of 0.005 to 0.010in. (0,127 to 0,254mm.) for the final machining is necessary.

(iv) Do the final machine of the rear face of the Stage-7 rear damping wire slot.	Use IAE 3R19314 rear groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. Finish machine to the dimensions given. (Refer to Figures 1, 2 and 3
(v) Rough machine the Stage-8 front damping wire slot.	Use IAE 3R19361 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. (Refer to Figures 1, 2 and 4.).

NOTE: Do not machine to the full dimensions of the slots. An allowance of 0.005 to 0.010in. (0,127 to 0,254mm.) for the final machining is necessary.

(vi) Do the final machine of the Stage-8 front damping wire slot.	Use IAE 3R19361 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. Finish machine to the dimensions given. (Refer to Figures 1, 2 and 3).
(f) Remove all sharp edges.	Use standard workshop tools.
(g) Remove the disc assembly from the machine tool.	
(h) Check the dimensions of the machined slots.	Make sure the dimension are within the specified limits. (Refer to Figures 1, 2, 3 and 4). Make sure that the slots were not damaged during machining. Use standard inspection equipment.

CAUTION: MAKE SURE THAT YOU PROTECT THE RUB-STRIP MATERIAL BEFORE YOU DO WET PROCESSING OPERATIONS. WIRE LOCATION SLOTS. IF THE RUB-STRIP HAS ANY CONTAMINATION, THEN YOU MUST DO VRS6007 AND REPLACE THE STAGE-6 AND 7 RUB-STRIP LININGS.

(i) To prepare for the crack tests, chemically clean the machined surface.	Refer to the SPM Manual, TASK 70-11-26-300-503.
(j) Do a swab-etch. (i) Chemically clean the machined surface.	Use chemical cleaning equipment. Refer to the SPM Manual, TASK 70-11-08-300-503, SUBTASK 70-11-08-300-001.

(ii) Swab etch the machined surface.	Use chemical cleaning equipment. Refer to the SPM Manual, TASK 70-11-08-300-503, SUBTASK 70-11-08-300-002.

(k) Do a crack test of the machined surface.

(i) Do a penetrant crack test.	Refer to SPM Manual, TASK 70-23-04-230-501. If cracks are found, reject the component.
(l) Chemically clean the machined surfaces to remove the the flourescent penetrant	Use standard chemical cleaning equipment (Refer to the SPM Manual, TASK 70-11-26-300-002).
(m) Clean the disc assembly.	Use the overhaul process facility. Refer to the SPM Manual TASK 72-41-11-100-001-B00 (72-41-11, PB 601), SUBTASK 72-41-11-110-057.
(n) Replace the initial part number and re-identify with the new part number.	Use vibro-engraving equipment. (Refer to the SPM Manual, TASK 70-09-00-400-501).

Existing	Re-number
6A6473	6A7385
6A5594	6A7379
6A5592	6A7380
6A5659	6A7382
6A5467	6A7384

C. Rework instructions (A5/D5Models).

(1) Rework the parts that follow:

6A6473, 6A4900, or 6A5467, HP. Compressor Stage-3 to 8 Disc Assembly. (Refer to the Illustrated Parts Catalogue (IPC) 72-41-11, Fig/Item 01-200).

Standard Equipment

Centre lathe
Dial test indicator
Standard turning tool
Standard workshop tools
Vibro-engraving tool

CAUTION 1 TITANIUM COMPONENT - USE SILICON CARBIDE TYPE ABRASIVE WHEELS, STONES AND PAPERS TO DRESS, BLEND AND POLISH THIS COMPONENT.

CAUTION 2 TITANIUM COMPONENT - DO NOT USE FORCE WITH MECHANICAL CUTTERS OR THE MATERIAL WILL BECOME TOO HOT.

CAUTION 3 TITANIUM COMPONENT - IF THE COLOR OF THE MATERIAL BECOMES DARKER THAN A LIGHT STRAW COLOR, THE COMPONENT MUST BE REJECTED.

Procedure	Supplementary Information
(a) Clean the disc assembly.	Use the overhaul process facility. Refer to the SPM Manual, TASK 70-11-34-300-503.
(b) Set up the disc assembly for machining.	Use IAE 3R18735 Turning arbour, 1 off, with centre lathe. Use a dial test indicator to make sure the disc assembly runs true. Make sure Datum's A, B and C run true. (Refer to Figures 1 and 2).
(c) Set up the dimension from Datum A within the tolerance band of 1.098 in. (+/-0.004 in.) (27,89 mm (+/- 0,1 mm)). This is to clean up the front face of the Stage-7 rear damping wire slot. Do not remove more than 0.002 in. 0,05 mm) of material from this face.	
(d) Machine the new profile at the front of the Stage-7 rear damping wire slot and the rear of the Stage-8 front damping wire slot.	Use a standard turning tool (Refer to Figures 1, 2, 3 and 4).

CAUTION: YOU MUST TAKE CARE WHEN YOU MACHINE THE STAGE-7 REAR AND THE STAGE-8 FRONT DAMPING WIRE LOCATIONS.

(e) Machine the damping wire location slots at the rear of the Stage-7 and the front of the Stage-8 blade root location.

(i) Rough machine the front face of the Stage-7 rear damping wire slot.	Use IAE 3R19079 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. (Refer to Figures 1, 2 and 3)

NOTE: Do not machine to the full dimensions of the slots. An allowance of 0.005 to 0.010in. (0,127 to 0,254mm.) for the final machining is necessary.

(ii) Do the final machine of the front face of the Stage-7 rear damping wire slot.	Use IAE 3R19079 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. Finish machine to the dimensions given. (Refer to Figures 1, 2 and 3).
(iii) Rough machine the rear face and 60 degree angle of the Stage-7 rear damping wire slot.	Use IAE 3R19314 rear groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. (Refer to Figures 1, 2 and 3).

NOTE: Do not machine to the full dimensions of the slots. An allowance of 0.005 to 0.010in. (0,127 to 0,254mm.) for the final machining is necessary.

(iv) Do the final machine of the rear face of the Stage-7 rear damping wire slot.	Use IAE 3R19314 rear groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. Finish machine to the dimensions given. (Refer to Figures 1, 2 and 3).
(v) Rough machine the Stage-8 front damping wire slot.	Use IAE 3R19361 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. (Refer to Figures 1, 2 and 4).

NOTE: Do not machine to the full dimensions of the slots. An allowance of 0.005 to 0.010in. (0,127 to 0,254mm.) for the final machining is necessary.

(vi) Do the final machine of the Stage-8 front damping wire slot.	Use IAE 3R19361 front groove tool 1 off. Use a turning speed of 114.8ft (35m.) per minute, with a feed of 0.002in. (0,05mm.) per revolution. Finish machine to the dimensions given. (Refer to Figures 1, 2 and 3).
(f) Remove sharp edges.	Use standard workshop tools.

(g) Remove the disc assembly from the machine tool.

(h) Check the dimensions of the machined slots. Make sure the dimension are within the specified limits. (Refer to Figures 1, 2, 3 and 4).
Make sure that the slots were not damaged during machining.
Use standard inspection equipment.

CAUTION: MAKE SURE THAT YOU PROTECT THE RUB-STRIP MATERIAL BEFORE YOU DO WET PROCESSING OPERATIONS. WIRE LOCATION SLOTS. IF THE RUB-STRIP HAS ANY CONTAMINATION, THEN YOU MUST DO VRS6007 AND REPLACE THE STAGE-6 AND 7 RUB-STRIP LININGS.

(i) To prepare for the crack tests, chemically clean the machined Surface. Refer to the SPM Manual, TASK 70-11-26-300-503.

(j) Do a swab-etch.

(i) Chemically clean the machined surface. Use chemical cleaning equipment. Refer to the SPM Manual, TASK 70-11-08-300-503, SUBTASK 70-11-08-300-001.

(ii) Swab-etch the machined surfaces. Refer to the SPM Manual, TASK 70-11-08-300-503, SUBTASK 70-11-08-300-002. Use chemical cleaning equipment.

(k) Do a crack test of the machined surface.

(i) Do a penetrant crack test. Refer to SPM Manual, TASK 70-23-04-230-501. If cracks are found, the component must be rejected.

(l) Chemically clean the machined surfaces to remove the the flourescent penetrant Use standard chemical cleaning equipment (Refer to the SPM Manual, TASK 70-11-26-300-002).

(m) Clean the disc assembly. Use the overhaul process facility. Refer to the SPM Manual TASK 72-41-11-100-001-B00. (72-41-11, PB 601), SUBTASK, 72-41-11-110-057.

(n) Cancel the existing part number and re-identify with the new part number.

Use vibro-engraving equipment. (Refer to the SPM Manual, TASK 70-09-00-400-501).

Existing	Re-number
6A6473	6A7385
6A4900	6A7383
6A5467	6A7384

D. Assembly Instructions

CAUTION: IT IS IMPORTANT THAT DURING THE ASSEMBLY OF THE L SHAPED DAMPER WIRES, THE END GAPS MUST BE POSITIONED AS FAR AWAY AS POSSIBLE FROM BOTH THE BLADE LOADING SLOT AND THE LOCATION OF THE MAXIMUM LOCAL WEAR OF THE DAMPER WIRE GROOVE.

(1) For the correct Disassembly/Assembly procedures refer to the Engine Manual (EM), Chapter/Section 72-41-10, Disassembly/Assembly.

(2) Make sure that a Stage-7 wire (6A7381) is not installed in the Stage-8 slot.

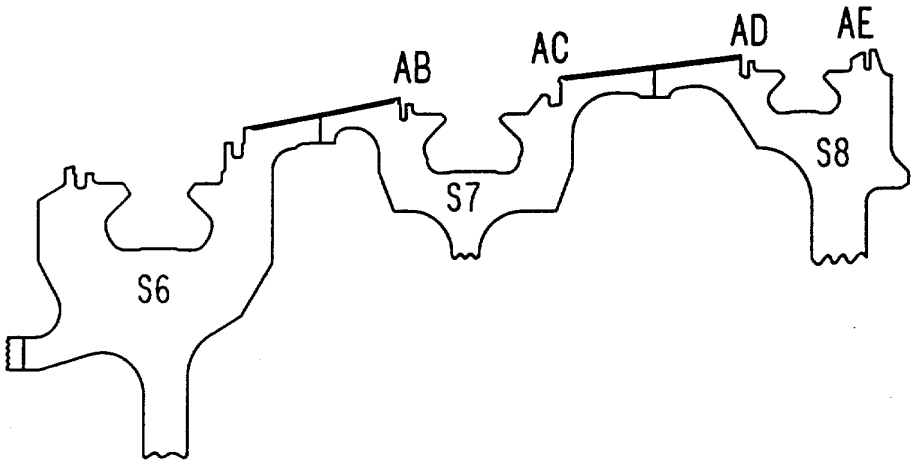
(a) After the blades have been installed in the slot, measure the gap between the ends of the wire.

(i) Make sure the dimension of the gap is not more than 0.236 in. (6,00mm).

(3) When blades are installed in the disc, the L shaped wires must be installed during all build procedures. (That is blade gapping, balancing, and rotor-tip grind). This is because the height of the wire retainer tip of the drum has been decreased so that the L shaped wire can be installed. If the wire is not installed, the amount of movement of the blades is increased.

E. Recording Instructions

A record of accomplishment is necessary.



PART SECTION THRU HPC
STAGE 3-8 DRUM

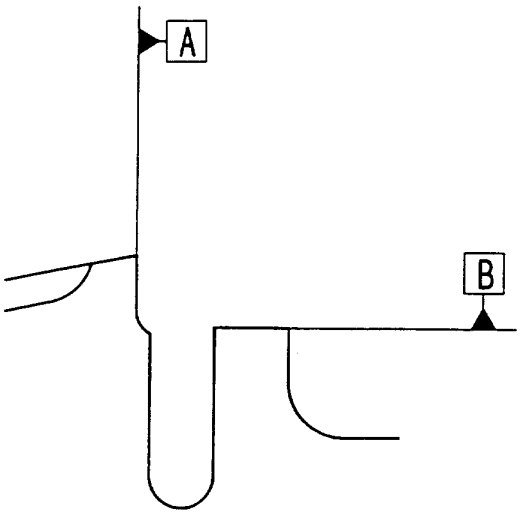
ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)

MACHINE SURFACE FINISH TO BE 125 MICROINCHES (3,2 MICROMETRES)

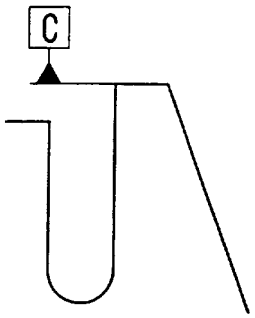
MACHINE WHERE MARKED ✓

ded0002389

Part section through the HP Compressor Stage-3 to 8 drum
Fig.1



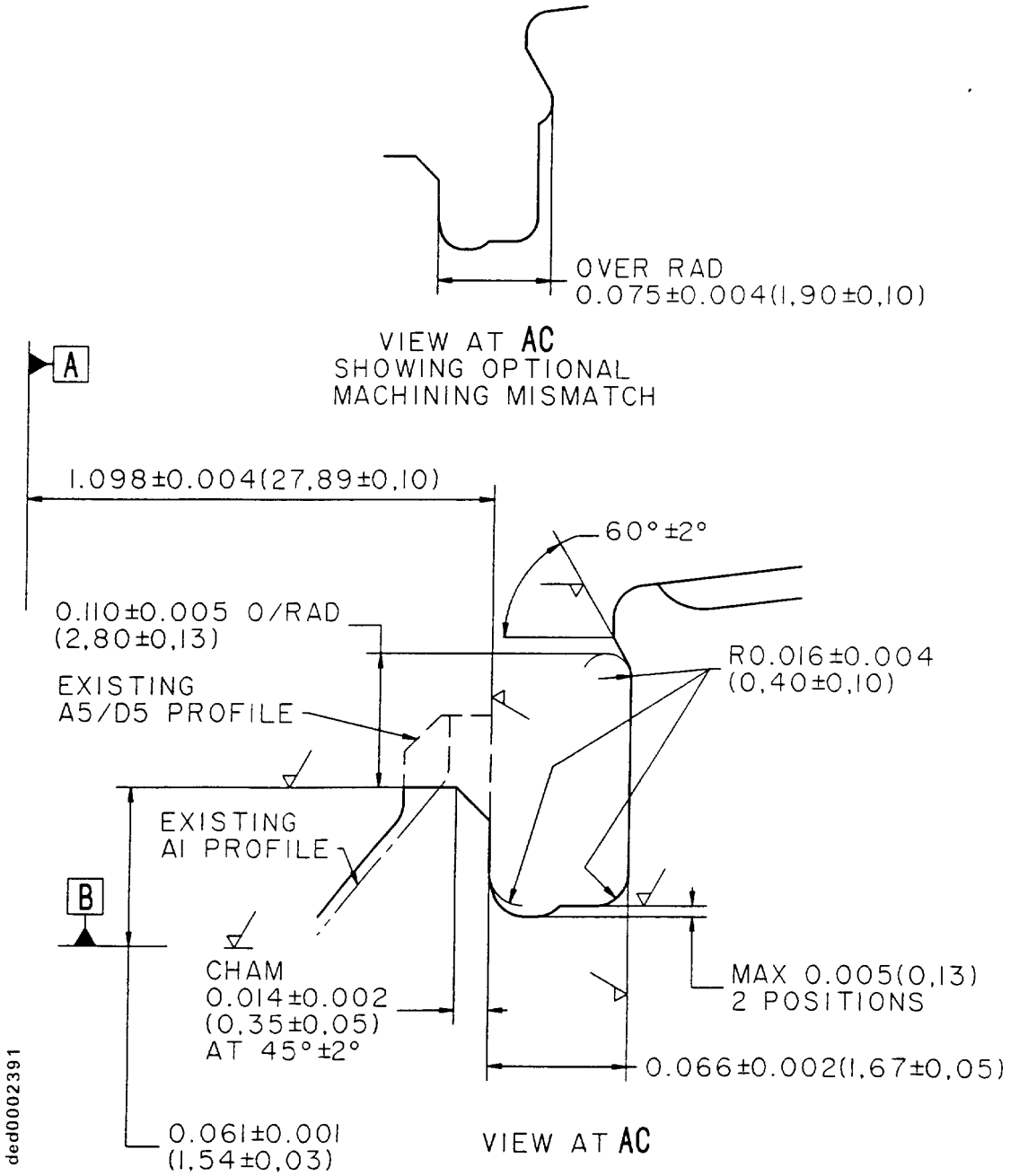
VIEW AT **AB**
(STAGE 7)



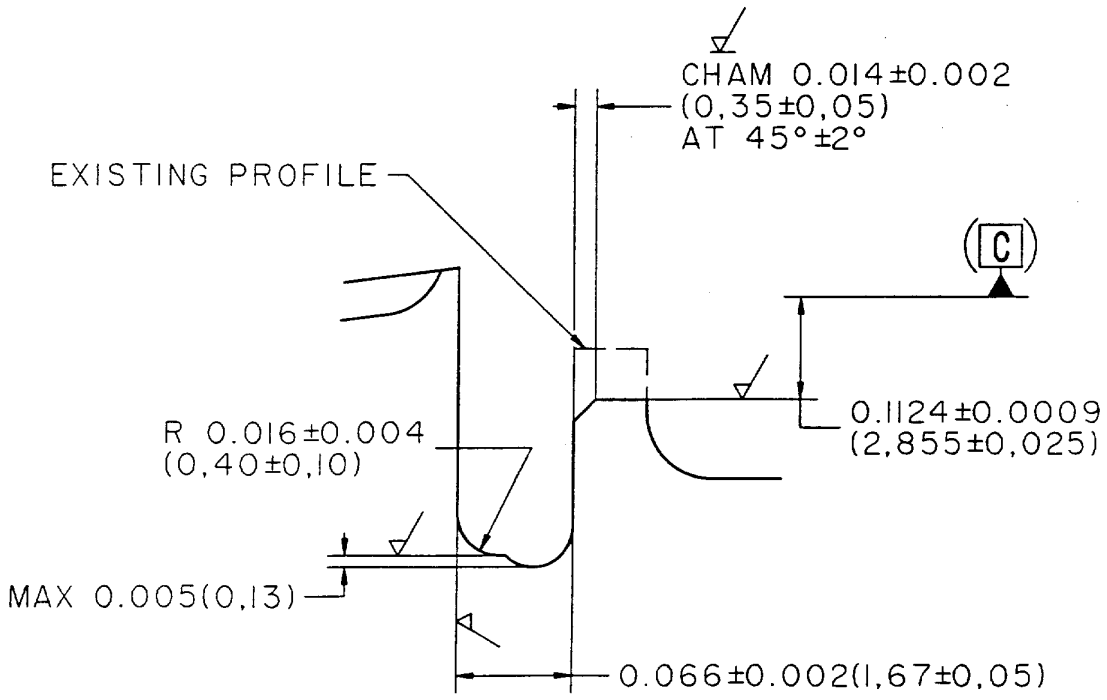
VIEW AT **AE**
(STAGE 8)

ded0002390

View at AB and AE
Fig.2



View at AC
Fig.3



VIEW AT **AD**

ded0002392

View at AD
Fig.4

3. Material Information

Applicability: For each V2500 engine to incorporate this Service Bulletin.

A. Kits necessary for this Service Bulletin:

None.

B. Parts affected by this Service Bulletin:

NEW PART NUMBER	QTY	EST'D UNIT PRICE ($)	PART TITLE	OLD PART No. (IPC No.)	INSTR DISP
All Models					
6A7381 (72-41-11)	1	797.00	Wire, seal - Stage 7 - rear	6A4916 (01-392)	(A)(S1)
6A7393 (72-41-11)	1	797.00	Wire, seal - Stage 8 - front	6A4917 (01-394)	(A)(S1)
For engines incorporating ENG-72-0254 (Excluding V2533-A5) and Baseline V2533-A5					
6A7385 (72-41-11)	1	NOTE	Disc assy of - Stage 3 to 8 - HP Compressor	6A6473 (01-200)	(S1)(1D)
A1 Models Only					
For engines incorporating ENG-72-0161, but not incorporating ENG-72-0178					
6A7379 (72-41-11)	1	NOTE	Disc assy of - Stage 3 to 8 - HP Compressor	6A5594 (01-200)	(B)(S1) (1D)
6A7380 (72-41-11)	Ref		Disc assy of - Stage 3 to 8 - HP Compressor	6A5592 (01-200)	(B)(S1) (1D)
6A7382 (72-41-11)	Ref		Disc assy of - Stage 3 to 8 - HP Compressor	6A5659 (01-200)	(B)(S1) (1D)
A5 Models (Excluding V2533-A5 Model) and D5 Models					
For engines pre-service bulletin ENG-72-0178:-					

6A7383 (72-41-11)	1	NOTE	Disc assy of - Stage 3 to 8 - HP Compressor	6A4900 (01-200)	(S1)(1D)

A1, A5 Models (Excluding V2533-A5 Model) and D5 Models

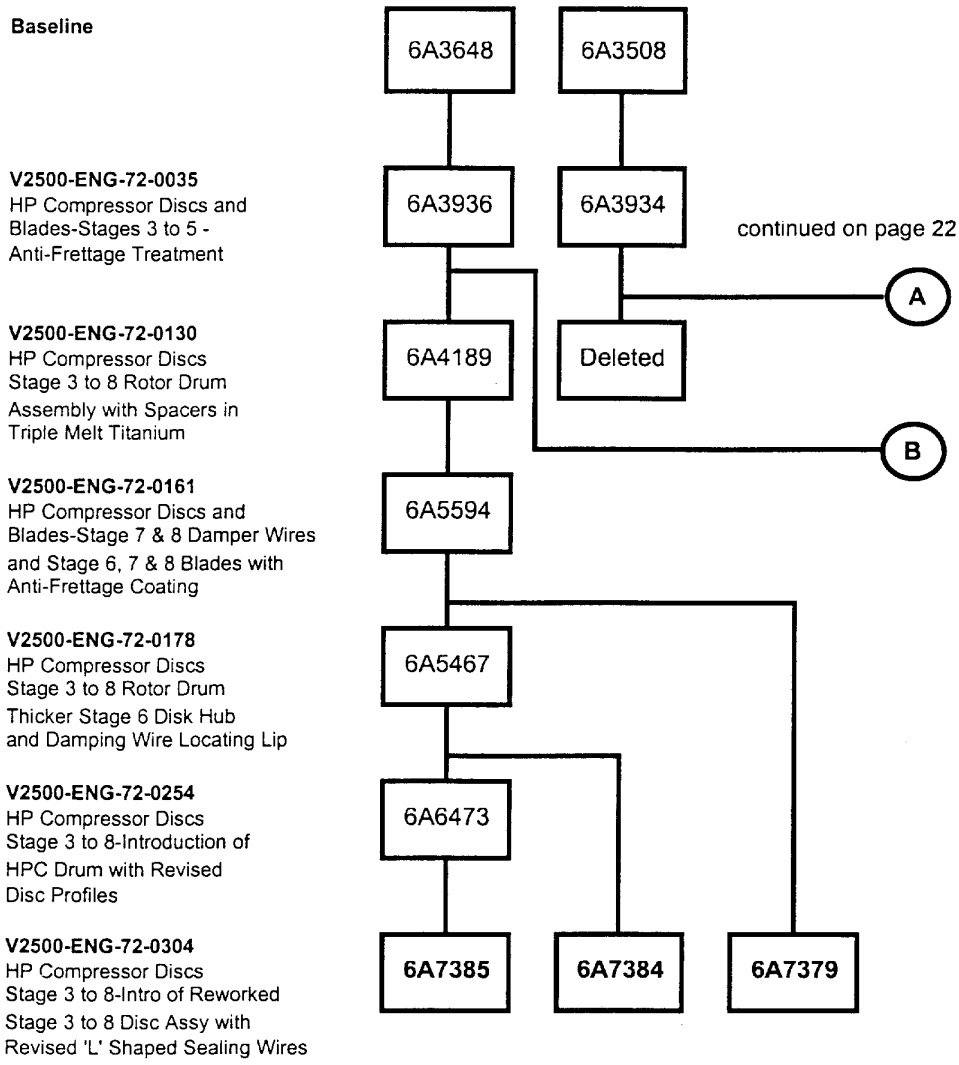
For engines incorporating ENG-72-0178, but not incorporating ENG-72-0254:-

6A7384 (72-41-11)	1	NOTE	Disc assy of - Stage 3 to 8 - HP Compressor	6A5467 (01-200)	(S1)(1D)

NOTE: The unit prices, if shown, are an estimate and they are given for the purpose of planning only. For information about actual prices, refer to the IAE Price Catalog or contact IAE's spare parts sales department.

C. Instruction Disposition Codes

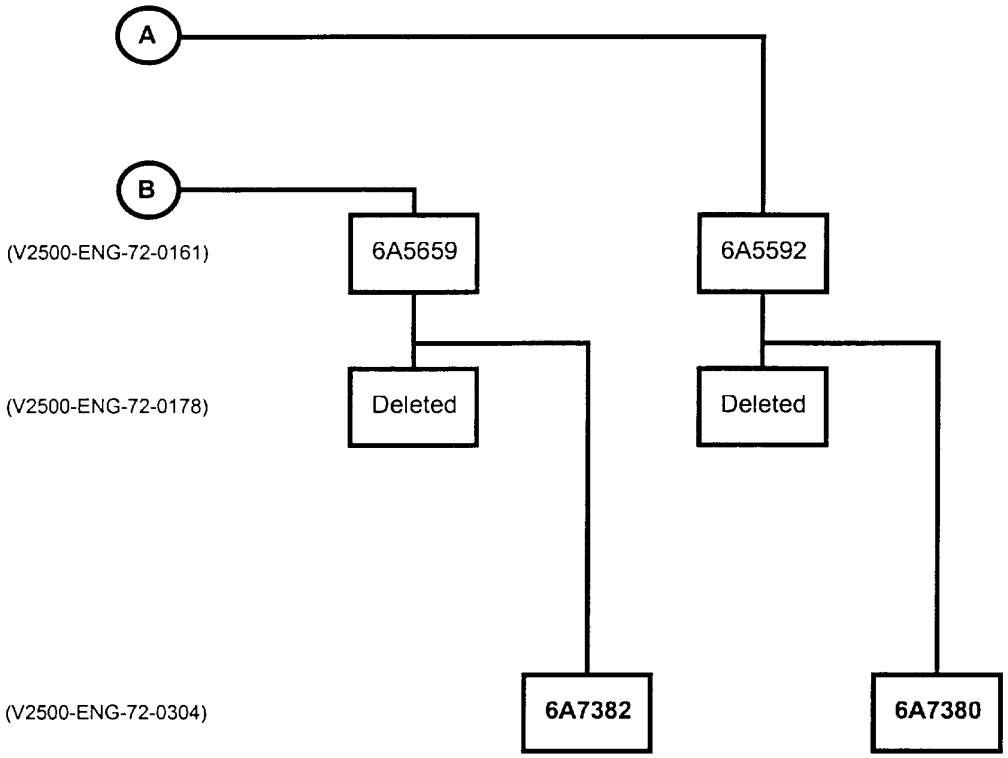
(A) New parts will be made available from February 1998.
(B) Alternatives.
(S1) New sealing wires and associated disc assembly standard, coded (S1) must replace
old sealing wires and associated disc assembly coded (S1) as a complete engine set.
(1D) Old parts may be reworked and re-identified to the new part number (Refer to Figures 1 through to 4).



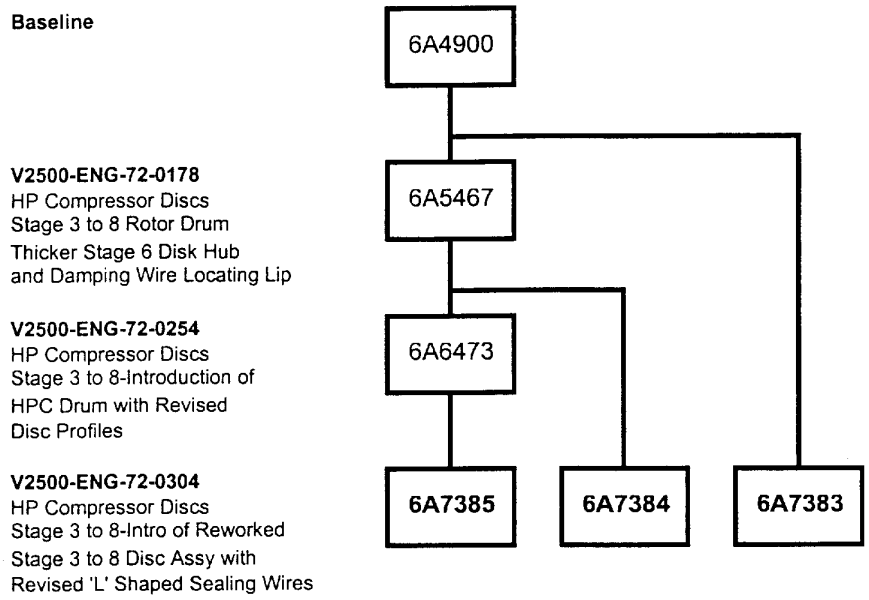
ded0002393

Family Tree 1- Stage-3 to 8 HP Compressor Disc Assembly A1 Engines
(Sheet 1)

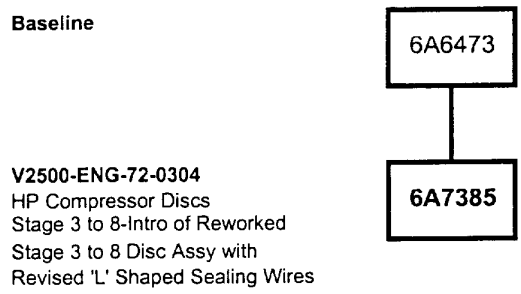
continued from
page 21



Family Tree 1- Stage-3 to 8 HP Compressor Disc Assembly A1 Engines
(Sheet 2)



Family Tree 2 - Stage-3 to 8 HP Compressor Disc Assembly
A5 and D5 Engines (Not Including A533)



ded0002403

Family Tree 2 - Stage-3 to 8 HP Compressor Disc Assembly A5 and D5 Engines (Not Including A533)/Family Tree 2A - Stage-3 to 8 HP Compressor Disc Assembly A533 Engine Only -