V2500 International Aero Engines
SERVICE BULLETIN

Nov.29/96

Subject: Transmittal of Revision 1 to Service Bulletin No. V2500-ENG-72-0235

Service Bulletin Revision History:

Event	Date
Basic Issue	July 12/96
Revision 1	Nov.29/96

Reason for Issuance of Revision:

To revise model effectivity

Effect on Past Compliance:

None

List of Effective Pages:

Bulletin Page No.	Rev. No.	Effective Date
1 to 5	1	Nov.29/96
6 to 44		July 12/96

V2500 International Aero Engines
SERVICE BULLETIN

ENGINE - HP COMPRESSOR - NEW STAGES 6, 7 AND 8 ROTOR PATH RINGS WITH IMPROVED ABRADABLE LININGS

MODEL APPLICATION

V2500-A1
R V2522-A5
R V2524-A5
V2527-A5
V2530-A5
V2525-D5
V2528-D5

BULLETIN INDEX LOCATOR

72-41-00

Compliance Category Code	Internal Reference No.
6	94VR033

ENGINE - HP COMPRESSOR - NEW STAGES 6, 7 AND 8 ROTOR PATH RINGS
WITH IMPROVED ABRADABLE LININGS

1. Planning Information

A. Effectivity

(1) Aircraft:

(a) Airbus A320

(b) Airbus A321

(c) McDonnell Douglas MD90

(2) Engines:

(a) V2500-A1 Engines prior to Serial No.V0362

R (b) V2522-A5 Engines prior to Serial No.V10197

R (c) V2524-A5 Engines prior to Serial No.V10197

R (d) V2527-A5 Engines prior to Serial No.V10197

R (e) V2530-A5 Engines prior to Serial No.V10197

R (f) V2525-D5 Engines prior to Serial No.V20089

R (g) V2528-D5 Engines prior to Serial No.V20089

B. Concurrent Requirements

None

C. Reason

(1) Condition

R The HP compressor rotor path stages 6, 7 and 8 abradable linings can
R become detached during service operation, the debris from which can
R block the turbine Nozzle Guide Vane (NGV) cooling holes and in extreme
R circumstances result in a decrease in engine performance.

(2) Background

Several instances of stage 6, 7 and 8 rotor path ring abradable lining
R becoming detached have been reported on in-service engines.

R (3) Objective

R Incorporation of this Service Bulletin is designed to maintain
R reliability.

(4) Substantiation

R The changes introduced by this Service Bulletin have been the subject of
R extensive in service experience on other Rolls-Royce engine projects.

(5) Effect of Bulletin on Workshop Procedures:

Removal/Installation	Not Affected
Disassembly/Assembly	Not Affected
Cleaning	Not Affected
Inspection/Check	Not Affected
Repair	Affected (see Supplemental Information)
Testing	Not Affected

(6) Supplemental Information

R The parts introduced by this Service Bulletin must be fitted as a complete engine set.

D. Description

R The changes introduced by this Service Bulletin are as follows:

R (1) Revised stage 6, 7 and 8 HP compressor rotor paths are introduced
R similar to the existing items except for an improved abradable lining
R material.

R (2) Existing stage 6, 7 and 8 rotor path linings may be reworked.

E. Approval

The part number changes and/or part modification described in Section 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and FAA-APPROVED for the Engine Modules listed.

F. Compliance

Category Code 6

Accomplish when the sub-assembly (ie modules, accessories, components, build groups) is disassembled sufficiently to afford access to the affected parts and to all affected spare parts.

G. Manpower

Estimated manhours to incorporate the full intent of this Bulletin:

	Venue	Estimated Manhours
(1)	In Service	Not Applicable
(2)	At Overhaul	

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

(a)	To rework rotor path linings. Stages 7 and 8 (A1 Engines)	7 hours
(b)	To rework rotor path linings. Stages 6, 7 and 8 (A5/D5 Engines)	10 hours
	TOTAL	17 hours

H. Material - Price and availability

(1) Modification kit not required.

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

I. Tooling - Prices and availability

Special tools are not required.

J. Weight and Balance

(1)	Weight change	None
(2)	Moment arm	No effect
(3)	Datum	Engine front mount centreline (Power Plant Station (P.P.S.) 100)

K. Electrical Load Data

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

L. References

(1) V2500 Engine Manual (E-V2500-1IA)

(2) V2500 Engine Manual (E-V2500-3IA)

(3) Standard Practices/Processes Manual (SPP-V2500-1IA)

M. Other Publications Affected

V2500 Illustrated Parts Catalog (S-V2500-1IA) Chapter/Section 72-41-21, 72-41-31.
V2500 Illustrated Parts Catalog (S-V2500-2IA) Chapter/Section 72-41-21, 72-41-31.
V2500 Illustrated Parts Catalog (S-V2500-3IA) Chapter/Section 72-41-21, 72-41-31.
V2500 Engine Manual (E-V2500-1IA) Chapter/Section 72-41-21, Cleaning Inspection and Repair.
V2500 Engine Manual (E-V2500-1IA) Chapter/Section 72-41-31, Cleaning Inspection and Repair.
V2500 Engine Manual (E-V2500-3IA) Chapter/Section 72-41-21, Cleaning Inspection and Repair.
V2500 Engine Manual (E-V2500-3IA) Chapter/Section 72-41-31, Cleaning Inspection and Repair.

2. Accomplishment Instructions

A. Rework Instructions (for A1 Engine Marks)

(1) Rework the following parts:

6A4101 HP. Compressor Rotor Path Ring, Stage 7
(Refer to 72-41-21, Fig/Item 03-450).

Consumable Materials

CoMat 01-025 Nitric acid HNO3
CoMat 01-041 Alkaline rust remover
CoMat 02-019 Heat resistant paper masking tape
CoMat 03-036 Metal spray wire
CoMat 03-038 Metal spraying powder
CoMat 03-273 Aluminium graphite composite powder
CoMat 05-001 Abrasive medium
CoMat 06-022 Fluorescent penetrant

Standard Equipment

Chemical cleaning equipment
Penetrant crack test equipment
Lathe
Dial test indicator
Air operated grinder
Rotary burr
Abrasive blast equipment
Polythene bottle
Workshop inspection equipment
Metal spray equipment
Hardness testing equipment
Standard workshop equipment
Vibro-engraving equipment

PROCEDURE	SUPPLEMENTARY INFORMATION
(a) Chemically clean	Refer to SPM TASK 70-11-03-300-503. Use chemical cleaning equipment
(b) Do a crack test	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted

(c) Remove the Abradable Lining from the H.P. Compressor Rotor Path Ring, Stage 7

(i)	Assemble the fixture on the machine	Refer to Figs.2, 3 and 4. Use IAE3R18232 lifting tool, 1 off and IAE3R18570 turning fixture, 1 off with a lathe. Set to turn correctly. Use a dial test indicator
(ii)	Assemble the rotor path ring onto the turning fixture and machine to remove the abradable lining	Refer to Figs.2, 3 and 4. Turn to remove the abradable lining. You must not remove material from the ring
(d)	Remove the remaining lining material	Refer to Figs.2, 3 and 4. Use an air operated grinder with a rotary burr or applicable alternatives. You must not remove material from the ring

NOTE: This operation is an alternative to operation (e).

(e)	Chemically remove the bond coat from the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.2, 3 and 4. Refer to SPM TASK 70-33-59-300-503, SUBTASK 70-33-59-300-002. Use CoMat 01-025 Nitric Acid HNO3 with chemical cleaning equipment. Put the assembly into the nitric acid and keep below the surface until the bubbles stop

NOTE: This operation is an alternative to operation (d).

(f)	Abrasive blast to remove the bond coat that remains	Refer to Figs.2, 3 and 4. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment.
(g)	Cold ferric chloride etch the repaired area	Refer to SPM TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001. Use a polythene bottle
(h)	Visually examine and measure the dimensions of the repaired area	Refer to Figs.2, 3 and 4. Use Workshop inspection equipment

(i)	Do a local penetrant crack test of the repaired area	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted
(j)	Chemically clean the HP Compressor Rotor Path Ring, Stage 7	Refer to SPM TASK 70-11-01-300-503. Use chemical cleaning equipment
(k)	Apply the surface protection as necessary	Refer to VRS6161, TASK 72-41-21-300-004.
(l)	Seal the areas not to be sprayed	Refer to Figs.2, 3 and 5. Use CoMat 02-019 heat resistant paper masking tape or locally made fixture

NOTE: The heat resistant paper masking tape permits the blasting and the sprayed coating to be done in the one operation.

CAUTION: 1. TO PREVENT CONTAMINATION, DO NOT TOUCH THE SURFACE WHICH IS CLEANED FOR REPAIR.

2. TOO MUCH ABRASIVE BLAST CAN CAUSE DETERIORATION OF THE PREPARED SURFACE CONDITION AND MUST BE PREVENTED.

(m)	Abrasive blast the areas to be sprayed	Refer to Figs.2, 3 and 5. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(n)	Apply the bond coat to the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.2, 3 and 5. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-025 or SUBTASK 70-34-01-340-010. For powder feed plasma spray gun, use CoMat 03-038 metal spraying powder. Alternatively for wire feed combustion spraying, use CoMat 03-036 metal spraying wire. Pre-heat the seal ring to 221 deg.F to 257 deg.F (105 deg.C to 125 deg.C). Use metal spray equipment

(o)	Apply the abradable lining to the HP. Compressor Rotor Path Ring, Stage 7	Refer to Figs.2, 3 and 5. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-023. Use CoMat 03-273 aluminium graphite composite powder, with metal spray equipment. Spray a sufficient thickness to allow for machining. Also spray a test piece to check the spray hardness
(p)	Remove the masking tape	
(q)	Examine the HP Compressor Rotor Path Ring, Stage 7	
(i)	Visually examine the sprayed coating on the ring	Refer to SPM TASK 70-34-01-340-501.
(ii)	Measure the dimensions of the required area	Refer to Figs.2, 3 and 5. Use workshop inspection equipment
(iii)	Hardness test the sprayed coating on the test piece	Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-004. Use hardness testing equipment. Average hardness must be 55 to 80 R15Y, outer limits 45 min, 90 max
(r)	Remove the overspray	Refer to Figs.2, 3 and 5. Use standard workshop equipment
(s)	Remove sharp edges	Refer to Figs.2, 3 and 5. Use standard workshop equipment
(t)	Visually examine and measure the dimensions of the repaired area, on the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.2, 3 and 5. Use workshop inspection equipment

(u)	Cancel the old part number and identify with the new part number	Refer to SPM TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001 EXISTING: 6A4101 — RENUMBER: 6A5992 Use vibro-engraving equipment

(2) Rework the following parts:

6A4102 HP Compressor Rotor Path Ring, Stage 8 (refer to 72-41-21, Fig/Item 03-600).

Consumable Materials

CoMat 01-025 Nitric acid HNO3
CoMat 01-041 Alkaline rust remover
CoMat 02-019 Heat resistant paper masking tape
CoMat 03-036 Metal spray wire
CoMat 03-038 Metal spraying powder
CoMat 03-273 Aluminium graphite composite powder
CoMat 05-001 Abrasive medium
CoMat 06-022 Fluorescent penetrant

Standard Equipment

Chemical cleaning equipment
Penetrant crack test equipment
Lathe
Dial test indicator
Air operated grinder
Rotary burr
Abrasive blast equipment
Polythene bottle
Workshop inspection equipment
Metal spray equipment
Hardness testing equipment
Standard workshop equipment
Vibro-engraving equipment

PROCEDURE	SUPPLEMENTARY INFORMATION
(a) Chemically clean	Refer to SPM TASK 70-11-03-300-503. Use chemical cleaning equipment

(b)	Do a crack test	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted

(c) Remove the Abradable Lining from the H.P. Compressor Rotor Path Ring, Stage 8

(i)	Assemble the fixture on the machine	Refer to Figs.2, 3 and 6. Use IAE3R18232 lifting tool, 1 off and IAE3R18570 turning fixture, 1 off, with a lathe set to turn correctly. Use a dial test indicator
(ii)	Assemble the rotor path ring onto the turning fixture and machine to remove the abradable lining	Refer to Figs.2, 3 and 6. Turn to remove the abradable lining. You must not remove material from the ring
(d)	Remove the remaining lining material	Refer to Figs.2, 3 and 6. Use an air operated grinder with a rotary burr or applicable alternatives. You must not remove material from the ring

NOTE: This operation is an alternative to operation (e).

(e)	Chemically remove the bond coat from the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.2, 3 and 6. Refer to SPM TASK 70-33-59-300-503, SUBTASK 70-33-59-300-002. Use CoMat 01-025 Nitric Acid HN03 with chemical cleaning equipment. Put the assembly into the nitric acid and keep below the surface until the bubbles stop

NOTE: This operation is an alternative to operation (d).

(f)	Abrasive blast to remove the bond coat that remains	Refer to Figs.2, 3 and 6. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(g)	Cold ferric chloride etch the repaired area	Refer to SPM TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001. Use a polythene bottle
(h)	Visually examine and measure the dimensions of the repaired area	Refer to Figs.2, 3 and 6. Use Workshop inspection equipment
(i)	Do a local penetrant crack test of the repaired area	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted
(j)	Chemically clean the HP Compressor Rotor Path Ring, Stage 8	Refer to SPM TASK 70-11-01-300-503. Use chemical cleaning equipment
(k)	Apply the surface protection as necessary	Refer to VRS6146, TASK 72-41-21-300-059
(l)	Seal the areas not to be sprayed	Refer to Figs.2, 3 and 7. Use CoMat 02-019 heat resistant paper masking tape or locally made fixture

NOTE: The heat resistant paper masking tape permits the blasting and the sprayed coating to be done in the one operation.

CAUTION: 1. TO PREVENT CONTAMINATION, DO NOT TOUCH THE SURFACE WHICH IS CLEANED FOR REPAIR.

2. TOO MUCH ABRASIVE BLAST CAN CAUSE DETERIORATION OF THE PREPARED SURFACE CONDITION AND MUST BE PREVENTED.

(m) Abrasive blast the areas to be sprayed	Refer to Figs.2, 3 and 7. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(n) Apply the bond coat to the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.2, 3 and 7. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-025 or SUBTASK 70-34-01-340-010. For powder feed plasma spray gun, use CoMat 03-038 metal spraying powder. Alternatively for wire feed combustion spraying, use CoMat 03-036 metal spraying wire. Pre-heat the seal ring to 221 deg.F to 257 deg.F (105 deg.C to 125 deg.C). Use metal spray equipment
(o) Apply the abradable lining to the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.2, 3 and 7. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-020. Use CoMat 03-273 aluminium graphite composite powder, with metal spray equipment. Spray a sufficient thickness to allow for machining. Also spray a test piece to check the spray hardness
(p) Remove the masking tape	

(q) Examine the HP Compressor Rotor Path Ring, Stage 8

(i)	Visually examine the sprayed coating on the ring	Refer to SPM TASK 70-34-01-340-501
(ii)	Measure the dimensions of the required area	Refer to Figs.2, 3 and 7. Use workshop inspection equipment
(iii)	Hardness test the sprayed coating on the test piece	Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-004. Use hardness testing equipment. Average hardness must be 55 to 80 R15Y, outer limits 45 min, 90 max
(r)	Remove the overspray	Refer to Figs.2, 3 and 7. Use standard workshop equipment
(s)	Remove sharp edges	Refer to Figs.2, 3 and 7. Use standard workshop equipment
(t)	Visually examine and measure the dimensions of the repaired area, on the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.2, 3 and 7. Use workshop inspection equipment
(u)	Cancel the old part number and identify with the new part number	Refer to SPM TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001 EXISTING 6A4102 RENUMBER 6A5993 Use vibro-engraving equipment

B. Rework Instructions (for A5/D5 Engine Marks)

(1) Rework the following parts:

6A4723 HP Compressor Rotor Path Ring, Stage 6 (refer to 72-41-31, Fig/Item 01-705).

Consumable Materials

CoMat 01-025 Nitric acid HNO3
CoMat 01-041 Alkaline rust remover
CoMat 02-019 Heat resistant paper masking tape
CoMat 03-036 Metal spray wire
CoMat 03-038 Metal spraying powder
CoMat 03-273 Aluminium graphite composite powder
CoMat 05-001 Abrasive medium
CoMat 06-022 Fluorescent penetrant

Standard Equipment

Chemical cleaning equipment
Penetrant crack test equipment
Abrasive blast equipment
Polythene bottle
Workshop inspection equipment
Metal spray equipment
Hardness testing equipment
Standard workshop equipment
Vibro-engraving equipment

PROCEDURE	SUPPLEMENTARY INFORMATION
(a) Chemically clean	Refer to SPM TASK 70-11-03-300-503. Use chemical cleaning equipment
(b) Do a crack test	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted
(c) Chemically remove the abradable lining from the HP Compressor Rotor Path Ring, Stage 6	Refer to Figs.8, 9 and 10. Refer to SPM TASK 70-33-59-300-503, SUBTASK 70-33-59-300-003. Use CoMat 01-041 alkaline rust remover with chemical cleaning equipment

(d)	Chemically remove the bond coat from the HP Compressor Rotor Path Ring, Stage 6	Refer to Figs.8, 9 and 10. Refer to SPM TASK 70-33-59-300-503, SUBTASK 70-33-59-300-002. Use CoMat 01-025 Nitric Acid HNO3 with chemical cleaning equipment. Put the assembly into the nitric acid and keep below the surface until the bubbles stop
(e)	Abrasive blast to remove the bond coat that remains	Refer to Figs.8, 9 and 10. Refer to SPM TASK 70-12-02-120-501 Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(f)	Cold ferric chloride etch the repaired area	Refer to SPM TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001. Use a polythene bottle
(g)	Visually examine and measure the dimensions of the repaired area	Refer to Figs.8, 9 and 10. Use Workshop inspection equipment

(h)	Do a local penetrant crack test of the repaired area	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted
(i)	Chemically clean the HP Compressor Rotor Path Ring, Stage 6	Refer to SPM TASK 70-11-01-300-503. Use chemical cleaning equipment
(j)	Seal the areas not to be sprayed	Refer to Figs.2, 3 and 7. Use CoMat 02-019 heat resistant paper masking tape or locally made fixture

NOTE: The heat resistant paper masking tape permits the blasting and the sprayed coating to be done in the one operation.

CAUTION: 1. TO PREVENT CONTAMINATION, DO NOT TOUCH THE SURFACE WHICH IS CLEANED FOR REPAIR.

2. TOO MUCH ABRASIVE BLAST CAN CAUSE DETERIORATION OF THE PREPARED SURFACE CONDITION AND MUST BE PREVENTED.

(k)	Abrasive blast the areas to be sprayed	Refer to Figs.8, 9 and 11. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(l)	Apply the bond coat to the HP Compressor Rotor Path Ring, Stage 6	Refer to Figs.8, 9 and 11. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-025 or SUBTASK 70-34-01-340-010. For powder feed plasma spray gun, use CoMat 03-038 metal spraying powder. Alternatively for wire feed combustion spraying, use CoMat 03-036 metal spraying wire. Pre-heat the seal ring to 221 deg.F to 257 deg.F (105 deg.C to 125 deg.C). Use metal spray equipment

(m)	Apply the abradable lining to the HP Compressor Rotor Path Ring, Stage 6	Refer to Figs.8, 9 and 11. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-020. Use CoMat 03-273 aluminium graphite composite powder, with metal spray equipment. Spray a sufficient thickness to allow for machining. Also spray a test piece to check the spray hardness
(n)	Remove the masking tape	
(o)	Examine the HP Compressor Rotor Path Ring, Stage 6	
(i)	Visually examine the sprayed coating on the ring	Refer to SPM TASK 70-34-01-340-501.
(ii)	Measure the dimensions of the required area	Refer to Figs.8, 9 and 11. Use workshop inspection equipment
(iii)	Hardness test the sprayed coating on the test piece	Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-004. Use hardness testing equipment. Average hardness must be 55 to 80 R15Y, outer limits 45 min, 90 max
(p)	Remove the overspray	Refer to Figs.8, 9 and 11. Use standard workshop equipment.
(q)	Remove sharp edges	Refer to Figs.8, 9 and 11. Use standard workshop equipment

(r)	Visually examine and measure the dimensions of the repaired area, on the HP Compressor Rotor Path Ring, Stage 6	Refer to Figs.8, 9 and 11. Use workshop inspection equipment
(s)	Cancel the old part number and identify with the new part number	Refer to SPM TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001 EXISTING 6A4723 RENUMBER 6A5994 Use vibro-engraving equipment

(2) Rework the following parts:

6A4161 HP Compressor Rotor Path Ring, Stage 7 (refer to 72-41-21, Fig/Item 03-450).

Consumable Materials

CoMat 01-025 Nitric acid HNO3
CoMat 01-041 Alkaline rust remover
CoMat 02-019 Heat resistant paper masking tape
CoMat 03-036 Metal spray wire
CoMat 03-038 Metal spraying powder
CoMat 03-273 Aluminium graphite composite powder
CoMat 05-001 Abrasive medium
CoMat 06-022 Fluorescent penetrant

Standard Equipment

Chemical cleaning equipment
Penetrant crack test equipment
Lathe
Dial test indicator
Air operated grinder
Rotary burr
Abrasive blast equipment
Polythene bottle
Workshop inspection equipment
Metal spray equipment
Hardness testing equipment
Standard workshop equipment
Vibro-engraving equipment

PROCEDURE	SUPPLEMENTARY INFORMATION
(a) Chemically clean	Refer to SPM TASK 70-11-03-300-503. Use chemical cleaning equipment
(b) Do a crack test	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted
(c) Remove the Abradable Lining from the HP Compressor Rotor Path Ring, Stage 7.	
(i) Assemble the fixture on the machine	Refer to Figs.8, 9 and 12. Use IAE3R18232 lifting tool, 1 off and IAE3R19081 turning fixture, 1 off, with a lathe set to turn correctly. Use a dial test indicator
(ii) Assemble the rotor path ring onto the turning fixture and machine to remove the abradable lining	Refer to Figs.8, 9 and 12. Turn to remove the abradable lining. You must not remove material from the ring
(d) Remove the remaining lining material	Refer to Figs.8, 9 and 12. Use an air operated grinder with a rotary burr or applicable alternatives. You must not remove material from the ring
NOTE: This operation is an alternative to operation (e).	
(e) Chemically remove the bond coat from the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.8, 9 and 12. Refer to SPM TASK 70-33-59-300-503, SUBTASK 70-33-59-300-002. Use CoMat 01-025 Nitric Acid HNO3 with chemical cleaning equipment Put the assembly into the nitric acid and keep below the surface until the bubbles stop
NOTE: This operation is an alternative to operation (d).	

(f)	Abrasive blast to remove the bond coat that remains	Refer to Figs.8, 9 and 12. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(g)	Cold ferric chloride etch the repaired area	Refer to SPM TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001. Use a polythene bottle
(h)	Visually examine and measure the dimensions of the repaired area	Refer to Figs.8, 9 and 12. Use workshop inspection equipment
(i)	Do a local penetrant crack test of the repaired area	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted
(j)	Chemically clean the HP Compressor Rotor Path Ring, Stage 7	Refer to SPM TASK 70-11-01-300-503. Use chemical cleaning equipment
(k)	Apply the surface protection as necessary	Refer to VRS6141, TASK 72-41-21-300-004
(l)	Seal the areas not to be sprayed	Refer to Figs.8, 9 and 13. Use CoMat 02-019 heat resistant paper masking tape or locally made fixture

NOTE: The heat resistant paper masking tape permits the blasting and the sprayed coating to be done in the one operation.

CAUTION: 1. TO PREVENT CONTAMINATION, DO NOT TOUCH THE SURFACE WHICH IS CLEANED FOR REPAIR.

2. TOO MUCH ABRASIVE BLAST CAN CAUSE DETERIORATION OF THE PREPARED SURFACE CONDITION AND MUST BE PREVENTED.

(m)	Abrasive blast the areas to be sprayed	Refer to Figs.8, 9 and 13. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(n)	Apply the bond coat to the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.8, 9 and 13. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-025 or SUBTASK 70-34-01-340-010. For powder feed plasma spray gun, use CoMat 03-038 metal spraying powder. Alternatively for wire feed combustion spraying, use CoMat 03-036 metal spraying wire. Pre-heat the seal ring to 221 deg.F to 257 deg.F (105 deg.C to 125 deg.C). Use metal spray equipment
(o)	Apply the abradable lining to the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.8, 9 and 13. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-020. Use CoMat 03-273 aluminium graphite composite powder, with metal spray equipment. Spray a sufficient thickness to allow for machining. Also spray a test piece to check the spray hardness

(p) Remove the masking tape

(q) Examine the HP Compressor Rotor Path Ring, Stage 7

(i)	Visually examine the sprayed coating on the ring	Refer to SPM TASK 70-34-01-340-501
(ii)	Measure the dimensions of the required area	Refer to Figs.8, 9 and 13. Use workshop inspection equipment
(iii)	Hardness test the sprayed coating on the test piece	Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-004. Use hardness testing equipment. Average hardness must be 55 to 80 R15Y, outer limits 45 min, 90 max
(r)	Remove the overspray	Refer to Figs.8, 9 and 13. Use standard workshop equipment
(s)	Remove sharp edges	Refer to Figs.8, 9 and 13. Use standard workshop equipment
(t)	Visually examine and measure the dimensions of the repaired area, on the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.8, 9 and 13. Use workshop inspection equipment
(u)	Cancel the old part number and identify with the new part number	Refer to SPM TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001 EXISTING 6A4161 — RENUMBER 6A5995 Use vibro-engraving equipment

(3) Rework the following parts:

6A4162 HP Compressor Rotor Path Ring, Stage 7 (refer to 72-41-21, Fig/Item 03-600).

Consumable Materials

CoMat 01-025 Nitric acid HNO3
CoMat 01-041 Alkaline rust remover
CoMat 02-019 Heat resistant paper masking tape
CoMat 03-036 Metal spray wire
CoMat 03-038 Metal spraying powder
CoMat 03-273 Aluminium graphite composite powder
CoMat 05-001 Abrasive medium
CoMat 06-022 Fluorescent penetrant

Standard Equipment

Chemical cleaning equipment
Penetrant crack test equipment
Lathe
Dial test indicator
Air operated grinder
Rotary burr
Abrasive blast equipment
Polythene bottle
Workshop inspection equipment
Metal spray equipment
Hardness testing equipment
Standard workshop equipment
Vibro-engraving equipment

PROCEDURE	SUPPLEMENTARY INFORMATION
(a) Chemically clean	Refer to SPM TASK 70-11-03-300-503. Use chemical cleaning equipment
(b) Do a crack test	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted

(c) Remove the Abradable Lining from the HP Compressor Rotor Path Ring, Stage 8

(i) Assemble the fixture on the machine	Refer to Figs.8, 9 and 14. Use IAE3R18232 lifting tool, 1 off and IAE3R19081 turning fixture, 1 off, with a lathe set to turn correctly. Use a dial test indicator

(ii)	Assemble the rotor path ring onto the turning fixture and machine to remove the abradable lining	Refer to Figs.8, 9 and 14. Turn to remove the abradable lining. You must not remove material from the ring
(d)	Remove the remaining lining material	Refer to Figs.8, 9 and 14. Use an air operated grinder with a rotary burr or applicable alternatives. You must not remove material from the ring

NOTE: This operation is an alternative to operation (e).

(e)	Chemically remove the bond coat from the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.8, 9 and 14. Refer to SPM TASK 70-33-59-300-503, SUBTASK 70-33-59-300-002. Use CoMat 01-025 Nitric Acid HNO3 with chemical cleaning equipment. Put the assembly into the nitric acid and keep below the surface until the bubbles stop

NOTE: This operation is an alternative to operation (d).

(f)	Abrasive blast to remove the bond coat that remains	Refer to Figs.8, 9 and 14. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(g)	Cold ferric chloride etch the repaired area	Refer to SPM TASK 70-11-39-300-503, SUBTASK 70-11-39-300-001. Use a polythene bottle
(h)	Visually examine and measure the dimensions of the repaired area	Refer to Figs.8, 9 and 14. Use Workshop inspection equipment
(i)	Do a local penetrant crack test of the repaired area	Refer to SPM TASK 70-23-05-230-501. Use CoMat 06-022 fluorescent penetrant, with penetrant crack test equipment. Cracks are not permitted

(j)	Chemically clean the HP Compressor Rotor Path Ring, Stage 8	Refer to SPM TASK 70-11-01-300-503. Use chemical cleaning equipment
(k)	Apply the surface protection as necessary	Refer to VRS6141, TASK 72-41-21-300-059
(l)	Seal the areas not to be sprayed	Refer to Figs.8, 9 and 15. Use CoMat 02-019 heat resistant paper masking tape or locally made fixture

NOTE: The heat resistant paper masking tape permits the blasting and the sprayed coating to be done in the one operation.

CAUTION: 1. TO PREVENT CONTAMINATION, DO NOT TOUCH THE SURFACE WHICH IS CLEANED FOR REPAIR.

2. TOO MUCH ABRASIVE BLAST CAN CAUSE DETERIORATION OF THE PREPARED SURFACE CONDITION AND MUST BE PREVENTED.

(m)	Abrasive blast the areas to be sprayed	Refer to Figs.8, 9 and 15. Refer to SPM TASK 70-12-02-120-501. Use CoMat 05-001 abrasive medium, with abrasive blast equipment
(n)	Apply the bond coat to the HP Compressor Rotor Path Ring, Stage 7	Refer to Figs.8, 9 and 15. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-025 or SUBTASK 70-34-01-340-010. For powder feed plasma spray gun, use CoMat 03-038 metal spraying powder. Alternatively for wire feed combustion spraying, use CoMat 03-036 metal spraying wire. Pre-heat the seal ring to 221 deg.F to 257 deg.F (105 deg.C to 125 deg.C). Use metal spray equipment

(o)	Apply the abradable lining to the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.8, 9 and 15. Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-020. Use CoMat 03-273 aluminium graphite composite powder, with metal spray equipment. Spray a sufficient thickness to allow for machining. Also spray a test piece to check the spray hardness
(p)	Remove the masking tape	
(q)	Examine the HP Compressor Rotor Path Ring, Stage 8	
(i)	Visually examine the sprayed coating on the ring	Refer to SPM TASK 70-34-01-340-501
(ii)	Measure the dimensions of the required area	Refer to Figs.8, 9 and 15. Use workshop inspection equipment
(iii)	Hardness test the sprayed coating on the test piece	Refer to SPM TASK 70-34-01-340-501, SUBTASK 70-34-01-340-004. Use hardness testing equipment. Average hardness must be 55 to 80 R15Y, outer limits 45 min, 90 max
(r)	Remove the overspray	Refer to Figs.8, 9 and 15. Use standard workshop equipment.
(s)	Remove sharp edges	Refer to Figs.8, 9 and 15. Use standard workshop equipment.
(t)	Visually examine and measure the dimensions of the repaired area, on the HP Compressor Rotor Path Ring, Stage 8	Refer to Figs.8, 9 and 15. Use workshop inspection equipment

(u)	Cancel the old part number and identify with the new part number	Refer to SPM TASK 70-09-00-400-501, SUBTASK 70-09-00-400-001 EXISTING 6A4162 RENUMBER 6A5996 Use vibro-engraving equipment.

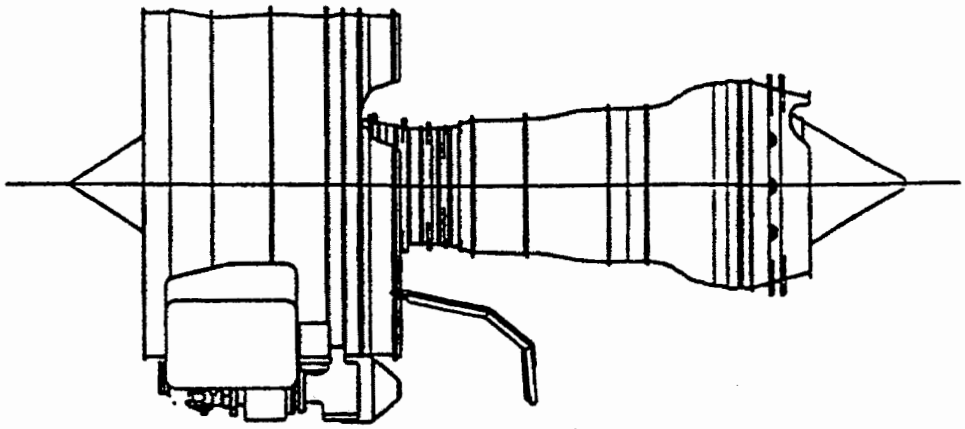
C. Assembly Instructions

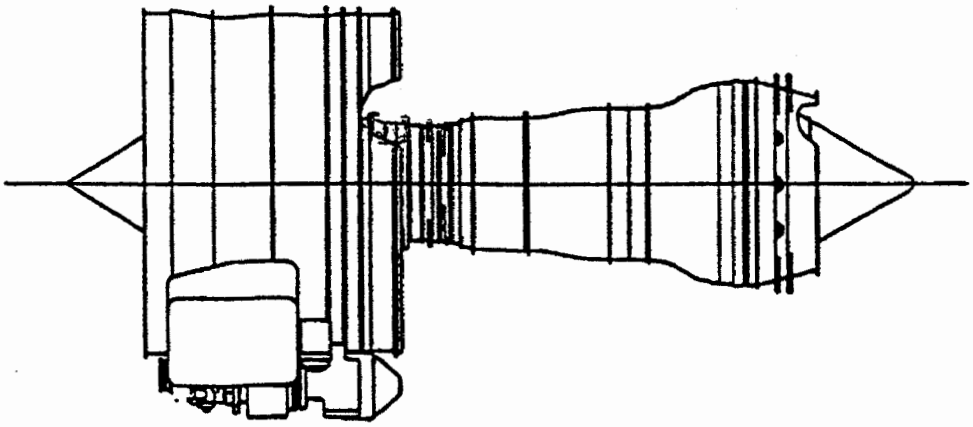
(1) The new 6A5992 and 6A5993 Stages 7 and 8 rotor rings (A1 Engines) also the new 6A5994, 6A5995 and 6A5996 Stages 6, 7 and 8 rotor segments and rings (A5/D5 Engines) introduced by this Service Bulletin must be fitted as a COMPLETE SET in place of old parts.

(2) Assemble new or reworked 6A5992 and 6A5993 Stages 7 and 8 rotor rings (A1 Engines) also the new 6A5994, 6A5995 and 6A5996 Stages 6, 7 and 8 rotor segments and rings (A5/D5 Engines) by use of approved procedures Engines Manual, 72-41-10 Assembly.

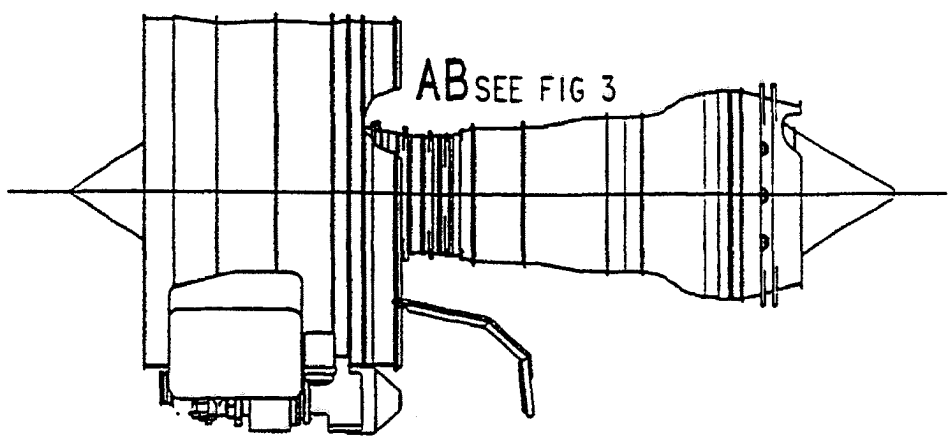
D. Recording Instructions

(1) A record of accomplishment is necessary.

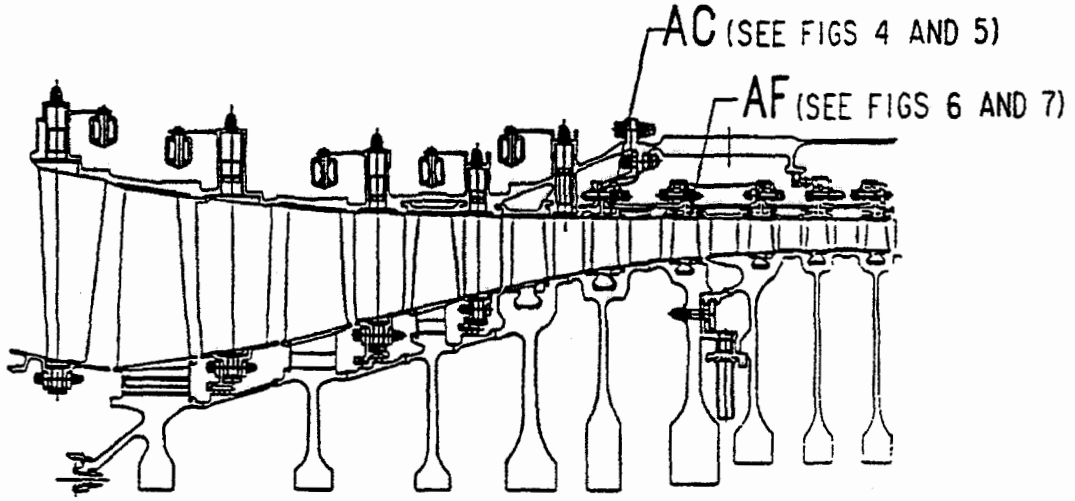




View on engine exteriors A1, A5 AND D5 engines
Fig.1



View on engine exterior (A1 engines only)
Fig.2

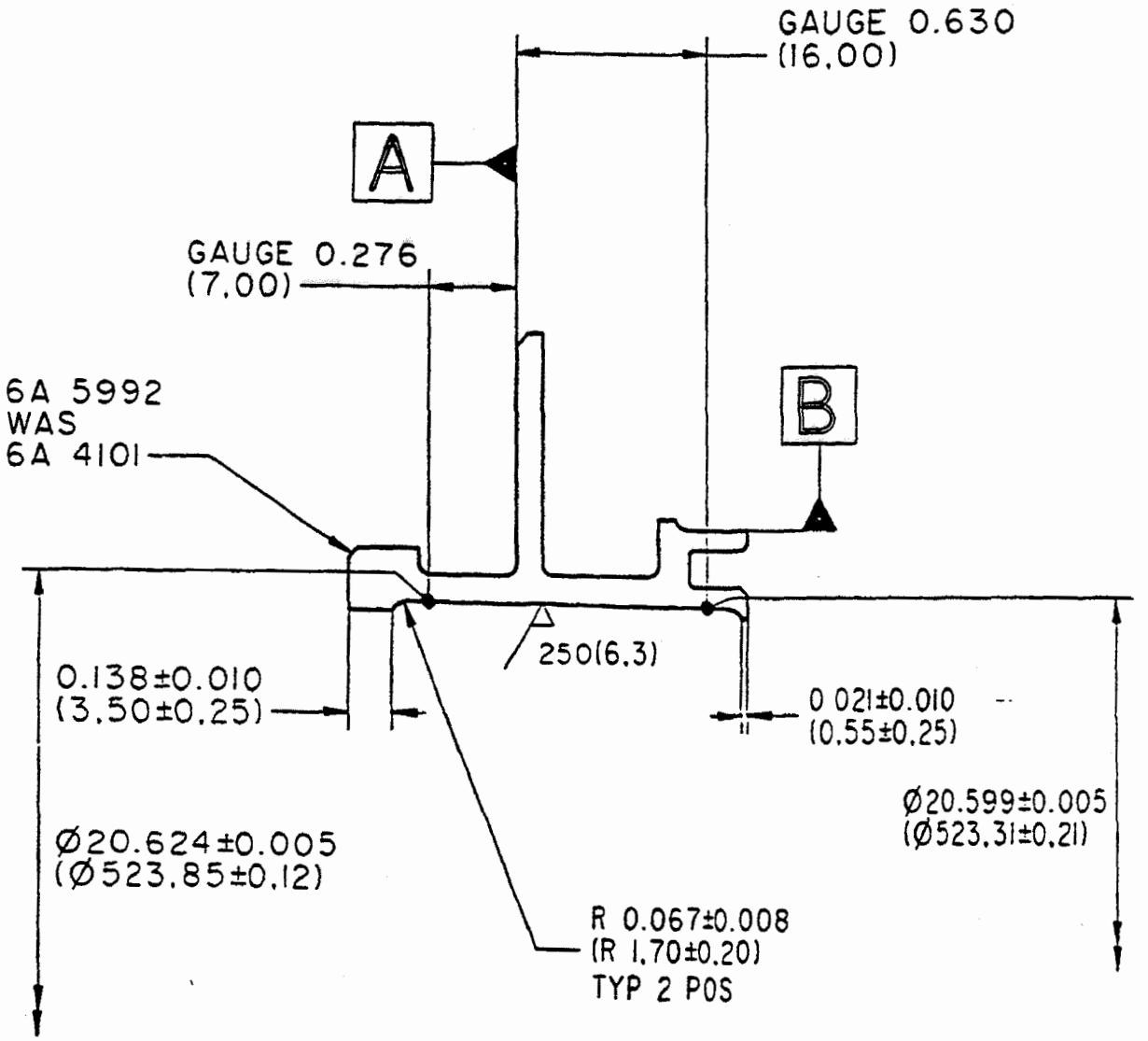


VIEW AT AB
(A1 ENGINES ONLY)

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)
MACHINE SURFACE FINISH TO BE
125 MICROINCHES (3.2 MICROMETRES) U.O.S

MACHINE WHERE MARKED ∇
BREAK SHARP EDGES 0.012 (0.30) ±0.008 (0.20) U.O.S

View at AB (A1 engines only)
Fig.3

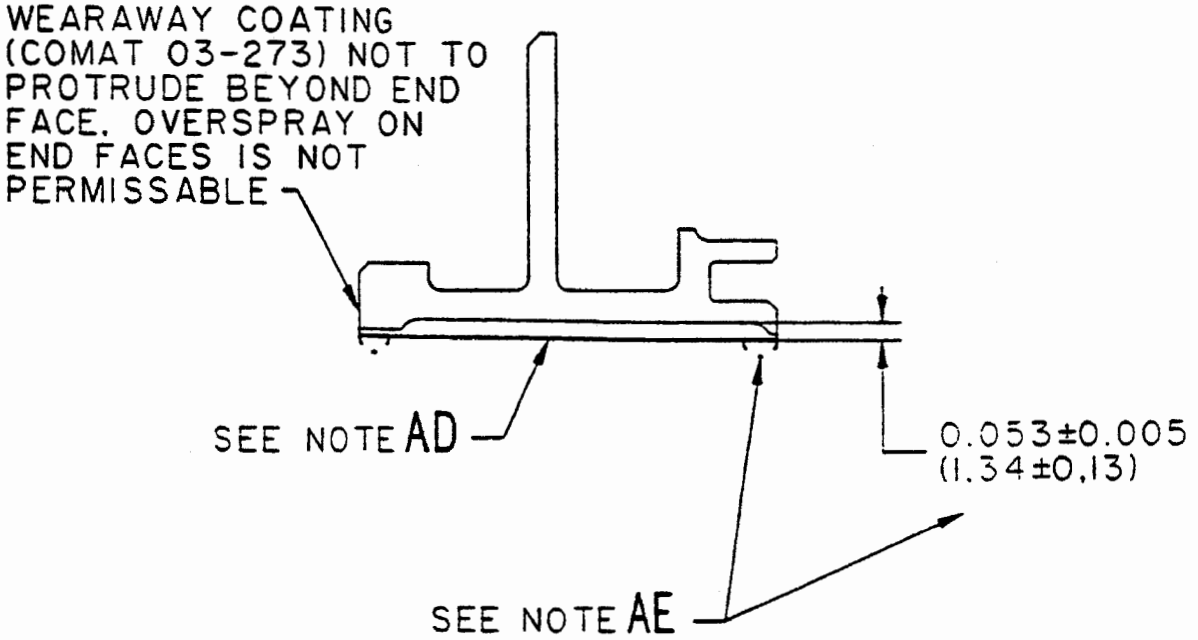


VIEW AT AC
SHOWING MACHINING REQUIRED
PROIR TO HARD COATING

Reworking of existing stage 7 rotor path liners
Fig.4

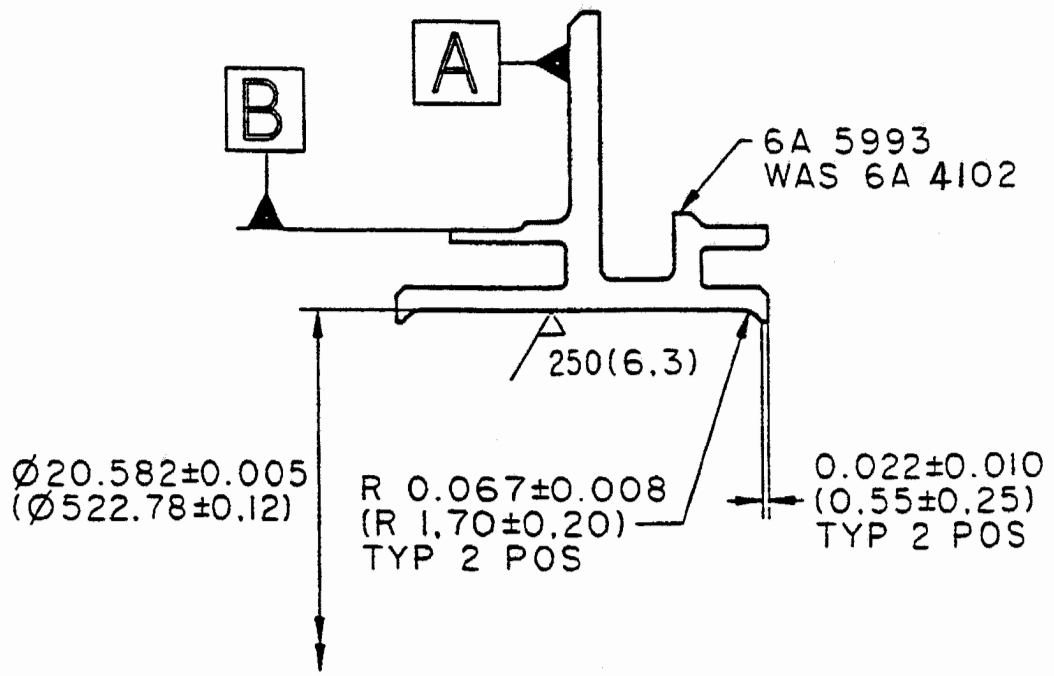
NOTE AD
APPLY A BOND COAT 0.004±0.001 (0.105±0.025) THICK OF COMAT 03-038 OR 03-036 THEN APPLY COMAT 03-273 TO SPM TASK 70-34-01-340-501

NOTE AE
SURFACE UNDULATIONS DUE TO PRODUCTION PROCESSES ARE ACCEPTABLE. SEE MACHINING ASSEMBLY



REPEAT VIEW AT AC
SHOWING APPLICATION
HARD COATING

Reworking of existing stage 7 rotor path liners
Fig.5

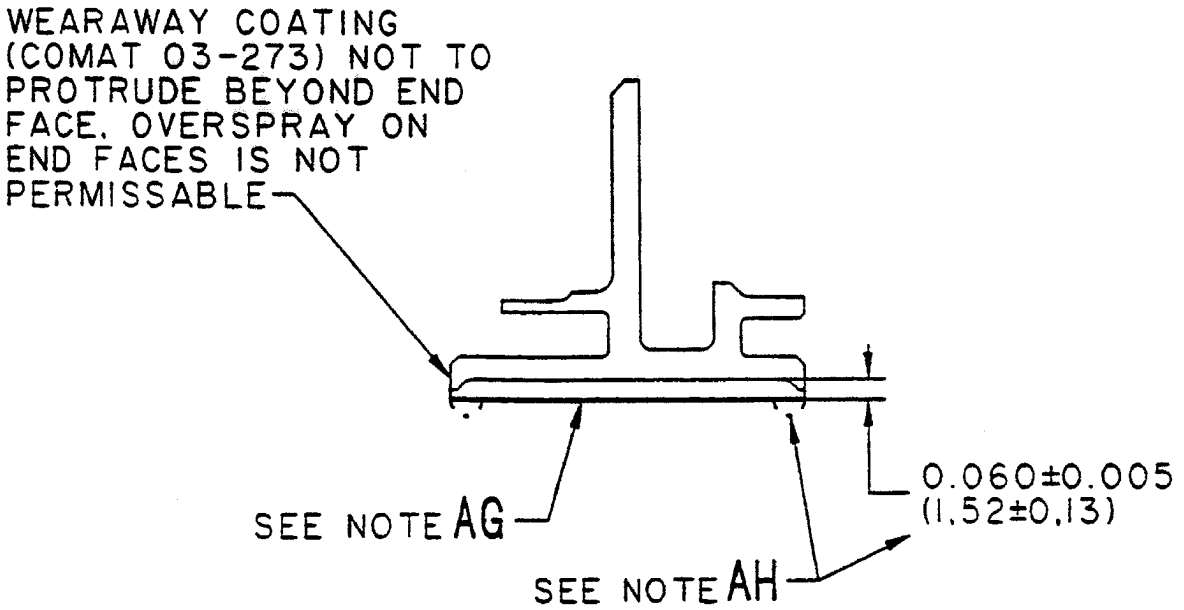


VIEW AT AF
SHOWING MACHINING REQUIRED
PRIOR TO HARD COATING

Reworking of existing stage 8 rotor path liners
Fig.6

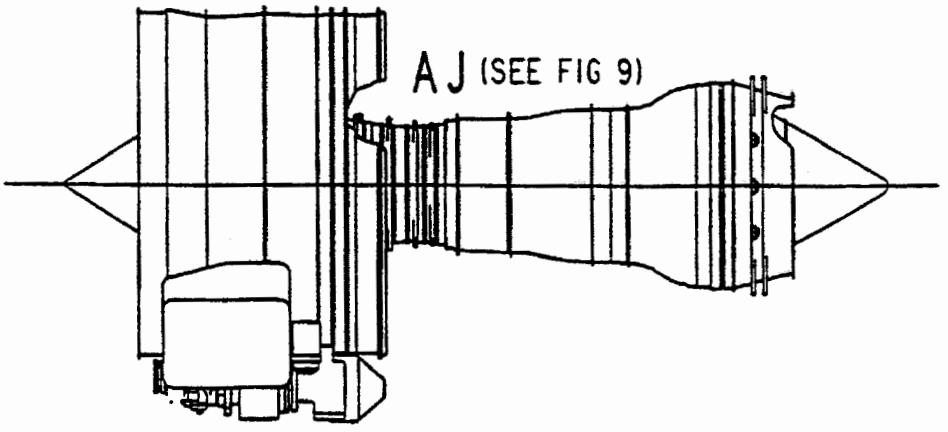
NOTE AG
APPLY A BOND COAT 0.004±0.001 (0.105±0.025) THICK OF COMAT 03-038 OR 03-036 THEN APPLY COMAT 03-273 TO SPM TASK 70-34-01-340-501

NOTE AH
SURFACE UNDULATIONS DUE TO PRODUCTION PROCESSES ARE ACCEPTABLE. SEE MACHINING ASSEMBLY



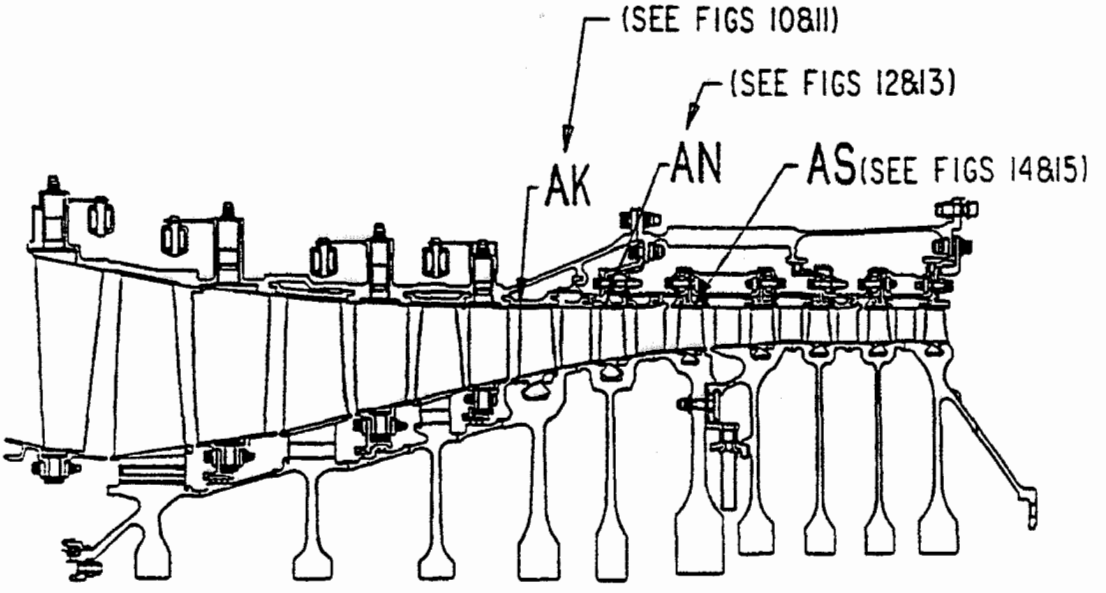
REPEAT VIEW AT AF
SHOWING APPLICATION
OF HARD COATING

Reworking of existing stage 8 rotor path liners
Fig.7



VIEW ON ENGINE EXTERIOR
(A5 AND D5 ENGINES)

View on engine exterior (A5 and D5 engines)
Fig.8

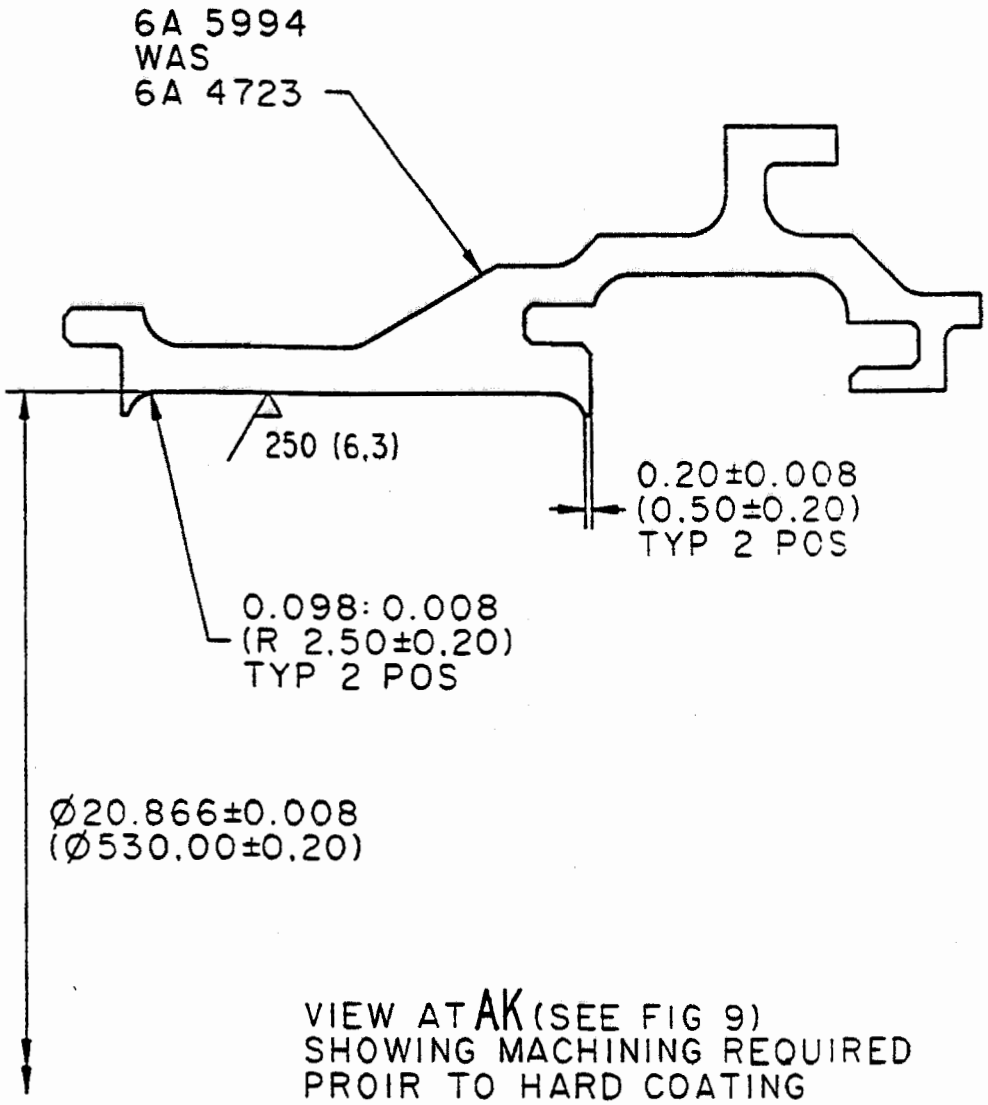


VIEW AT AJ
(A5 AND D5 ENGINES)

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)
MACHINE SURFACE FINISH TO BE
125 MICROINCHES (3.2 MICROMETRES) U.O.S

MACHINE WHERE MARKED ▽
BREAK SHARP EDGES 0.012 (0.30) ±0.008 (0.20) U.O.S

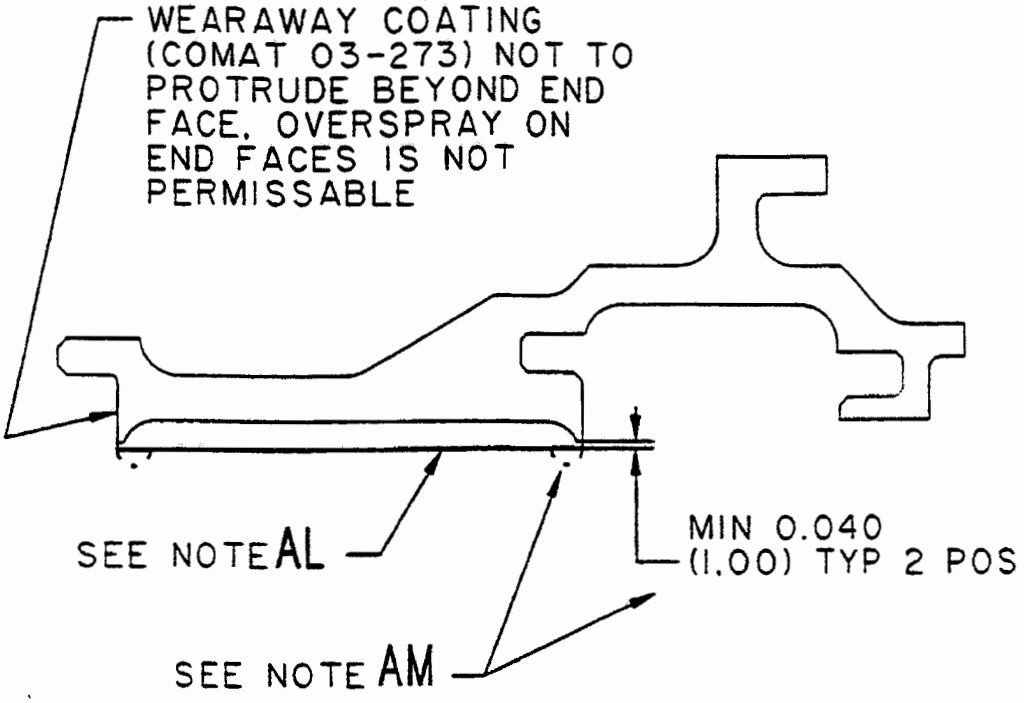
View at AJ (A5 and D5 engines)
Fig.9



Reworking of existing stage 6 rotor path liners
Fig.10

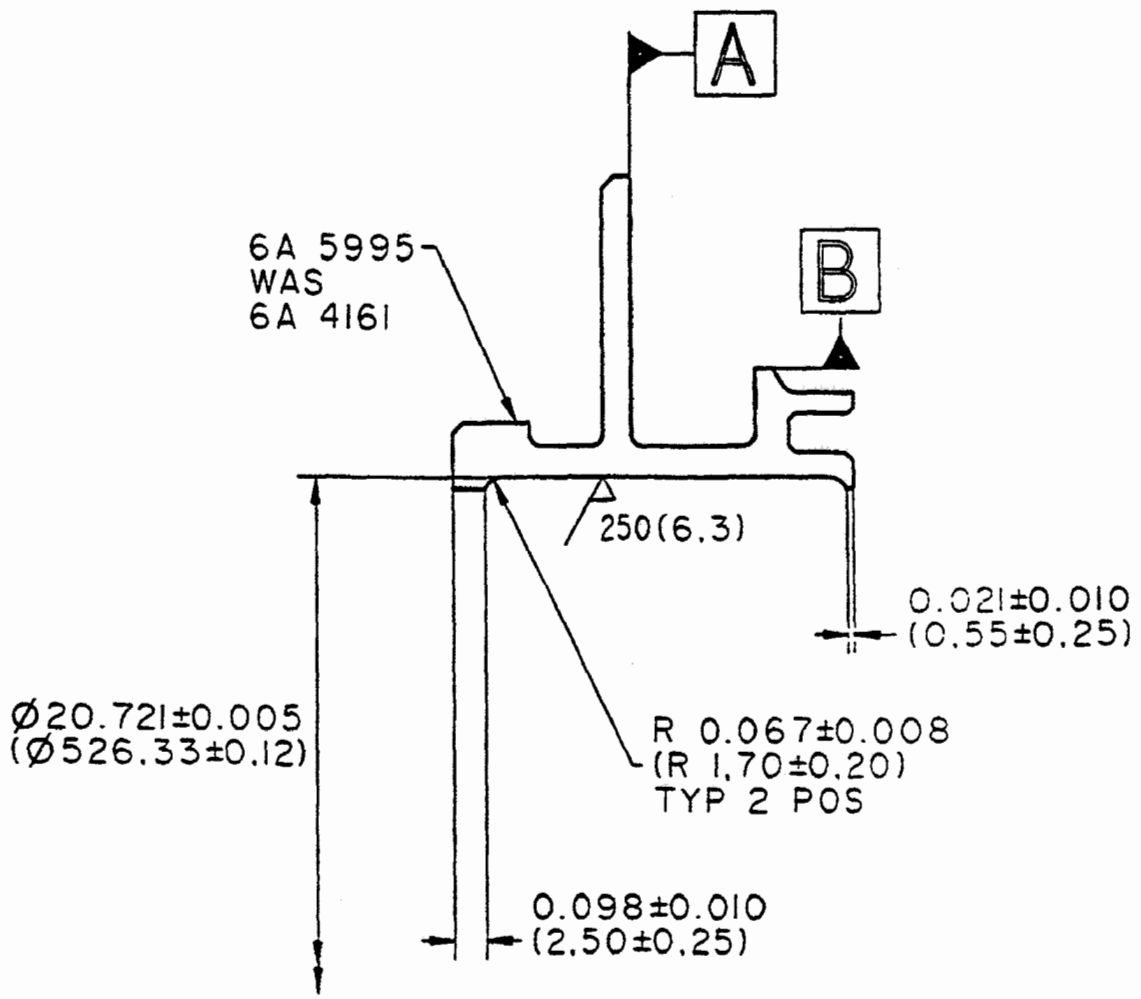
NOTE AL
APPLY A BOND COAT 0.004±0.001 (0.105±0.025) THICK OF COMAT 03-038 OR 03-036 THEN APPLY COMAT 03-273 TO SPM TASK 70-34-01-340-501

NOTE AM
SURFACE UNDULATIONS DUE TO PRODUCTION PROCESSES ARE ACCEPTABLE.SEE MACHINING ASSEMBLY



REPEAT VIEW AT AK
SHOWING APPLICATION
OF HARD COATING

Reworking of existing stage 6 rotor path liners
Fig.11

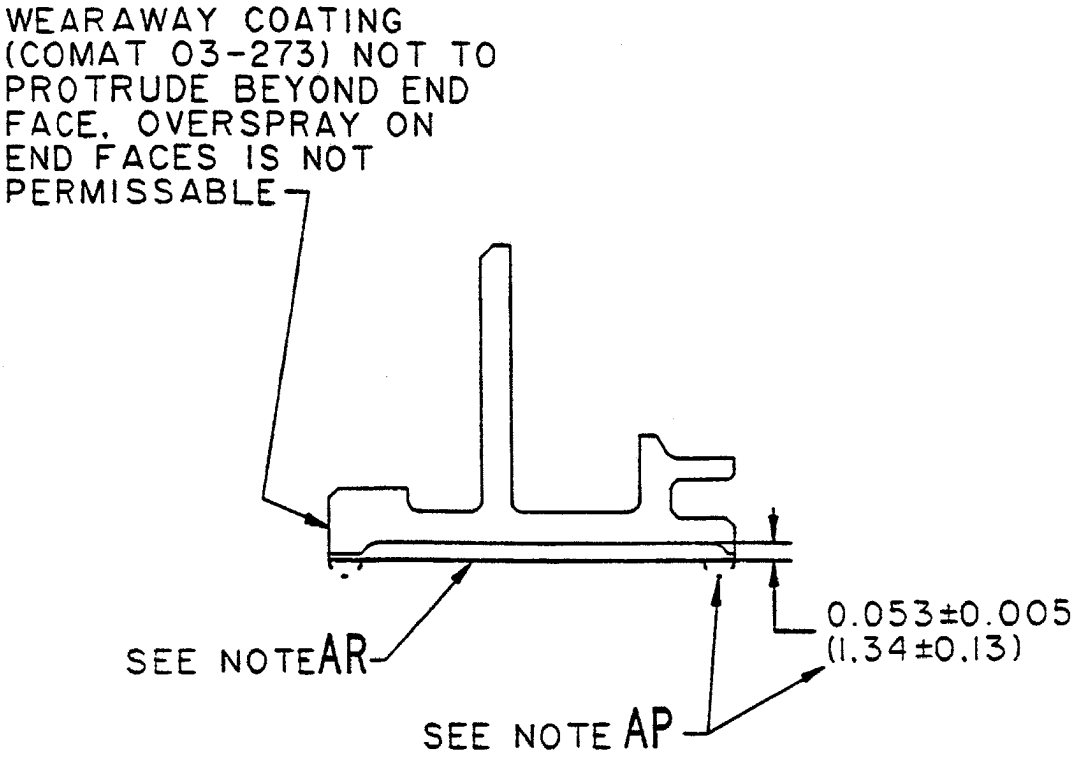


VIEW AT AN
SHOWING MACHINING REQUIRED
PRIOR TO HARD COATING

Reworking of existing stage 7 rotor path liners
Fig.12

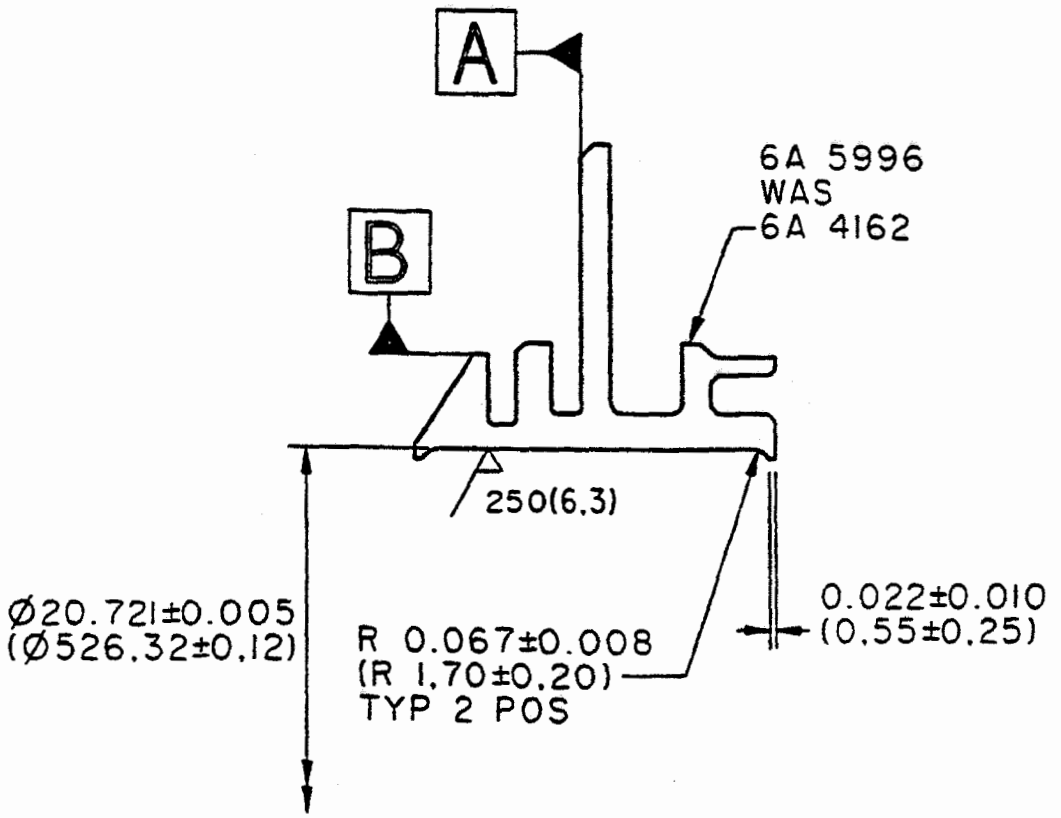
NOTE AR
APPLY A BOND COAT 0.004±0.001 (0,105±0,025) THICK OF COMAT 03-038 OR 03-036 THEN APPLY COMAT 03-273 TO SPM TASK 70-34-01-340-501

NOTE AP
SURFACE UNDULATIONS DUE TO PRODUCTION PROCESSES ARE ACCEPTABLE.SEE MACHINING ASSEMBLY



REPEAT VIEW AT AN
SHOWING APPLICATION
OF HARD COATING

Reworking of existing stage 7 rotor path liners
Fig.13

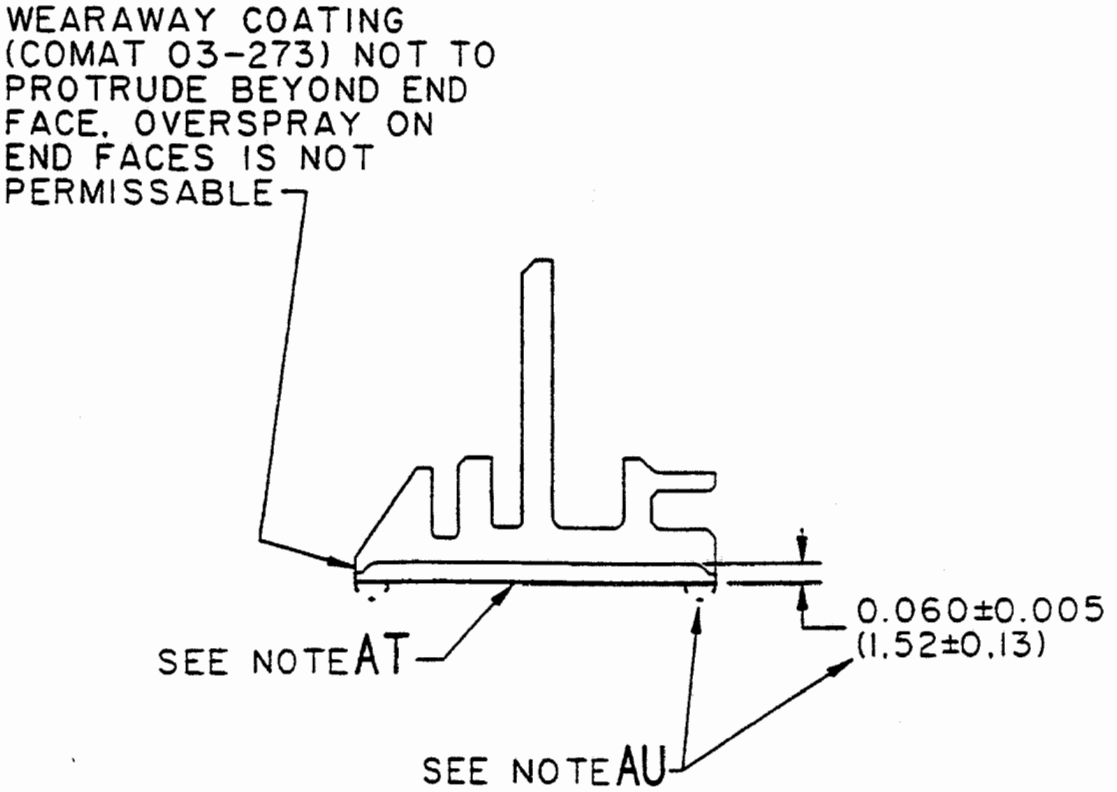


VIEW AT AS
SHOWING MACHINING REQUIRED
PRIOR TO HARD COATING

Reworking of existing stage 8 rotor path liners
Fig.14

NOTE AT
APPLY A BOND COAT 0.004±0.001 (0.105±0.025) THICK OF COMAT 03-038 OR 03-036 THEN APPLY COMAT 03-273 TO SPM TASK 70-34-01-340-501

NOTE AU
SURFACE UNDULATIONS DUE TO PRODUCTION PROCESSES ARE ACCEPTABLE. SEE MACHINING ASSEMBLY



REPEAT VIEW AT AS
SHOWING APPLICATION OF HARD COATING

Reworking of existing stage 8 rotor path liners
Fig.15

3. Material Information

Applicability: For each V2500 Engine to incorporate this Bulletin.

A. Kits associated with this Bulletin:

None

B. Parts affected by this Bulletin:

New Part No. (ATA No.)	Qty	Est'd Unit Price ($)	Keyword	Old Part No. (IPC No.)	Instructions Disposition
A1 Engines					
6A5992 (72-41-21)	1		Ring, Stage 7 Rotor path HPC	6A4101 (03-450)	(A)(B) (S1)(1D)
6A5993 (72-41-21)	1		Ring Stage 8 Rotor path HPC	6A4102 (03-600)	(A)(B) (S1)(1D)
A5/D5 Engines					
6A5995 (72-41-21)	1		Ring Stage 7 Rotor path HPC	6A4161 (03-450)	(A)(B) (S1)(1D)
6A5996 (72-41-21)	1		Ring Stage 8 Rotor path HPC	6A4162 (03-600)	(A)(B) (S1)(1D)
6A5994 (72-41-31)	4		Ring segment Stage 6 rotor HPC	6A4723 (01-705)	(A)(B) (S1)(1D)

C. Instructions/Disposition Codes Statements:

(A) New parts are currently available
(B) Old parts are no longer available
(S1) New parts coded (S1) must replace old parts coded (S1) as a COMPLETE SET per engine
(1D) Old part may be reworked and re-identified to the new part number.

NOTE: The estimated 1996 unit prices shown are provided for planning purposes only and do not constitute a firm quotation. Consult the IAE Price Catalog or contact IAE's Spare Parts Sales Department for information concerning firm prices.