B757 MANUAL SUPPLEMENT - ATP 3510
SECTION 1 CHAPTER 72
CONTROL PAGE - ISSUE 9

A. File the attached Temporary Revision/Alerts in the Manual Supplement in ATA Chapter/Section/Subject/Page sequence

B. File this Control Page in front of the Chapter TRs/Alerts.

C. The following list shows active TRs/Alerts together with TRs/Alerts added by this control page.

Chapter Section Subject	Page		TR/Alert No.
72-00-00 Confg.1	601	* Boe	72-1002
72-31-13	701		72-578
72-34-10	607		72-582
72-62-01	401 & 408	Alert	72-588
72-62-01	601		72-577

D. Remove and Destroy the following TRs/Alerts:

* Indicates TRs/Alerts issued with this control page

ENGINE - INSPECTION/CHECK

TEMPORARY REVISION 72-1002

FILING INSTRUCTIONS

This temporary revision applies only to document D633N132. For the printed manual, file this temporary revision adjacent to the page(s) affected.

For the microfilm manual, file this temporary revision in sequence by ATA number. Mark the microfilm cartridge to indicate that it has been changed by temporary revision(s).

This temporary revision will be incorporated in the revision dated Sep 28/01.

Revision reason: Added damage limits for the combustion liner.

This temporary revision furnishes an advance copy of the enclosed page(s) which supersede any previously issued page(s). The information thereon is to be used until this revision is either incorporated or rescinded.

At the end of this TR there is a TR Status Report for document D633N132.

REVISED LIST OF EFFECTIVE PAGES FOR THIS DOCUMENT

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
* 601	JUL 20/01	R01A.1	* 623	JUL 20/01	R01A.1	* 645	JUL 20/01	R01A.1
* 602	JUL 20/01	R01A.1	* 624	JUL 20/01	R01A.1	* 646	JUL 20/01	R01A.1
* 603	JUL 20/01	R01A.1	* 625	JUL 20/01	R01A.1	* 647	JUL 20/01	R01A.1
* 604	JUL 20/01	R01A.1	* 626	JUL 20/01	R01A.1	* 648	JUL 20/01	R01A.1
* 605	JUL 20/01	R01A.1	* 627	JUL 20/01	R01A.1	* 649	JUL 20/01	R01A.1
* 606	JUL 20/01	R01A.1	* 628	JUL 20/01	R01A.1	* 650	JUL 20/01	R01A.1
* 607	JUL 20/01	R01A.1	* 629	JUL 20/01	R01A.1	* 651	JUL 20/01	R01A.1
* 608	JUL 20/01	R01A.1	* 630	JUL 20/01	R01A.1	* 652	JUL 20/01	R01A.1
* 609	JUL 20/01	R01A.1	* 631	JUL 20/01	R01A.1	* 653	JUL 20/01	R01A.1
* 610	JUL 20/01	R01A.1	* 632	JUL 20/01	R01A.1	* 654	JUL 20/01	R01A.1
* 611	JUL 20/01	R01A.1	* 633	JUL 20/01	R01A.1	* 655	JUL 20/01	R01A.1
* 612	JUL 20/01	R01A.1	* 634	JUL 20/01	R01A.1	* 656	JUL 20/01	R01A.1
* 613	JUL 20/01	R01A.1	* 635	JUL 20/01	R01A.1	* 657	JUL 20/01	R01A.1
* 614	JUL 20/01	R01A.1	* 636	JUL 20/01	R01A.1	* 658	JUL 20/01	R01A.1
* 615	JUL 20/01	R01A.1	* 637	JUL 20/01	R01A.1	* 659	JUL 20/01	R01A.1
* 616	JUL 20/01	R01A.1	* 638	JUL 20/01	R01A.1	* 660	JUL 20/01	R01A.1
* 617	JUL 20/01	R01A.1	* 639	JUL 20/01	R01A.1	* 661	JUL 20/01	R01A.1
* 618	JUL 20/01	R01A.1	* 640	JUL 20/01	R01A.1	* 662	JUL 20/01	R01A.1
* 619	JUL 20/01	R01A.1	* 641	JUL 20/01	R01A.1	* 663	JUL 20/01	R01A.1
* 620	JUL 20/01	R01A.1	* 642	JUL 20/01	R01A.1	* 664	JUL 20/01	R01A.1
* 621	JUL 20/01	R01A.1	* 643	JUL 20/01	R01A.1	* 665	JUL 20/01	R01A.1
* 622	JUL 20/01	R01A.1	* 644	JUL 20/01	R01A.1	* 666	JUL 20/01	R01A.1

* INDICATES PAGE INCLUDED IN THIS TEMPORARY REVISION.

(CONTINUED ON NEXT PAGE)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

THIS TR CREATED AT 2001/07/13.16:11:01 UTC

REVISED LIST OF EFFECTIVE PAGES FOR THIS DOCUMENT

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
* 667	JUL 20/01	R01A.1						
* 668	JUL 20/01	R01A.1						
* 669	JUL 20/01	R01A.1						
* 670	JUL 20/01	R01A.1						
* 671	JUL 20/01	R01A.1						
* 672	JUL 20/01	R01A.1						
* 673	JUL 20/01	R01A.1						
* 674	JUL 20/01	R01A.1						
* 675	JUL 20/01	R01A.1						

* INDICATES PAGE INCLUDED IN THIS TEMPORARY REVISION.

ENGINE - INSPECTION/CHECK

1. General
   A. The first procedure gives the instructions for the preparation and use of the equipment necessary for the borescope inspection.
   B. The second procedure prepares the airplane for the inspection.
   C. The following procedures are the inspections covered here:
      (1) Intermediate Pressure (IP) Compressor Inspection,
      (2) High Pressure (HP) Compressor Inspection,
      (3) Combustion Liners and High Pressure Nozzle Guide Vanes (HPNGV) Inspection,
      (4) High Pressure (HP) Turbine Inspection,
      (5) Intermediate Pressure (IP) Turbine Inspection,
      (6) Low Pressure Turbine (LPT) Inspection,
      (7) LPT Stage 3 Nozzle Guide Vanes (NGV) Inspection.
   D. The last procedure gives instructions to restore the plane to its usual condition.
   E. For the inspection of engine areas not contained in this section, refer to the Inspection/Check page block for the correct chapter.

      - LP compressor rotor blades, AMM 72-31-13/601
      - LP compressor case, AMM 72-34-10/601
      - LP compressor intake rotating fairing, AMM 72-35-01/601
      - Exhaust plug, AMM 72-51-01/601

Borescope Equipment Preparation and Use

TASK 72-00-00-206-136-R01

2. Borescope Equipment Preparation and Use

A. General

(1) This task lists the inspection equipment, the light-source functional test, and the installation of the borescope equipment used in the engine inspection.

B. Equipment

(1) Borescope Inspection Equipment (Fig. 601).

Supplier	Part No.	Description	Item No. (Fig. 601)
Rolls-Royce	702322	Light source box and case (NDT LSB-05-150) For use with all borescopes	1 and 2
Rolls-Royce	1017358	Light source box box (NDT LSB 100/ QH) used with 10120948 carrying case	1 and 2
Rolls-Royce	1702227	Cable - light guide (NDT FLGG/10/15A)	3
Rolls-Royce	1702375	Endoprobe (Green) (NDT 8, 120, 55, 270)	4
Rolls-Royce	1702379	Endoprobe (Blue) (NDT 8, 180, 55, 270)	5
Rolls-Royce	1702374	Endoprobe (Red) (NDT 8, 90, 55 270)	6

Borescope Equipment Preparation and Use

Rolls-Royce	1702376	Endoprobe (Yellow) (NDT 8, 70, 55 270)	6
Rolls-Royce	1702377	Endoprobe (Red) (NDT 11, 90, 30 265F)	14
Rolls-Royce	1702378	Endoprobe (Red) (NDT 11, 90, 10 265F)	15
Rolls-Royce	1702368	Location Stop (NDT A3101E) use with 1702378	-
Rolls-Royce	1702422	Location Stop (NDT 11, 90, 55, 185F)	-
Rolls-Royce	1702394	Eye Piece (EF/12)	13
Rolls-Royce	1702371	Protable light source box (NDT KVB-MK.1) For use with all borescope except 1702319	10
Cable (For use with item 10)			11

Borescope Equipment Preparation and Use

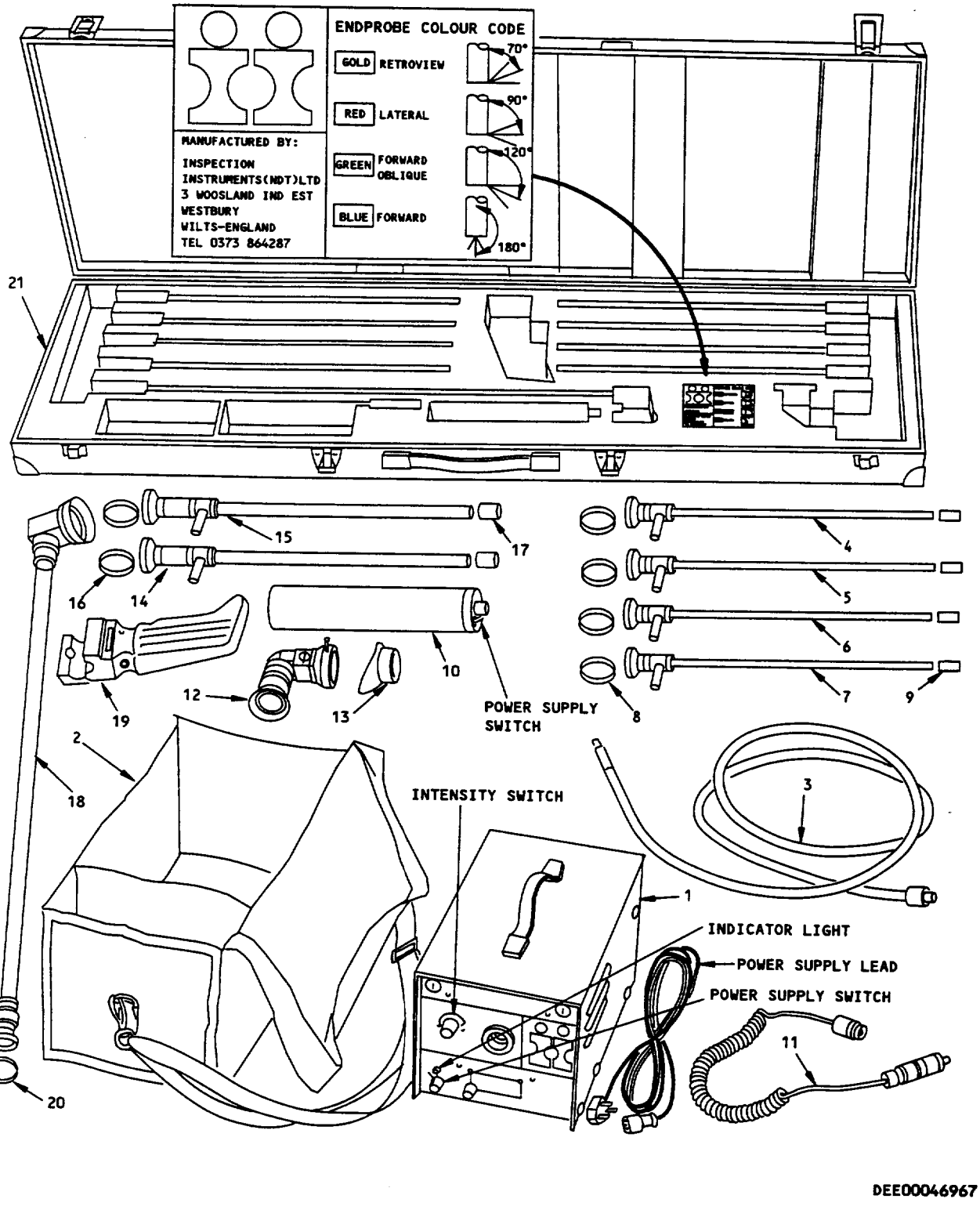
Rolls-Royce	1702393	Right angle viewer (NDT 2/RA3)	12
Rolls-Royce	1702380	Right angle viewer (NDT RAV535)	18
Rolls-Royce	1702381	Carrying Case (NDT CC/3)	21
Rolls-Royce	1702319	Flexible Borescope	
Rolls-Royce	HU19036/1	Impact extractor	
Rolls-Royce	89200	Protective workmat	

(2) Inspection lamp
(3) Clean, stiff bristled brush

C. Consumable Materials
(1) Refer to the table that follows:

Consumable	British Spec./Ref.	American Spec./Ref	OMat Item No.
Degreaser Inhibited and stabilized 1.1.1. trichloroethane	B.S.4487: 1969	-	1/21
Jointing compound	DTD.900/4586 PL.32 (light)	-	4/46
High temperature anti-seize compound	-	-	4/62
Lockwire	DTD.189A 22 S.W.G.	21 A.W.G.	238

D. References
(1) AMM 12-13-01/301, Engine Oil Replenishing
(2) AMM 70-51-00/201, Torgue Tightening Technique
(3) AMM 72-00-00/201, Engine
(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 73-11-05/401, Fuel Spray Nozzles
(6) AMM 78-31-00/201, Thrust Reverser System



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Borescope Equipment
Figure 601 (Sheet 1)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

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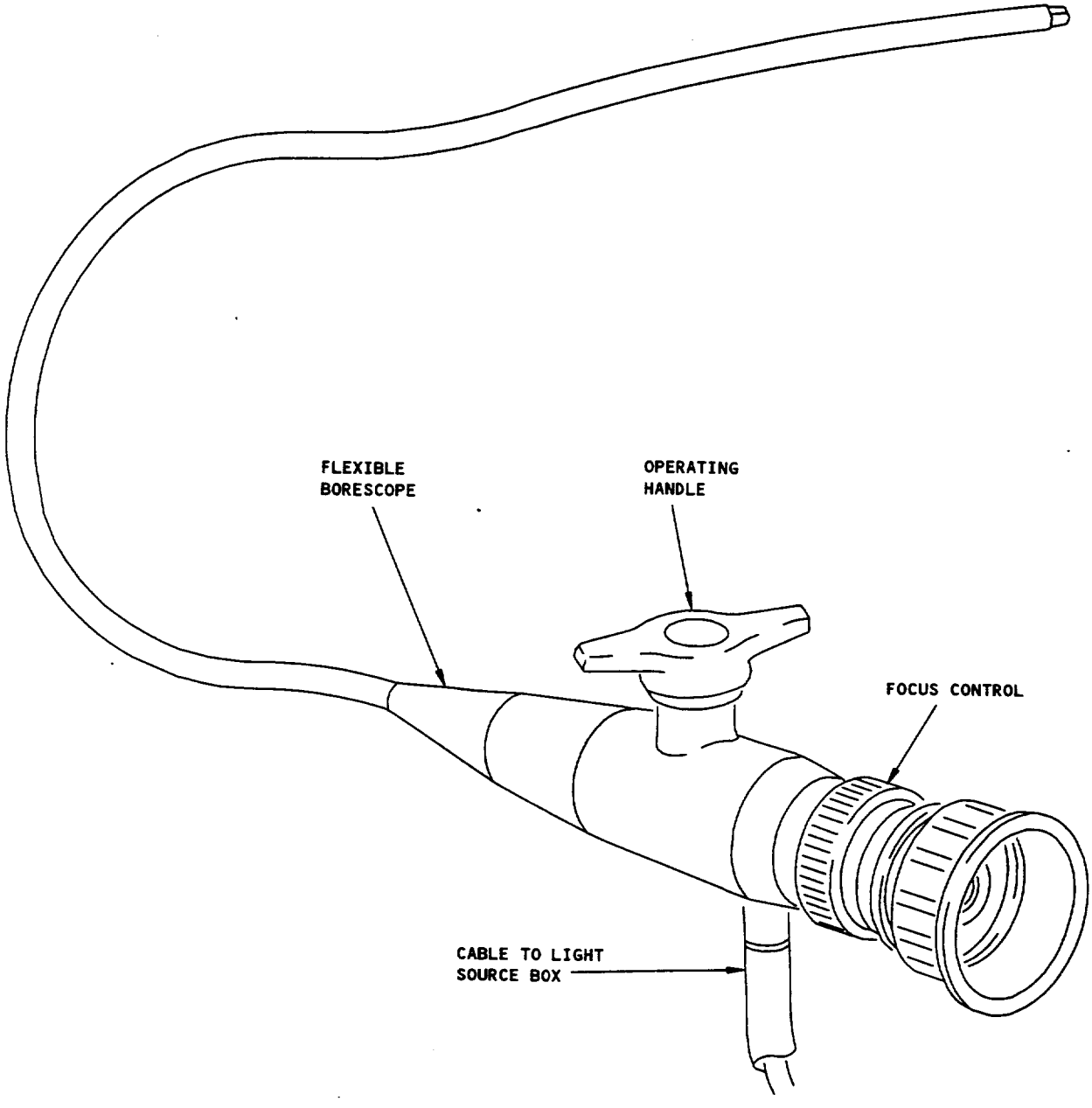

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Borescope Equipment
Figure 601 (Sheet 2)

Borescope Equipment Preparation and Use

E. Procedure

S 846-138-R01

(1) Prepare the borescope equipment (Fig. 601).
  (a) Use the switch at the rear of the light source box (1) to select the correct voltage.
  (b) Connect the power supply to the light source box.
  (c) Set the intensity switch to the lowest light setting.
  (d) Do a functional check of the light source box.
    1) Set the power supply switch to ON and make sure the red indication light comes on. Return the switch to OFF.
  (e) Attach the light cable (3) to the light source box.

    NOTE: The flexible borescope has an integral light cable and does not require the attachment of light cable (3).

  (f) If you use the portable light source , attach the cable (11) to the portable light source box (10).

    NOTE: The portable light source is used with all borescopes except 1702319.

  (g) Select and attach a borescope to a light cable, or attach a flexible borescope to a light source box.
  (h) Set the power supply switch to ON.

S 846-140-R01

(2) Do these steps to use the borescope equipment:

    NOTE: Deterioration of the HPNGV support ring heatshield may allow axial and circumferential movement of the heatshield over the support ring, after removal of the borescope plug. This may block access to the HP turbine borescope hole 'K'. The heatshield may be repositioned by hand to allow ease of entry of borescope. Looseness of the heatshield will not affect engine integrity.

  (a) Put the borescope through the applicable opening for the inspection to be done (Fig. 602).
  (b) Rotate the IP or HP system (AMM 72-00-00/201), if you do either the compressor or turbine system inspection.

Borescope Equipment Preparation and Use

(c) Refer to the applicable inspection task given in this procedure:

- IP Compressor
- HP Compressor
- Combustion liners and HPNGV
- HP Turbine
- IP Turbine
- LP Turbine
- LP Turbine, stage 3 NGV

(d) Withdraw the borescope from the engine.

S 216-141-R01

(3) Do an inspection through the fuel spray nozzle aperture (Fig. 602).
(a) Remove the borescope stop adapter, if it is attached.

CAUTION: MAKE SURE THE BORESCOPE DOES NOT MOVE FORWARD OF THE HP OUTLET GUIDE VANES. IF YOU DO NOT, THE BORESCOPE WILL HIT THE HP COMPRESSOR STAGE 6 ROTOR BLADES WHEN THE HP SYSTEM IS TURNED.

MAKE SURE THE FLEXIBLE BORESCOPE DOES NOT CATCH THE INTERNAL PARTS OF THE ENGINE.

IF YOU DO NOT DO THIS, DAMAGE TO THE BORESCOPE COULD OCCUR. ALSO, DAMAGE TO THE POWER PLANT COULD OCCUR IF THE BORESCOPE BECOMES BROKEN INSIDE THE ENGINE.

(b) Insert the flexible borescope through the fuel spray nozzle aperture and pass it carefully through the outer diffuser of the combustion liner head section. Then, pass the boresope between the HP outer guide vanes at their inner platform.
(c) Rotate the HP system (AMM 72-00-00/201).
(d) Refer to the HP Compressor inspection given in this procedure.
(e) Withdraw the flexible borescope from the engine.

S 846-142-R01

(4) Disassemble the borescope equipment.
(a) Select power supply switch to OFF. Let the power supply cool for at least 30 seconds.
(b) Remove the borescope and light cable from the light source box.
(c) Disconnect the power supply from the light source box.

Prepare the Airplane for the Inspection

TASK 72-00-00-846-137-R01

3. Prepare the Airplane for the Inspection

A. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings
(3) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

210 Control Cabin
411 No. 1 Engine
421 No. 2 Engine

C. Procedure

S 866-152-R01

(1) For the left engine, open these circuit breakers and install a DO-NOT-CLOSE tag:

(a) On the P11 Overhead Circuit Breaker Panel:

1) 11D7, ENGINES STBY IGN LEFT 1
2) 11D8, ENGINES STBY IGN LEFT 2
3) 11L1, LEFT ENGINE IGN 1
4) 11D12, LEFT T/R CONT
5) 11D17, LEFT ENG SYNC LOCK CONT
6) 11K5, LEFT ENG T/R IND
7) 11K6, LEFT ENG T/R DCV SEC .

S 866-153-R01

(2) For the right engine, open these circuit breakers and install a DO-NOT-CLOSE tag:

(a) On the P11 Overhead Circuit Breaker Panel:

1) 11D9, ENGINES STBY IGN RIGHT 1
2) 11D10, ENGINES STBY IGN RIGHT 2
3) 11L28, RIGHT ENGINE IGN 1
4) 11B30, RIGHT ENG T/R CONT ALTN
5) 11K31, RIGHT ENG T/R IND
6) 11K32, RIGHT ENG SYNC LOCK
7) 11K33, RIGHT ENG T/R CONT
8) 11K34, RIGHT ENG T/R DCV SEC

(b) On the P6 power distribution panel:

1) 6D12, R ENG SYNC LOCK ALTN (BAT BUS)

Prepare the Airplane for the Inspection

S 016-154-R01

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Open the thrust reversers (AMM 78-31-00/201).

S 016-155-R01

(4) Remove the lower-right compressor fairing panel (AMM 72-03-01/401).

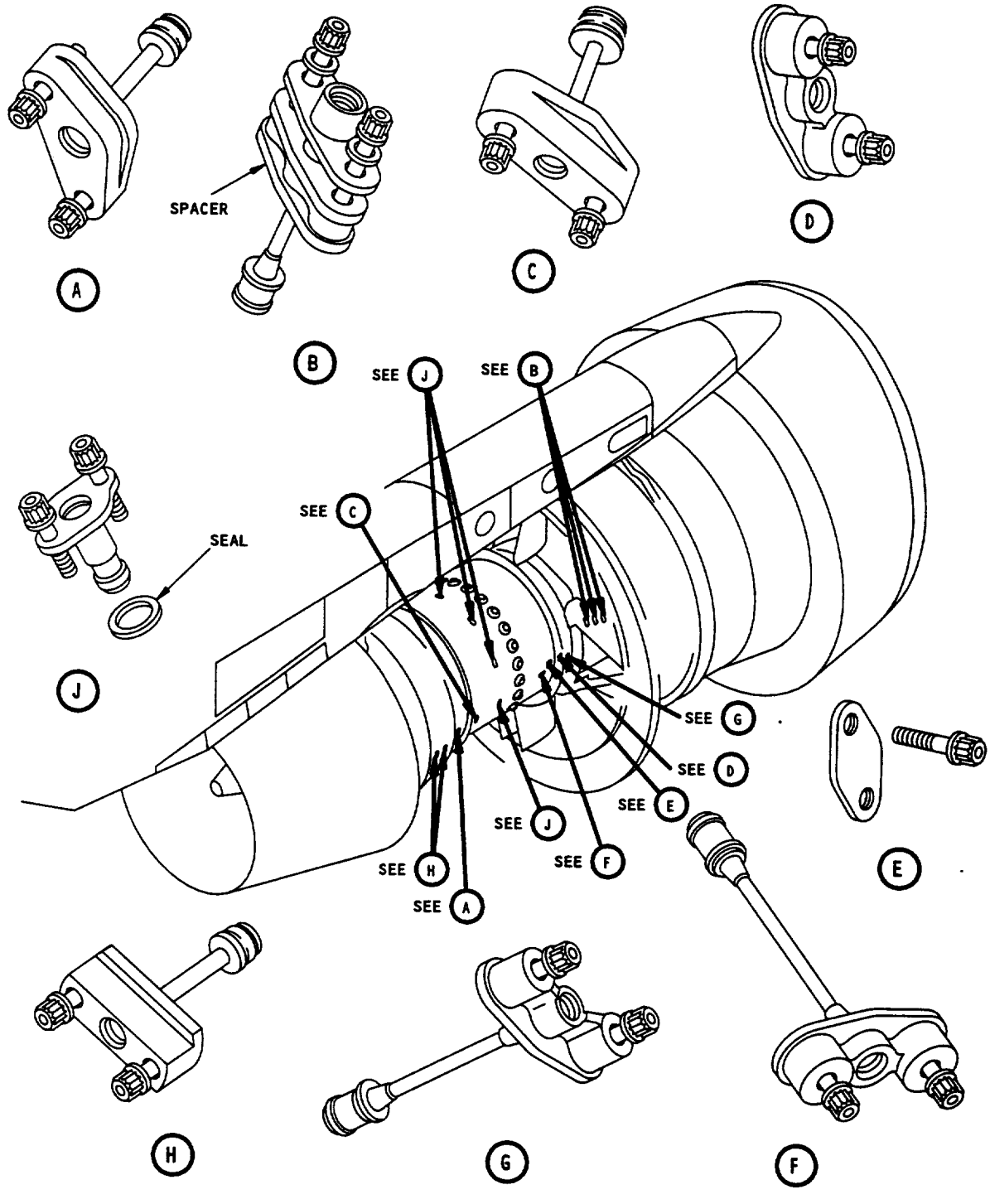
S 416-156-R01

(5) Install the IP and HP system turning tools (AMM 72-00-00/201).

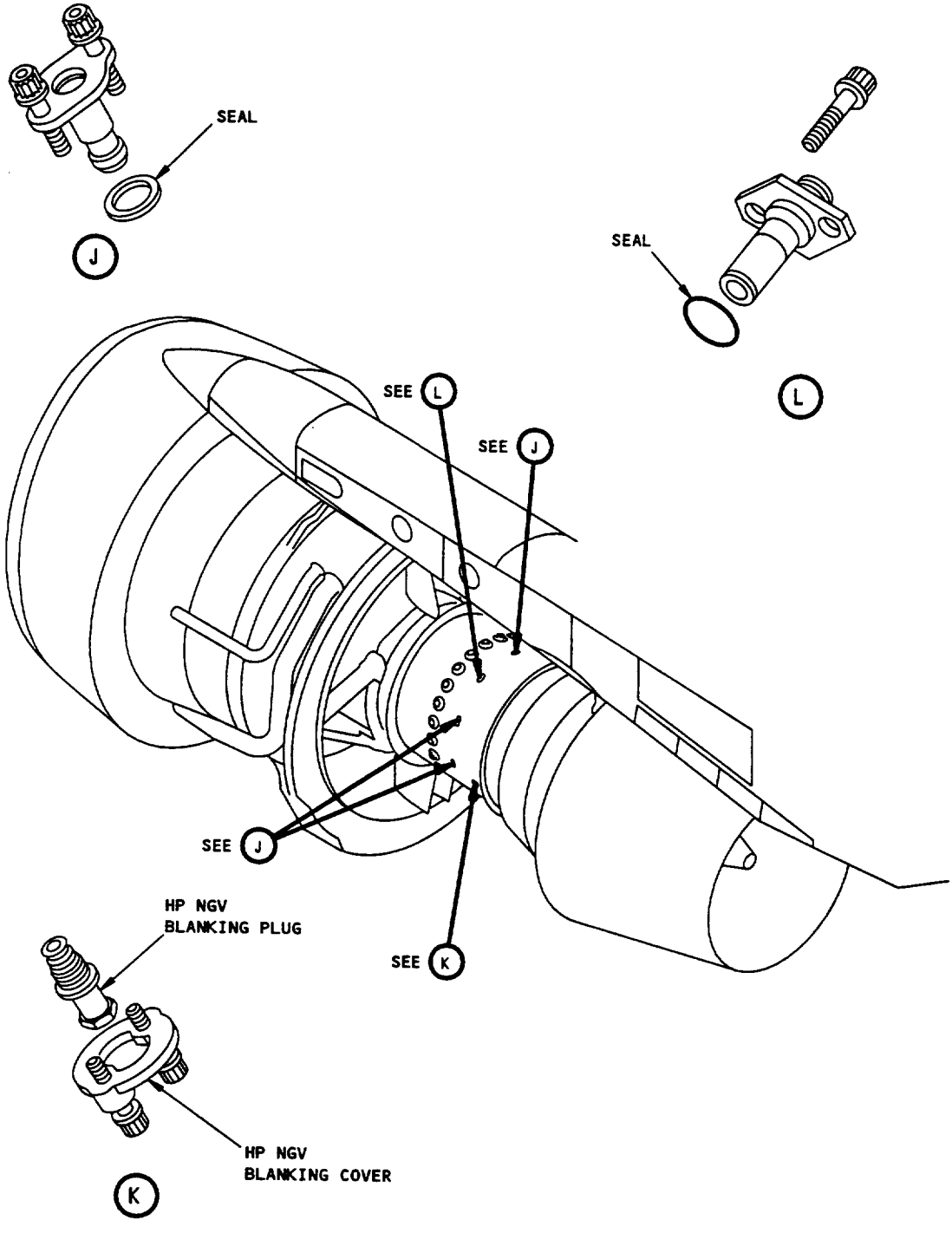
S 016-157-R01

(6) Remove the applicable borescope plugs for the inspection (Fig. 602). Use the impact extractor to withdraw the plug(s) if necessary.

NOTE: For the combustion section inspection, remove the blanking plugs at the rear of fuel spray nozzles 2, 5, 8, 11, 14, 17, 20 and 23, which are numbered clockwise when you look from aft of the engine. The number 1 nozzle is to the right of the engine top. Make sure that the C-ring seals have been removed with the blanking plugs.



Borescope Access Details
Figure 602 (Sheet 1)



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Borescope Access Details
Figure 602 (Sheet 2)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

MAINTENANCE

INSPECTION AREA	LOCATION OF ACCESS DETAILS	ENGINE IDENTIFATION
IP COMPRESSOR, STAGE 2 REAR, STAGE 3 FRONT	B	IP2S
IP COMPRESSOR, STAGE 4 REAR, STAGE 5 FRONT	B	IP4S
IP COMPRESSOR, STAGE 6 REAR	B	IP6S
HP COMPRESSOR, STAGE 1 REAR STAGE 2 FRONT	G	HP1S
HP COMPRESSOR, STAGE 2 REAR, STAGE 3 FRONT	D	HP2S
HP COMPRESSOR, STAGE 3 REAR, STAGE 4 FRONT	E	-
HP COMPRESSOR, STAGE 5 REAR, STAGE 6 FRONT	F	HP5S
COMBUSTION CHAMBER AND HPNGV LEADING EDGE	J	-
HP TURBINE LEADING EDGE	K	-
HP TURBINE TRAILING EDGE IP TURBINE LEADING EDGE	C	-
IP TURBINE TRAILING EDGE LP1 TURBINE LEADING EDGE	A	LP1S
LP1 TURBINE TRAILING EDGE LP2 TURBINE LEADING EDGE	H	LP2S
LP2 TURBINE TRAILING EDGE LP3 TURBINE LEADING EDGE	H	LP3S

Borescope Access Details
Figure 602 (Sheet 3)

Intermediate Pressure Compressor Inspection

TASK 72-00-00-206-026-R01

4. Intermediate Pressure (IP) Compressor Inspection

A. General

(1) The subsequent operations give the IP compressor inspection procedure and the standards (limits) you can accept.

(2) With this inspection you will examine the IP compressor blades for the conditions that follow:

(a) Loss of annular filler.

(b) Airfoil cracks, nick, tears.

(c) Airfoil dents, bends.

(d) Tip damage.

(e) Airfoil leading and trailing edge material loss.

(3) You do an inspection of the 1st-stage compressor blades by viewing the blades with aid of a bright light through the LP compressor and IP compressor inlet guide vanes.

(4) For the inspection of the 2nd-through-6th stage compressor blades you must use the borescope equipment (Fig. 602).

(5) Use an impact extractor if you cannot easily remove the plugs.

(6) The access location, the view area, and the number of blades for each compressor stage are as follows:

Access	View Area	Number of Blades
Engine Front	Front - 1st-Stage	50
IP 2S	Rear - 2nd-Stage	57
IP 2S	Front - 3rd-Stage	48
IP 4S	Rear - 4th-Stage	53
IP 4S	Front - 5th-Stage	49
IP 6S	Rear - 6th-Stage	46

(7) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 603).

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location Zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

Intermediate Pressure Compressor Inspection

D. Procedure

S 846-146-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-191-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 496-190-R01

(3) Attach the tool to turn the IP system (AMM 72-00-00/201).

S 296-134-R01

(4) Examine the front bearing housing support for loss of annular filler (Fig. 603).

NOTE: Inspect for loss of annulus filler by viewing with the aid of a bright light through the LP compressor and IP compressor inlet guide vanes.

(a) Accept the partial or complete loss of annulus filler.

S 296-163-R01

(5) Do an inspection of the IP Compressor Blades (Fig. 604).

NOTE: If you find damage which extends between different zones, compare the chordal width of the damage in each zone to the limit for that zone.

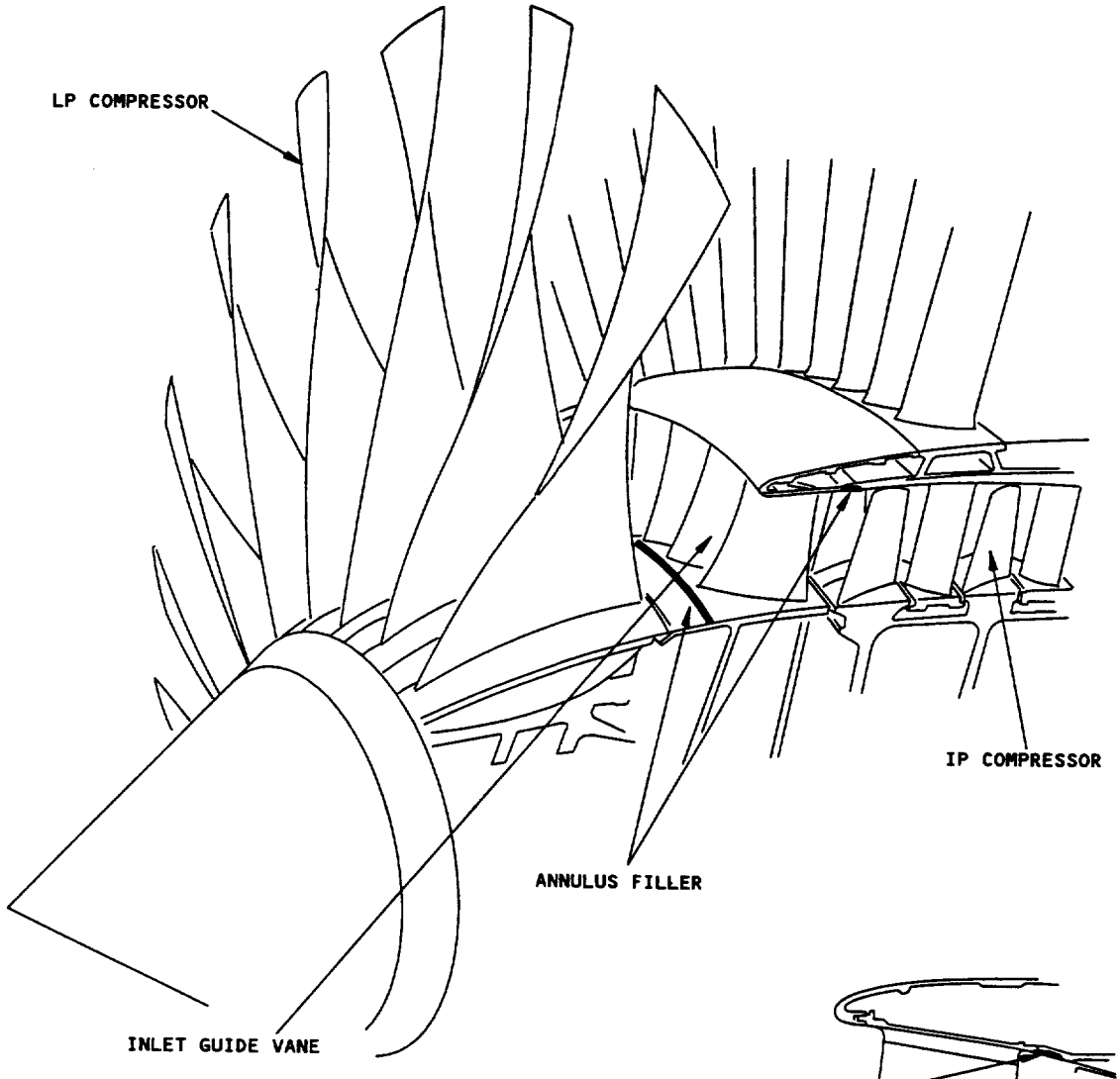
(a) Examine the IP compressor blades for cracks, nicks, and tears in zones A and B.

1) Cracks or tears within the following limits must be closely monitored at intervals not to exceed 300 hours.

NOTE: If the damage in Zone B is more than the limits, the engine can be operated only if:

The damage to the blades is not more than another 50% of the inspection limits, or

The engine is not operated for more than 5 cycles, or more than 25 hours before the damage is repaired.



INLET GUIDE VANE
CROSS-SECTION SHOWING
ANNULUS FILLER LOCZTION

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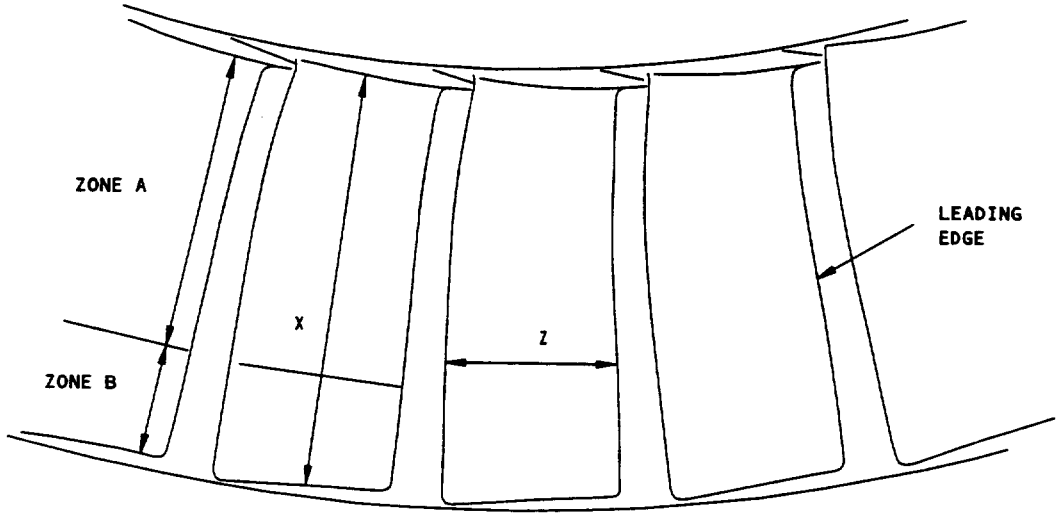
IP Compressor Inlet Guide Vanes and Front Bearing Housing Support
Figure 603

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

M60337



STAGE	QTY	DIMENSION X	DIMENSION Z (TRUE CHORD)
1	50	5.100 INCHES (129.54 mm)	2.97 INCHES (75.38 mm)
2	57	4.700 INCHES (119.38 mm)	2.52 INCHES (64.08 mm)
3	48	4.300 INCHES (109.22 mm)	2.36 INCHES (60.00 mm)
4	53	3.900 INCHES (99.06 mm)	2.19 INCHES (55.59 mm)
5	49	3.700 INCHES (93.98 mm)	2.21 INCHES (56.06 mm)
6	46	3.500 INCHES (88.9 mm)	2.31 INCHES (58.79 mm)
ZONE A = 75% OF BLADE AIRFOIL			
ZONE B = 25% OF BLADE AIRFOIL			

STAGE 2

VIEWED FROM THE
REAR

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IP Compressor Blade Dimensions
Figure 604

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60369

Intermediate Pressure Compressor Inspection

2) Accept a single crack from a blade tip not associated with any other damage, only if the crack's length does not exceed 10% of the true chord width:

Stage 1	0.30 in.	(7.5 mm)
Stage 2	0.25 in.	(6.4 mm)
Stage 3	0.24 in.	(6.0 mm)
Stage 4	0.22 in.	(5.6 mm)
Stage 5	0.22 in.	(5.6 mm)
Stage 6	0.23 in.	(5.9 mm)

3) Accept cracks, nicks, or tears on one edge in Zone A, only if the length of any one does not exceed 5% of the true chord width:

Stage 1	0.15 in.	(3.8 mm)
Stage 2	0.13 in.	(3.2 mm)
Stage 3	0.12 in.	(3.0 mm)
Stage 4	0.11 in.	(2.8 mm)
Stage 5	0.11 in.	(2.8 mm)
Stage 6	0.09 in.	(2.4 mm)

4) Accept cracks, nicks, or tears on both edges in Zone A, only if the length of any one does not exceed 2.5% of the chord width:

Stage 1	0.07 in.	(1.9 mm)
Stage 2	0.06 in.	(1.6 mm)
Stage 3	0.06 in.	(1.5 mm)
Stage 4	0.06 in.	(1.4 mm)
Stage 5	0.06 in.	(1.4 mm)
Stage 6	0.06 in.	(1.5 mm)

5) Accept cracks, nicks, or tears on one edge in Zone B, only if the length of any one does not exceed 15% of the chord width:

Stage 1	0.45 in.	(11.3 mm)
Stage 2	0.38 in.	(9.6 mm)
Stage 3	0.35 in.	(9.0 mm)
Stage 4	0.33 in.	(8.3 mm)
Stage 5	0.34 in.	(8.4 mm)
Stage 6	0.35 in.	(8.8 mm)

Intermediate Pressure Compressor Inspection

6) Accept cracks, nicks, or tears on both edges within Zone B, only if the individual lengths do not exceed 7.5% of the true chord width:

Stage 1	0.23 in.	(5.7 mm)
Stage 2	0.19 in.	(4.8 mm)
Stage 3	0.18 in.	(4.5 mm)
Stage 4	0.17 in.	(4.2 mm)
Stage 5	0.17 in.	(4.2 mm)
Stage 6	0.17 in.	(4.4 mm)

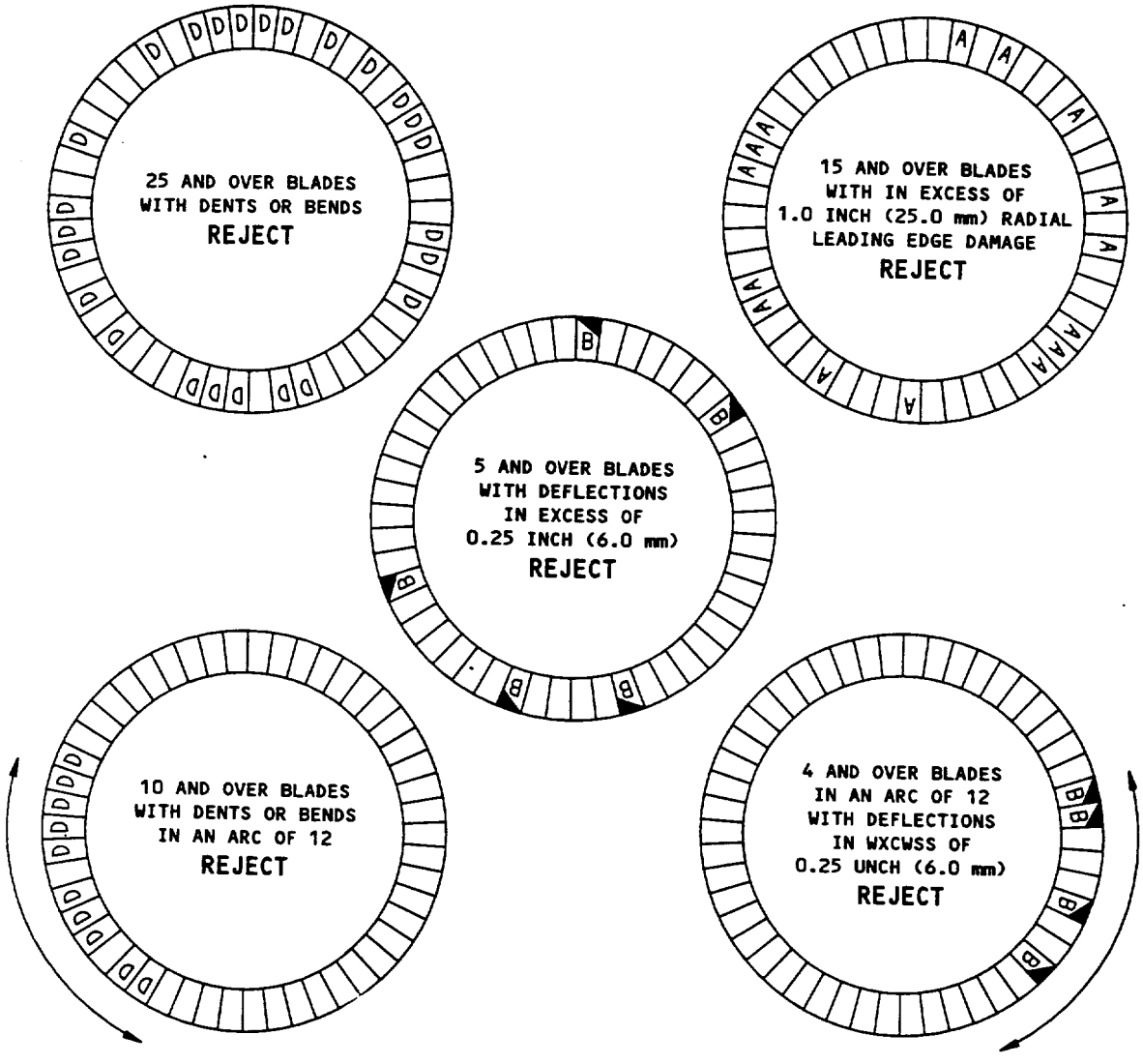
(b) Examine the IP compressor blades for dents or bends in Zones A and B.

NOTE: If the damage in Zone B is more than the limits, the engine can be operated only if:

The damage to the blades is not more than another 50% of the inspection limits.

The engine is not operated for more than 5 cycles, or more than 25 hours before the damage is repaired.

1) Examine the stage 1 blades for dent or bends (Fig. 604A).
   a) Reject if there are 25 or more blades with dents or bends.
   b) Reject if there are 15 or more blades with dents or bends that are more than 1.0 in. (25.0 mm) in radial length along the leading edge.
   c) Reject if there are 5 or more blades with dents or bends that change the shape of the blade more than 0.25 in. (6.0 mm) away from the correct aerofoil position.
   d) Reject if there are 10 or more blades, in an arc of 12 blades, that have dents or bends.
   e) Reject if there are 4 or more blades, in an arc of 12 blades, with dents or bends that change the shape of the blade more than 0.25 in. (6.0 mm) away from the correct aerofoil position.
2) Examine the stage 2 to stage 6 blades for dents or bends.
   a) Accept dents or bends if they are not related to cracks, nicks or tears.
   b) Reject large bends if the blade has touched another blade.



DAMAGED BLADE IDENIFICATION

- BLADE WITH NO DAMAGE
- A — BLADE WITH RADIAL LEADING EDGE DAMAGE MORE THAN 1.0 INCH (25.0 mm) IN LENGTH
- B — BLADE WITH DEFLECTION MORE THAN -.25 INCH (6.0 mm)
- D — BLADE WITH ANY DENTS AND BENDS INCLUDING DEFLECTIONS

DE000A9470

IP Compressor Stage 1 Example of Blade Damage
Figure 604A

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60396

Intermediate Pressure Compressor Inspection

c) For dents or bends related to cracks, nicks or tears, refer to the limits given for cracks, nicks or tears in zones A and B.

(c) Examine the IP compressor blades for tip damage in Zone B:

NOTE: If the damage in Zone B is more than the limits, the engine can be operated only if:

The damage to the blades is not more than another 50% of the inspection limits, or

The engine is not operated for more than 5 cycles, or more than 25 hours before the damage is repaired.

1) Accept heat discoloration associated with blade tip rub.
2) For burrs on the trailing edge tip that are related to blade tip rub:
   a) Accept if they are on not more than 25% of the blade chord width.
3) Accept bends or curls. Bends or curls with associated cracks or tears are also permitted only if:
   a) Re-inspection is carried out at intervals not to exceed 300 hours.
   b) The length of an individual crack or tear does not exceed 20% of true chord width:

Stage 1	0.60 in.	(15.1 mm)
Stage 2	0.50 in.	(12.8 mm)
Stage 3	0.47 in.	(12.0 mm)
Stage 4	0.44 in.	(11.1 mm)
Stage 5	0.44 in.	(11.2 mm)
Stage 6	0.46 in.	(11.8 mm)

4) Accept a piece of tip missing only if each subsequent stage is inspected and the missing piece does not exceed 30% of the true chord width:

Stage 1	0.89 in.	(22.6 mm)
Stage 2	0.76 in.	(19.2 mm)
Stage 3	0.71 in.	(18.0 mm)
Stage 4	0.66 in.	(16.7 mm)
Stage 5	0.66 in.	(16.7 mm)
Stage 6	0.69 in.	(17.6 mm)

Intermediate Pressure Compressor Inspection

(d) Examine the IP compressor blades for material loss in zones A and B.

1) Accept material loss from the leading and trailing edges only if there is no associated cracking. Individual areas of material loss must not exceed the following:

a) Refer to the limits given for cracks, nicks, tears in zones A and B, and apply these same limits to the individual areas of material loss.

High Pressure Compressor Inspection

TASK 72-00-00-206-038-R01

5. High Pressure (HP) Compressor Inspection

A. General

(1) The subsequent operations give the HP compressor inspection procedure and the standards (limits) you can accept.

(2) With this inspection, you will examine the HP compressor blades for the conditions that follow:

NOTE: You will not be able to examine the rear of the 4th-stage, the front of the 5th-stage, or the rear of the 6th-stage rotor blades.

(a) Airfoil cracks, nicks or tears.
(b) Airfoil dents.
(c) Material loss on the airfoil leading and trailing edges.
(d) Airfoil tip damage and discoloration.

(3) It is not possible to examine these areas of the HP compressor:
(a) The rear of the 4th-stage rotor blades.
(b) The front of the 5th-stage rotor blades.
(c) The rear of the 6th-stage rotor blades.

(4) The access location, the view area, and the number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
HP 1S	Rear - Stage 1	57
HP 1S	Front - Stage 2	82
HP 2S	Rear - Stage 2	82
HP 2S	Front - Stage 3	94
-----	Rear - Stage 3	94
-----	Front - Stage 4	97
HP 5S	Rear - Stage 5	76
HP 5S	Front - Stage 6	74
HP 6R	Rear - Stage 6	5 Lockplates

High Pressure Compressor Inspection

B. References
(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access
(1) Location Zones:
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure

S 846-158-R01
(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-189-R01
(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 496-188-R01
(3) Attach the tool to turn the HP system (AMM 72-00-00/201).

S 296-162-R01
(4) Do an inspection of the HP compressor blades. Use the following standards (limits) (Fig. 605):

NOTE: If you find damage that extends from one zone into another, compare the chord width of the damage in each zone with the limit for that zone.

(a) Examine the blades for cracks, nicks, or tears.

NOTE: If the damage in Zone B is more than the limits, the engine can be operated only if:

The damage to the blades is not more than another 50% of the inspection limits.

The engine is not operated for more than 5 cycles or more than 25 hours before the damage is repaired.

1) Accept nicks or tears that start on the leading or trailing edges, only if:
a) There is no cracking from damage.

High Pressure Compressor Inspection

b) The maximum size of the nick or tear is 0.015 in. (0.381 mm).

2) Blade cracks, nicks or tears more than 1) but in the limits that follow must be monitored. Do an inspection when each 300 hours of engine operation is completed.

If you see no increase in size or deterioration of the damage after three repeat inspections, do one more inspection after 1000 hours maximum.

If no deterioration of the damage is yet apparent, you can decide when the next inspection is necessary.

3) Do the inspection that follows:

a) Accept cracks, nicks or tears on one edge in Zone A if the length of each crack is not more than 10% of the true chord width.

Stage 1	0.17 in.	(4.3 mm)
Stage 2	0.14 in.	(3.5 mm)
Stage 3	0.12 in.	(3.1 mm)
Stage 4	0.14 in.	(3.6 mm)
Stage 5	0.13 in.	(3.4 mm)
Stage 6	0.13 in.	(3.2 mm)

b) Accept cracks, nicks, or tears on both edges in Zone A only if the length of any one does not exceed 5% of the true chord width:

Stage 1	0.08 in.	(2.0 mm)
Stage 2	0.07 in.	(1.8 mm)
Stage 3	0.06 in.	(1.5 mm)
Stage 4	0.07 in.	(1.8 mm)
Stage 5	0.07 in.	(1.7 mm)
Stage 6	0.06 in.	(1.6 mm)

High Pressure Compressor Inspection

c) Accept cracks, nicks, or tears on one edge in Zone B only if the length of any one does not exceed 20% of the true chord width:

Stage 1	0.33 in.	(8.4 mm)
Stage 2	0.28 in.	(7.1 mm)
Stage 3	0.24 in.	(6.2 mm)
Stage 4	0.27 in.	(6.9 mm)
Stage 5	0.27 in.	(6.8 mm)
Stage 6	0.25 in.	(6.4 mm)

d) Accept cracks, nicks, or tears on both edges in Zone B only if the length of any one does not exceed 10% of the true chord width:

Stage 1	0.17 in.	(4.3 mm)
Stage 2	0.14 in.	(3.5 mm)
Stage 3	0.12 in.	(3.1 mm)
Stage 4	0.14 in.	(3.6 mm)
Stage 5	0.13 in.	(3.4 mm)
Stage 6	0.13 in.	(3.2 mm)

(b) Examine the blades for dents.
1) Accept dents. For dents with associated cracks, nicks, or tears, refer to the limits given for cracks, nicks, or tears.

(c) Examine the blades for material loss in zones A and B.
1) Accept material loss from the leading and trailing edges, only if:
a) There is no cracking associated with the area of material loss.
b) Refer to the limits given for cracks, nicks, or tears and apply these limits to material loss. The area of material loss must not exceed those limits.

High Pressure Compressor Inspection

(d) Examine the blades for tip damage and discoloration

NOTE: All stages of HP compressor rotor and stator blades are manufactured with local bends at the tip and root. Do not confuse this design feature with airfoil bends or curls caused by foreign object impact.

1) Accept discoloration associated with blade tip rub.
2) Accept bends or curls. Bends or curls associated with cracks or tears are also permitted only if:
   a) Re-inspection is carried out at intervals not exceeding 300 hours.
   b) The individual length of the crack or tear does not exceed 20% of the chord width:

Stage 1	0.37 in.	(9.5 mm)
Stage 2	0.28 in.	(7.1 mm)
Stage 3	0.24 in.	(6.2 mm)
Stage 4	0.22 in.	(5.7 mm)
Stage 5	0.27 in.	(6.8 mm)
Stage 6	0.25 in.	(6.4 mm)

3) Accept a piece of tip missing only if each subsequent stage is inspected and the missing piece does not exceed 33% of the true chord width:

Stage 1	0.61 in.	(15.6 mm)
Stage 2	0.46 in.	(11.7 mm)
Stage 3	0.40 in.	(10.2 mm)
Stage 4	0.37 in.	(9.3 mm)
Stage 5	0.44 in.	(11.2 mm)
Stage 6	0.42 in.	(10.6 mm)

   a) Radial length from tip of missing piece is not restricted. Missing tip section may encroach into Zone A from Zone B (Fig. 605).

Combustion Liners and HPNGV Inspection

TASK 72-00-00-206-049-R01

6. Combustion Liners and High Pressure Nozzle Guide Vanes (HPNGV) Inspection

A. General

(1) The subsequent operations give the inspection procedure for the combustion liners and the the HPNGV; also given are the inspections standards (limits) you can accept.

(2) After 5 inspections at the times given in the limits that follow, you can multiply the inspection interval by two if:

(a) There is no increase in crack length and no new defects are found.

(3) With this inspection you will examine these parts of the combustion liners and HPNGV:

(a) The front liner inner and outer walls.
(b) Heatshields,
(c) Burner seals,
(d) Rear inner and outer discharge nozzles,
(e) Fuel spray nozzles,
(f) High pressure nozzle guide vanes (HPNGV).
(g) Subsequent to a birdstrike or if you think a bird has gone into the engine, you will do the following:

1) Carefully use a 0.32 in. (8.00 mm) diameter probe to look for damage to the following components:

a) Meter panel.
b) Heatshields.
c) Fuel spray nozzles.

(4) To help you make an estimate of the damage, the acceptance zones are given (Fig. 605, 606, and 607).

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings
(3) AMM 73-11-05/401, Fuel Spray Nozzles

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure

S 846-185-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-186-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

Combustion Liners and HPNGV Inspection

S 296-187-R01

(3) Do an inspection of the inner and outer walls of the front liner (Fig. 606) for the following:

(a) Cracks on the inner or outer walls of the front liner.

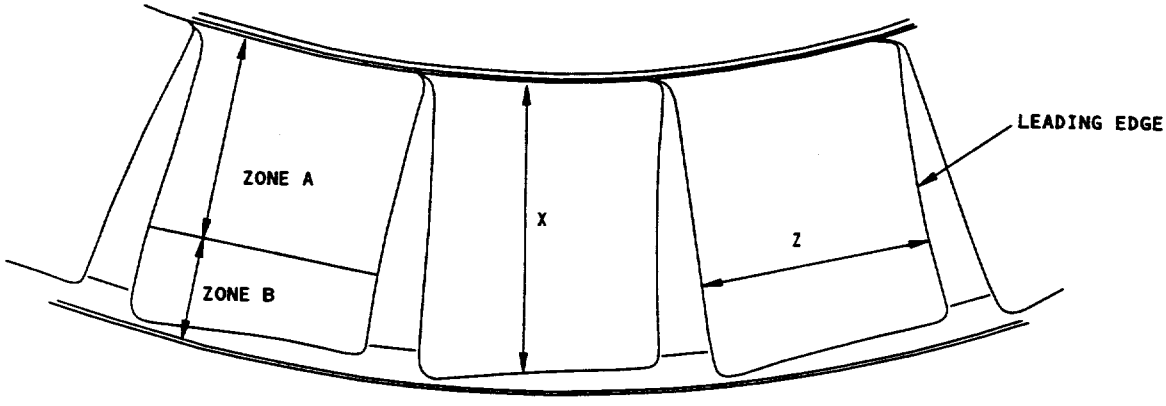
NOTE: Look carefully at the inner walls for cracks and at the areas around the dilution chutes.

1) Axial cracks in the cooling ring lip rearward of the cooling ring:
   a) Accept cracks that are less than 0.39 inches (10 mm) long only if they are more than 0.20 inches (5 mm) apart with crack-free material between them.
   b) If the cracks are less than 0.20 inches (5 mm) apart, you must do more inspections regularly, less than 300 flight cycles apart.
2) Isolated cracks in other areas:

NOTE: Cracks are isolated if they are 0.79 inches (20 mm) apart, with crack-free material between them.

   a) Accept if the cracks are less than 0.20 inches (5 mm) long.
   b) For axial cracks: Accept if the cracks do not extend through an adjacent cooling ring lip and do not connect. You must do more inspections regularly, less than 75 flight cycles apart.
   c) For axial cracks: Reject if the cracks connect or extend through an adjacent cooling ring lip. Remove the engine in less than 10 flight cycles.
   d) For circumferential cracks: Accept if the cracks are more than 0.20 inches (5 mm) long but less than 0.79 inches (20 mm) long. You must do more inspections regularly, less than 300 flight cycles apart.

TYPICAL STAGES 4,5 AND 6



STAGES 4,5 AND 6
VIEW FROM REAR
(EXAMPLE)

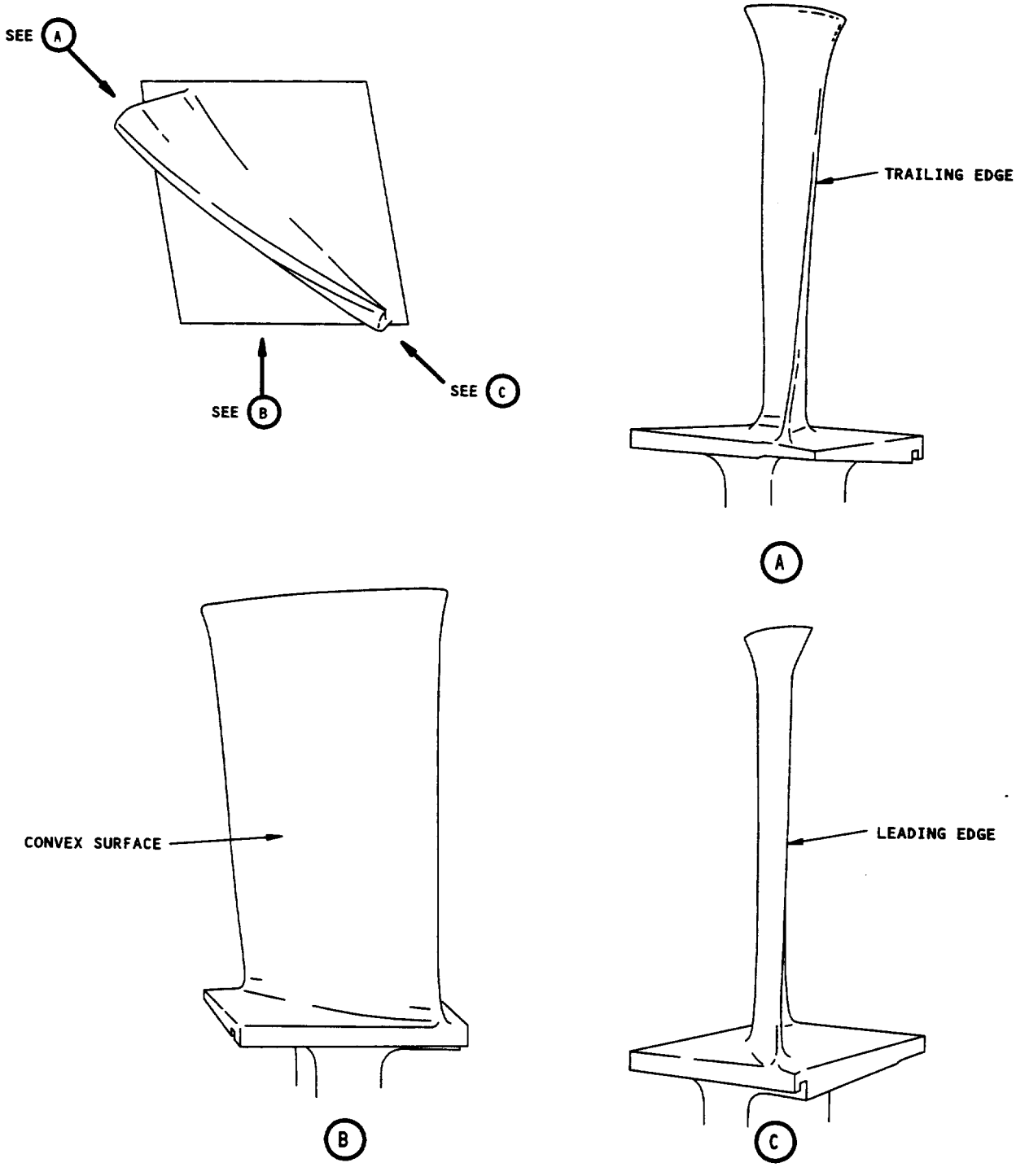
STAGE	QTY	DIMENSION X	DIMENSION Z (TRUE CHORD)
1	57	2.30 INCHES (58.3 mm)	1.65 INCHES (41.91 mm)
2	82	1.91 INCHES (48.4 mm)	1.39 INCHES (35.31 mm)
3	94	1.57 INCHES (39.9 mm)	1.21 INCHES (30.83 mm)
4	97	1.34 INCHES (34.1 mm)	1.35 INCHES (34.29 mm)
5	76	1.20 INCHES (30.4 mm)	1.34 INCHES (34.00 mm)
6	74	1.06 INCHES (27.0 mm)	1.26 INCHES (32.13 mm)
ZONE A = 75% OF BLADE AIRFOIL			
ZONE B = 25% OF BLADE AIRFOIL			

DE00067440A

HP Compressor Blades
Figure 605 (Sheet 1)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60437



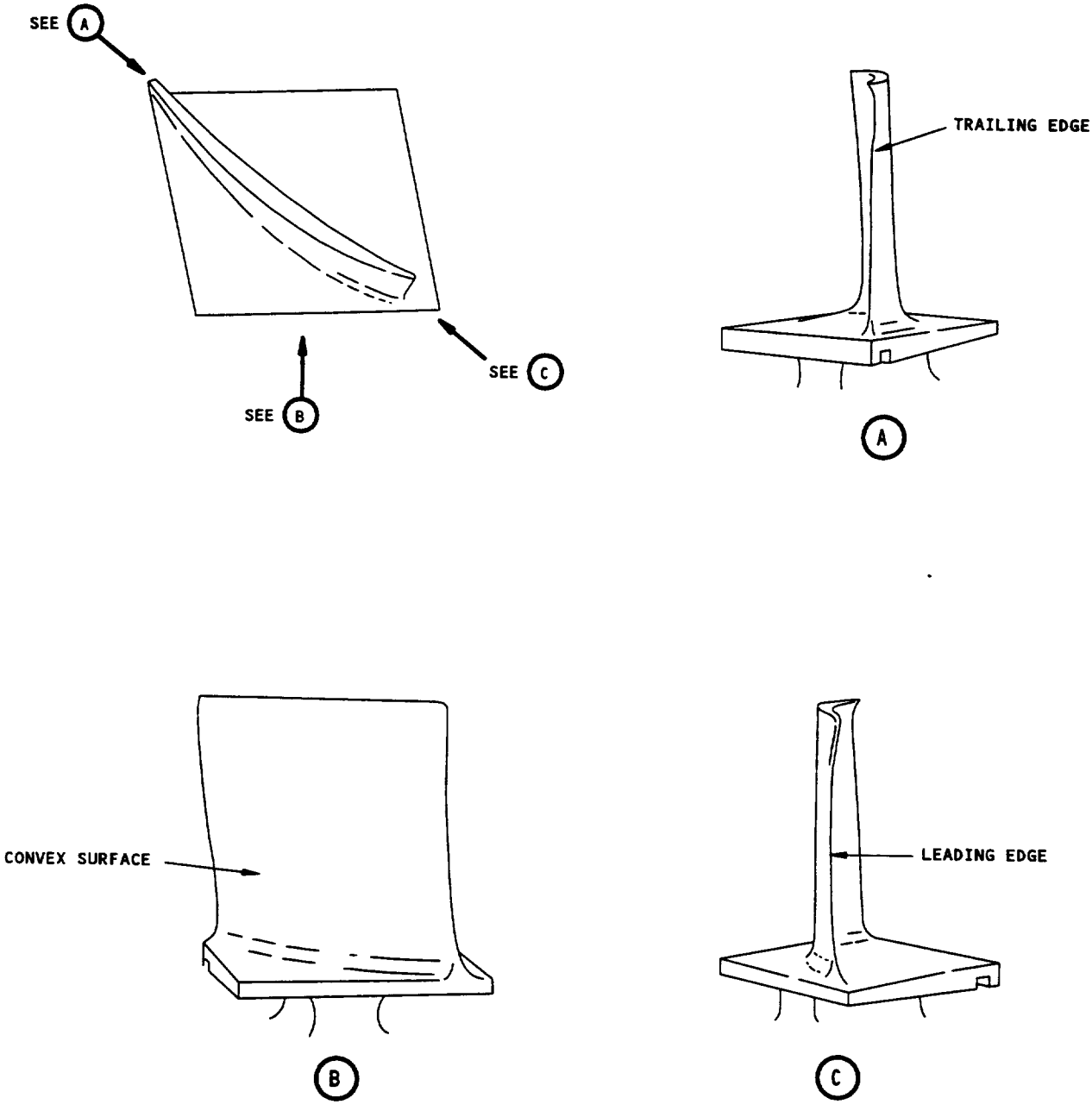
STAGE 1 (EXAMPLE)

DE00069088

HP Compressor Blades
Figure 605 (Sheet 2)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60471

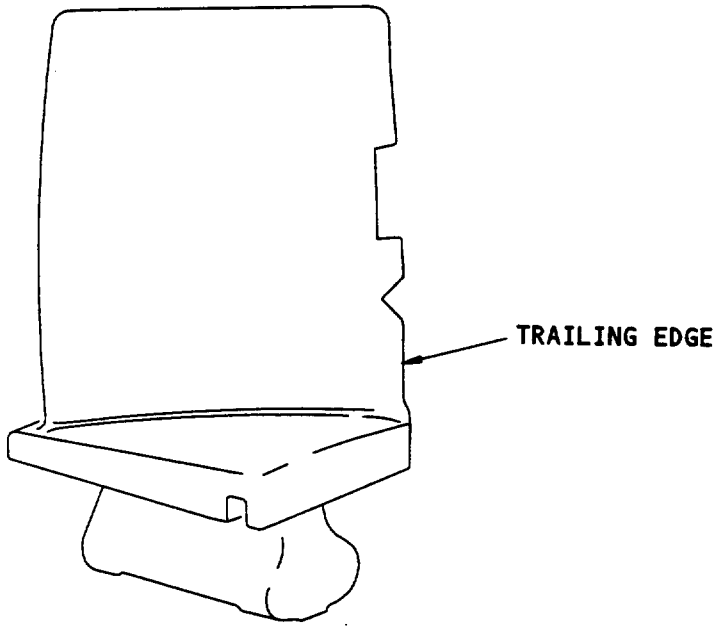


DEE00069298

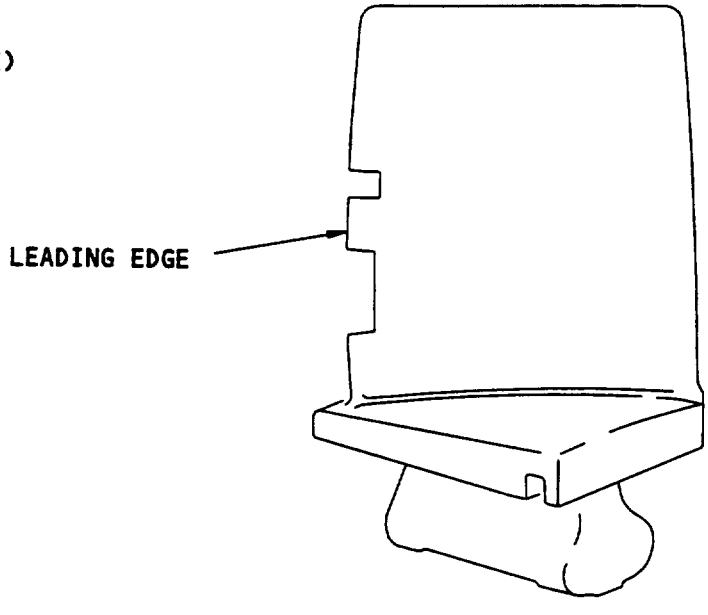
HP Compressor Blades
Figure 605 (Sheet 3)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60483



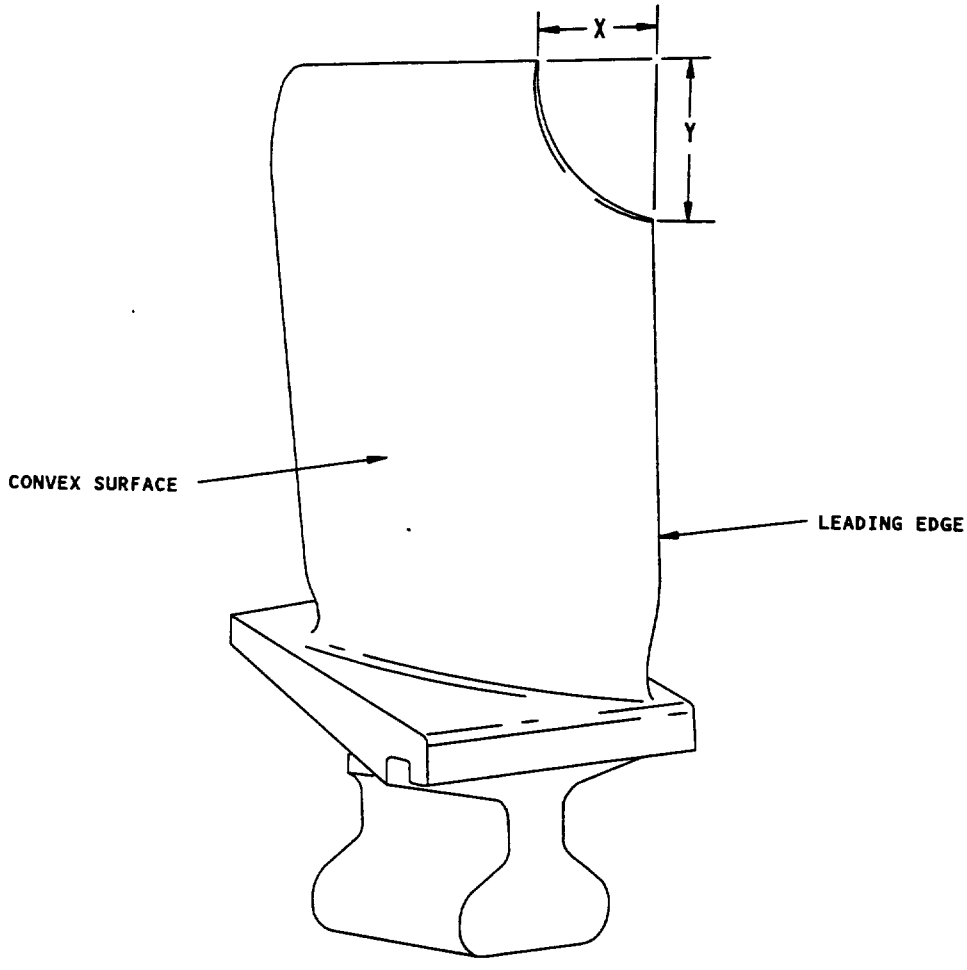
STAGE 5
(EXAMPLE)



STAGE 6
(EXAMPLE)

DE000A2960

HP Compressor Blades
Figure 605 (Sheet 4)



STAGE 3
(EXAMPLE)

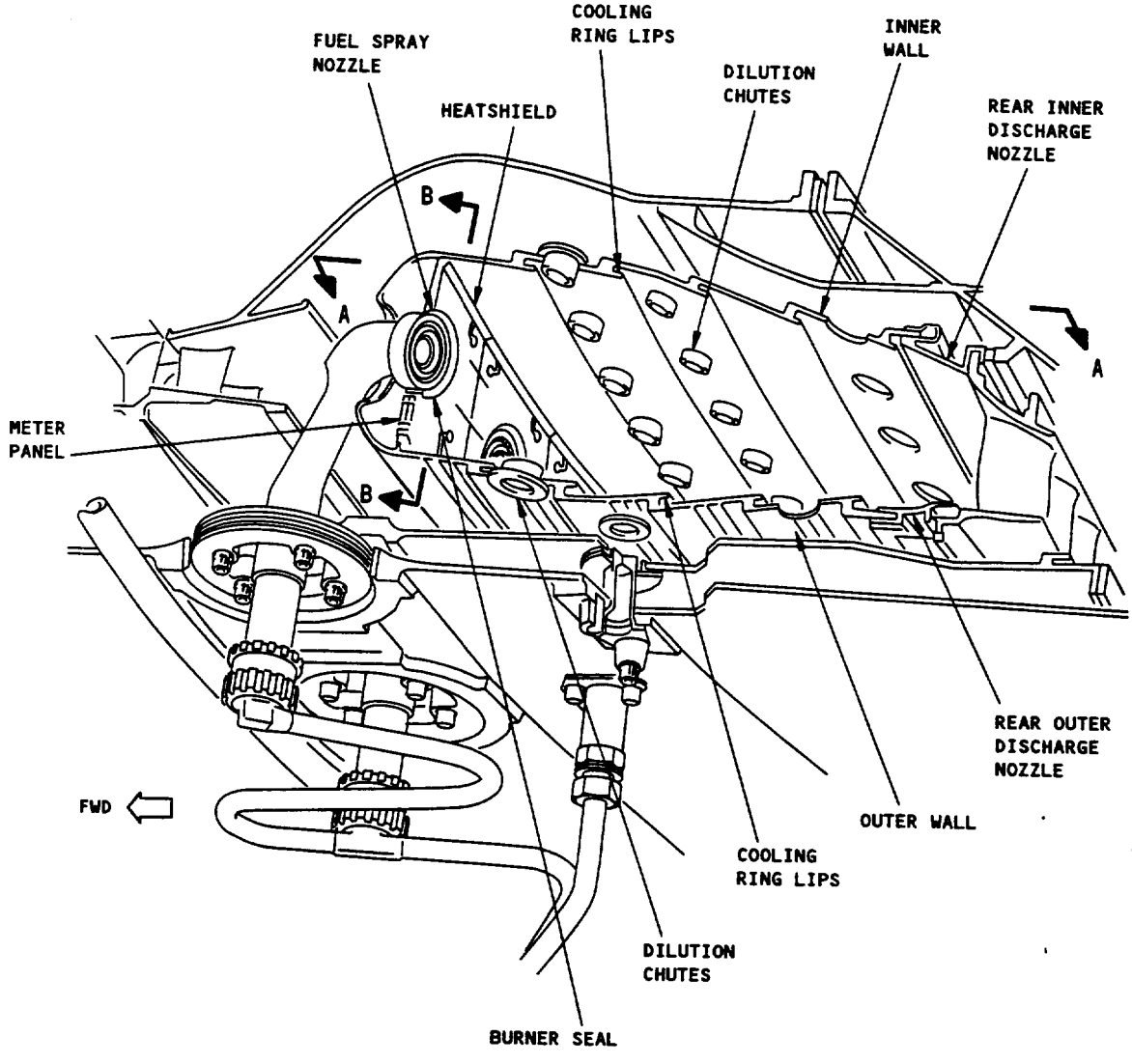
X EXAMPLE TIP RELEASE 0.25 INCH (6.35 mm)
Y EXAMPLE TIP RELEASE 0.40 INCH (10.16 mm)

DE000A2962A

HP Compressor Blades
Figure 605 (Sheet 5)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60525

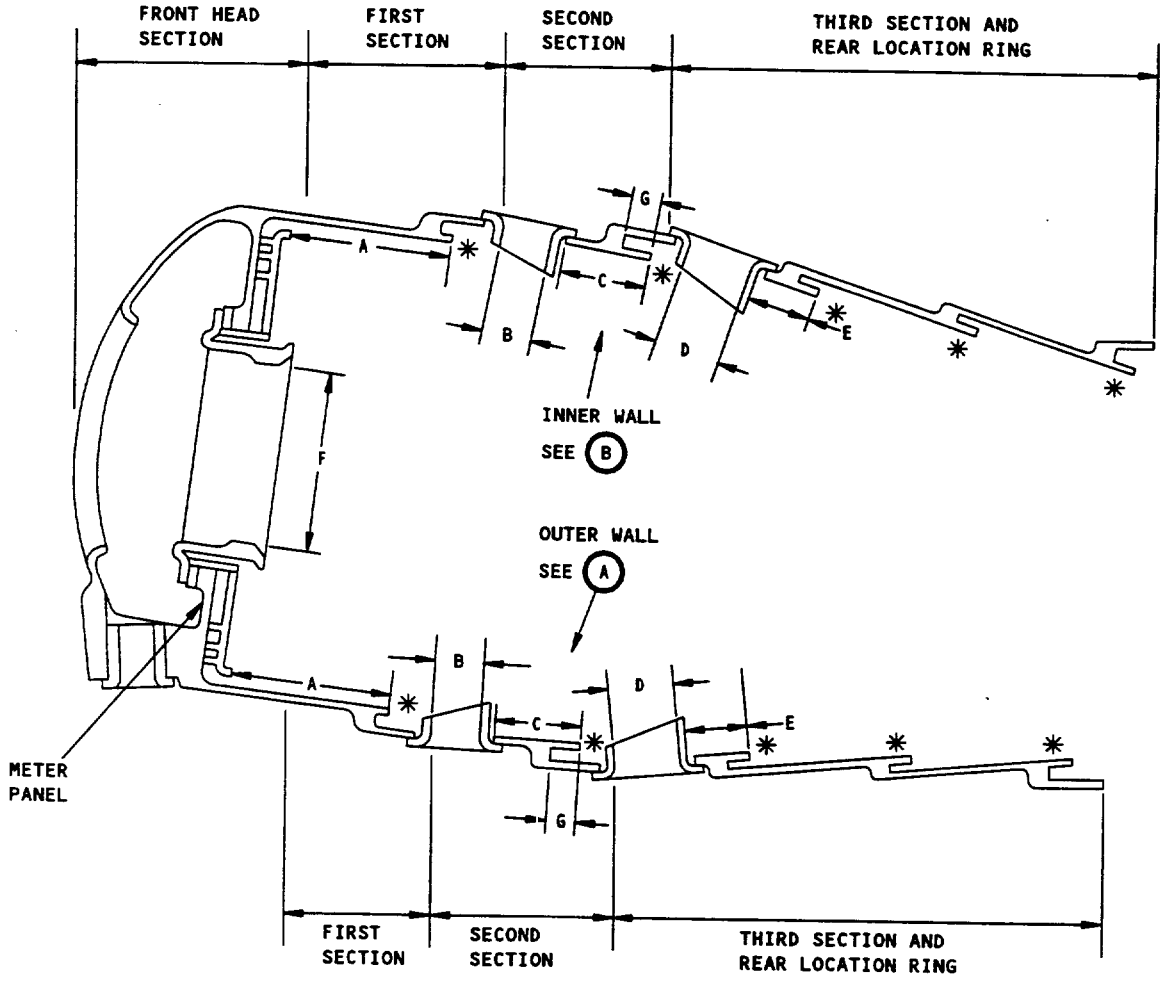


DEE0002218

Front Combustion Liner
Figure 606 (Sheet 1)

EFFECTIVITY
RB211-535E4, RB211-535E4-B
(POST 72-C230, PHASE V COMBUSTOR)
AND RB211-535E4-C.

H60588



A-A

NOTE: DIMENSIONS SPECIFIED ARE TO BE USED AS AN AID WHEN YOU ESTIMATE THE DAMAGE.

A = 1.56 INCH (39.56 mm)
B = 0.35 INCH (8.80 mm) DIAMETER
C = 0.91 INCH (23.09 mm)
D = 0.60 INCH (15.20 mm) DIAMETER
E = 0.77 INCH (19.50 mm)
F = 1.58 INCH (40.13 mm DIAMETER)
G = 0.28 INCH (7.00 mm)

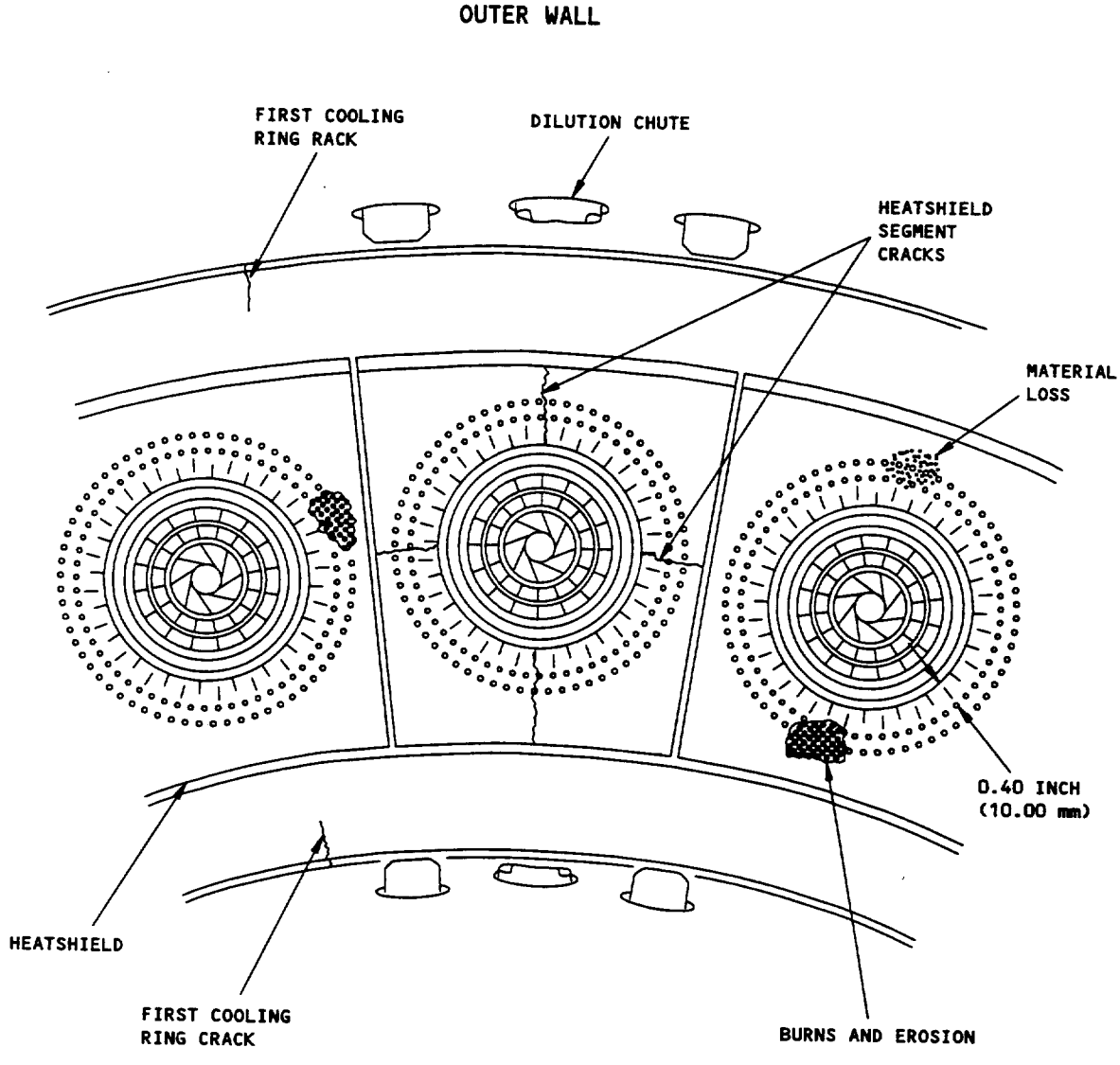
* COOLING RING LIPS (10 LOCATIONS)

DEE0004808

Front Combustion Liner
Figure 606 (Sheet 2)

EFFECTIVITY
RB211-535E4, RB211-535E4-B
(POST 72-C230, PHASE V COMBUSTOR)
AND RB211-535E4-C.

H60611

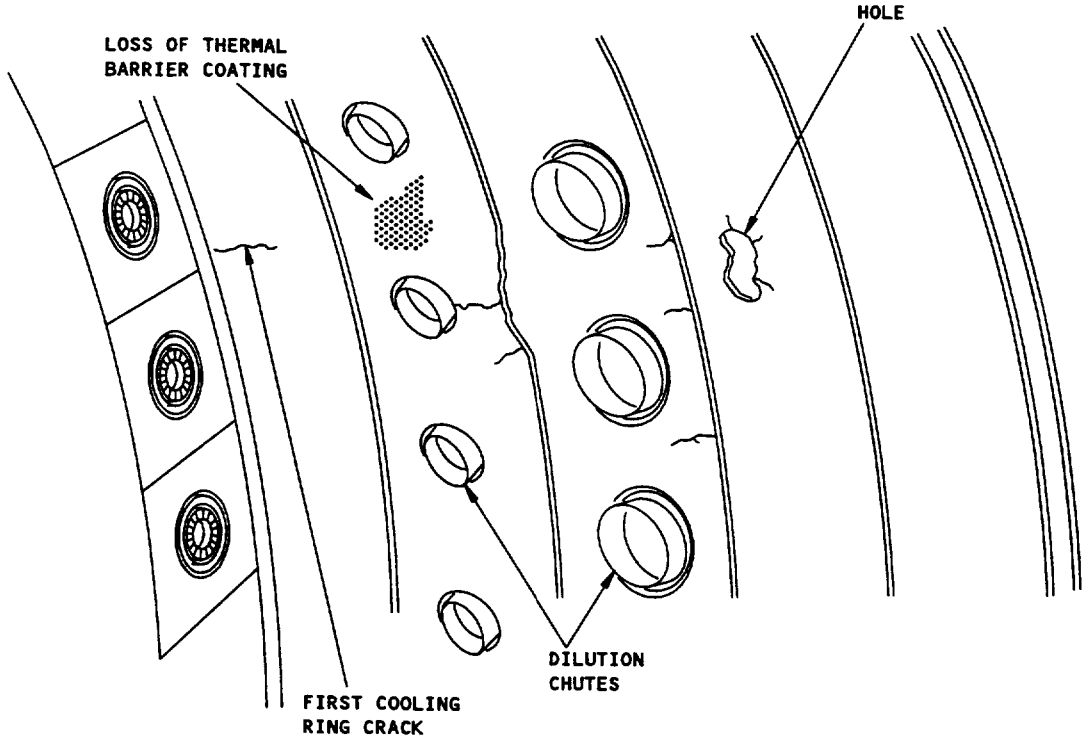


DEF0004309

Front Combustion Liner
Figure 606 (Sheet 3)

EFFECTIVITY
RB211-535E4, RB211-535E4-B
(POST 72-C230, PHASE V COMBUSTOR)
AND RB211-535E4-C.

L76607

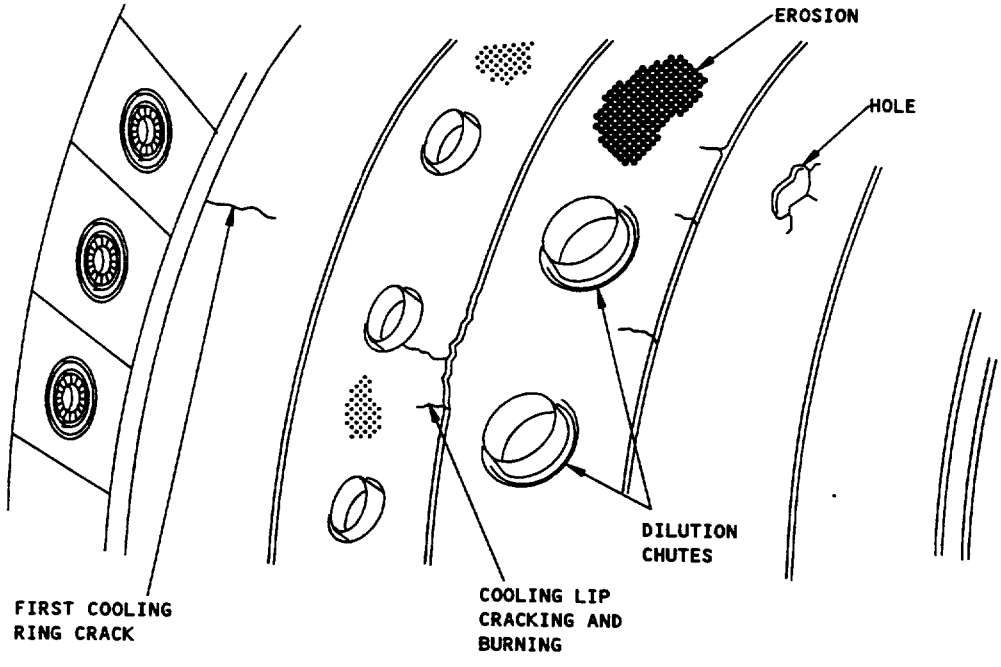


(VIEW ON OUTER WALL)

(A)

DEE0004809

Front Combustion Liner
Figure 606 (Sheet 4)



(VIEW ON INNER WALL)

(B)

DEE000481D

Front Combustion Liner
Figure 606 (Sheet 5)

Combustion Liners and HPNGV Inspection

e) For circumferential cracks: Accept if the cracks are more than 0.79 inches (20 mm) long but less than 1.57 inches (40 mm) long. You must do more inspections regularly, less than 75 flight cycles apart.
f) For circumferential cracks: Reject if the cracks are more than 1.57 inches (40 mm) long. Remove the engine in less than 10 flight cycles.
g) For cracks in the first section of the liner inner wall: Reject if the end of the crack nearest to the meter panel cannot be clearly seen. Remove the engine in less than 10 flight cycles.
h) Reject if the cracks are not isolated. Remove the engine in less than 10 flight cycles.

3) Cracks in the dilution chutes.
a) Accept if the cracks do not go into the liner walls.

(b) Burns or erosion of the inner or outer walls of the front liner.
1) Accept burns or erosion, with related distortion or material decrease, of the cooling ring if you obey the limits that follow:
a) The axial length must not be more than 0.39 in. (10.00 mm).
b) If the damage is more than the above limits, make an inspection of the damage before 500 hours.
2) Burns or erosion of dilution chutes are permitted.

(c) Holes on the inner or outer walls of the front liner.
1) Accept a hole caused by burns and/or cracks at a maximum of 4 locations if the size of the hole is not more than 0.31 sq.in. (200.00 sq.mm).
2) If the hole is larger than the limit given above in 1), then you must do an inspection of the rear inner and outer discharge nozzles and the HPNGV at the time intervals given below:
a) If the hole is greater than 0.31 sq.in. (200.00 sq.mm) but less than 0.62 sq.in. (400.00 sq.mm), do the inspection again before 250 hours.

Combustion Liners and HPNGV Inspection

b) If the hole is greater than 0.62 sq.in. (200.00 sq.mm) but less than 1.24 sq.in. (800.00 sq.mm), do the inspection again before 130 hours.
c) If the hole is greater than 1.24 sq.in. (800.00 sq.mm) but less than 2.48 sq.in. (1600.00 sq.mm), do the inspection again before 65 hours.
d) If the hole is greater than 2.48 sq.in. (1600.00 sq.mm), remove the engine before 30 hours.

(d) Material decrease on the inner or outer walls of the front liner.
1) If a large amount of material is loose and will possibly break away, replace the engine.

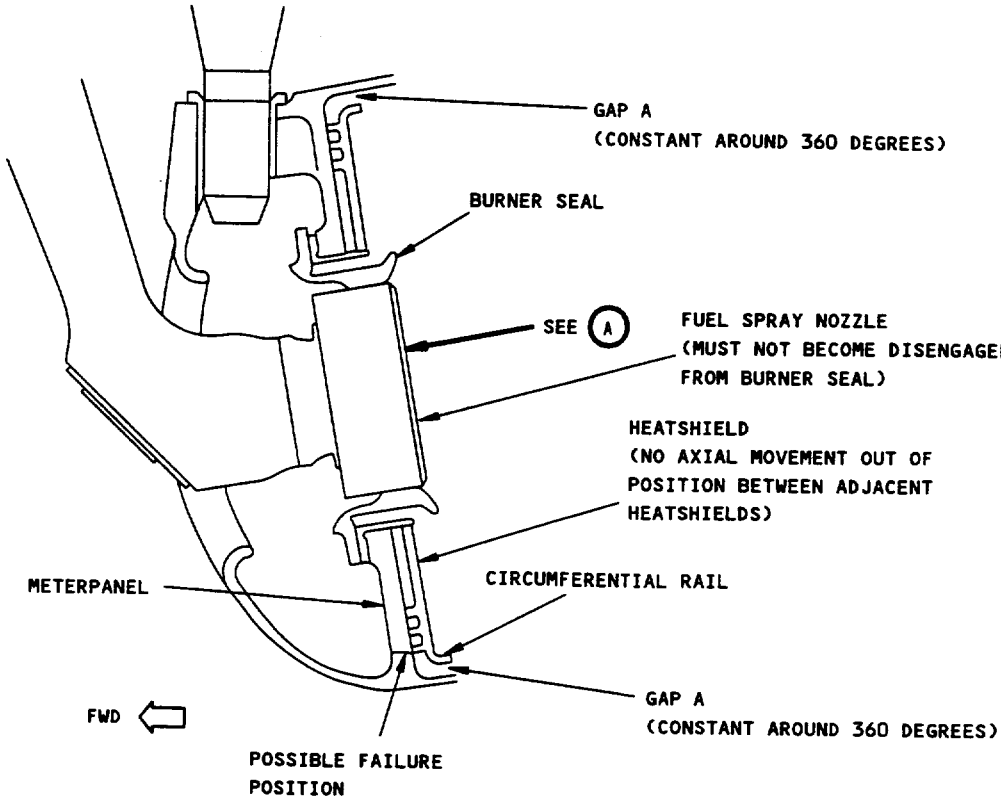
(e) Thermal barrier layer decrease on the inner or outer walls of the front liner.
1) Accept a general decrease of the thermal barrier layer.

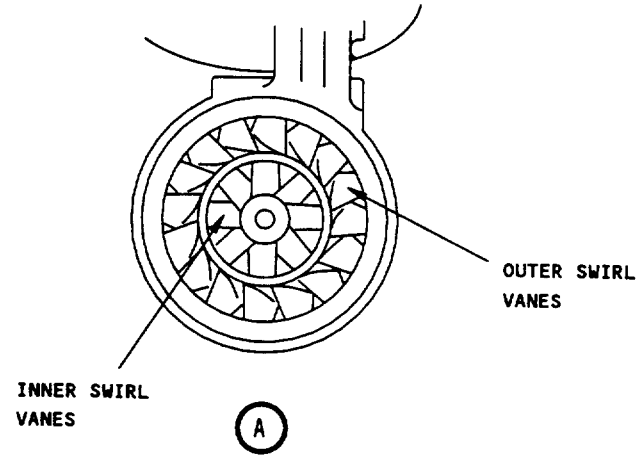
S 296-166-R01

(4) Do an inspection of the heatshield (Fig. 607) for the following:
(a) Cracks on the heatshield.
1) Accept cracks only if they are not more than 0.39 in. (10.00 mm) from the heatshield bore. They must also be more than 0.20 in. (5.00 mm) apart and have material with no cracks between them.
2) Accept cracks in the inner and outer circumferential rail provided they do not extend beyond the fillet radius.
3) Accept cracks that are longer than the limits only if you do the inspection again before 250 hours.

(b) Burns and erosion on the heatshield.
1) Accept burns and erosion only if there is no sign of holes.

(c) Holes in the heatshield.
1) Accept a hole or decrease of material only if the hole is not greater than 0.09 sq.in. (60.00 sq.mm).
2) Accept a hole or decrease of material greater than the limit only if the hole does not extend to more than 0.23 sq.in. (150.00 sq.mm) and you obey these conditions:
a) Do an inspection of the front liner inner and outer walls before 130 hours of operation.





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Meterpanel and Heatshield
Figure 607

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60653

Combustion Liners and HPNGV Inspection

b) Do an inspection of the rear inner and outer discharge nozzles before 130 hours of operation.
c) Do an inspection of the HPNGV before 130 hours of operation.
d) Do an inspection of the HP turbine before 130 hours of operation.

3) If a hole or decrease of material is greater than 0.23 sq.in. (150.00 sq.mm), you must replace the engine before 30 hours of operation.

(d) Lifting of the heatshield (Fig. 607).
1) If the dimension of gap A is not constant around 360 degrees at 0.08 to 0.10 in. (2.00 to 2.50 mm), replace the engine.

(e) Axial movement of the heatshield.
1) If there is axial movement out of position between adjacent heatshields, replace the engine.

S 296-167-R01

(5) Do an inspection of the burner seals (Fig. 607) for the following:
(a) Cracks on the burner seal.
1) Accept radial cracks around the conical section only if they are not greater than 0.12 in. (3.00 mm).
2) Accept cracks that are longer than the limits only if you do this inspection again before 130 hours.

(b) Burns or erosion on the burner seal.
1) Accept burns or erosion around the edge of the conical tip section only if it is not greater than 0.12 in. (3.00 mm) from the tip.
2) Accept burns or erosion greater than the limits only if you do this inspection again before 130 hours.

(c) Distortion of the burner seal.
1) Accept distortion of the conical section.

S 296-168-R01

(6) Do an inspection of the rear inner and outer discharge nozzles (Fig. 606) for the following:
(a) Cracks of the rear inner and outer discharge nozzles.
1) Accept isolated cracks only if they are not greater than 0.79 in. (20.00 mm).

Combustion Liners and HPNGV Inspection

2) Accept cracks that are greater than the limit only if you do this inspection again before 130 hours.

(b) Burns or erosion on the rear inner and outer discharge nozzles.
1) Accept burns or erosion only if there are no holes.

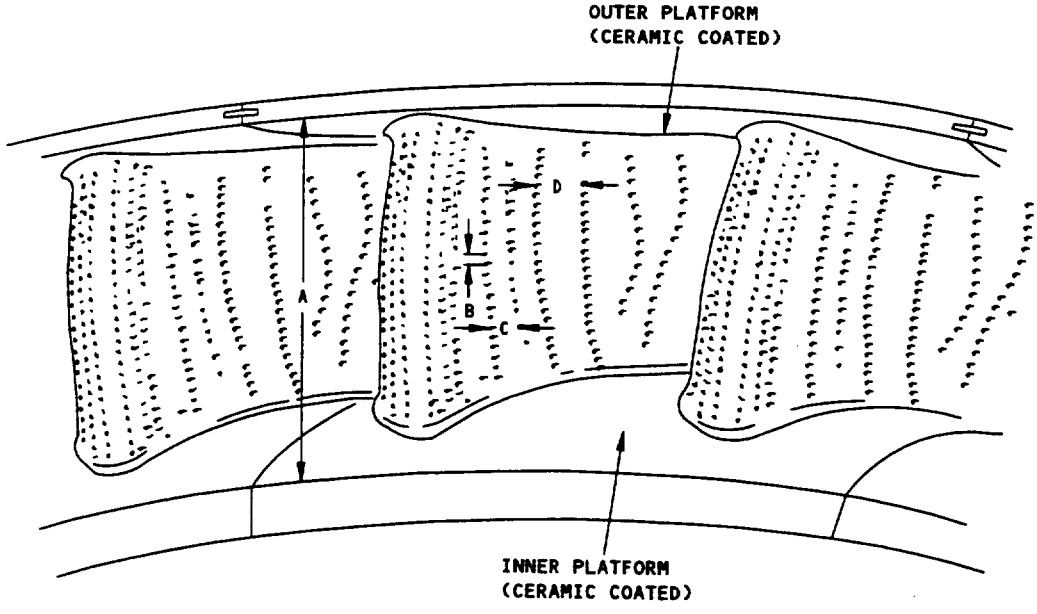
(c) Thermal barrier layer decrease of the rear inner and outer discharge nozzles.
1) Accept a general decrease of the thermal barrier coating.

S 296-169-R01

(7) Do an inspection of the fuel spray nozzles (Fig. 607) for the following:
(a) Cracks in the fuel spray nozzle.
1) If there are cracks in a fuel spray nozzle, replace the fuel spray nozzle (AMM 73-11-05/401).
(b) Material decrease on the fuel spray nozzle.
1) If the inner or outer swirler vane has gone, do an inspection of the HP turbine blades and HP NGV.
a) If the HP turbine blades and HPNGV are serviceable, replace the fuel spray nozzle (AMM 73-11-05/401).
b) If the HP turbine blades and HPNGV are not serviceable, replace the engine.
(c) Incorrect location of the fuel spray nozzle.
1) If the center of the fuel spray nozzle is not at the center of the burner seal, do an inspection of the combustion liner.
a) If the combustion liner is serviceable, replace the fuel spray nozzle (AMM 73-11-05/401).
b) If the combustion liner is not serviceable, replace the engine.

S 296-170-R01

(8) Do an inspection of the HP nozzle guide vanes (Fig. 608) for the following:



A = 2.952 INCHES (75.0 mm)
B = 0.078 INCH (2.0 mm)
C = 0.236 INCH (6.0 mm)
D = 0.500 INCH (12.7 mm)

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

HP Nozzle Guide Vanes
Figure 608

Combustion Liners and HPNGV Inspection

(a) Cracks in the airfoil surface of the HPNGV.
1) Accept axial cracks in the concave surface only if:
a) Each axial crack is not longer than 1.00 in. (25.4 mm), and,
b) The material has not lifted.
2) Accept radial cracks in the concave surface only if:
a) Each radial crack is not longer than 1.00 in. (25.4 mm).
b) The material has not lifted.
3) Accept axial and/or radial cracks in the concave surface that are longer than 1.00 in. (25.4 mm) only if:
a) The material has not lifted; and,
b) The cracks do not come together; and,
c) You must do the inspection again in less than 500 hours.
4) Axial cracks to convex surface:
a) Axial cracks up to 1.00 inch (25.4 mm) long no material lifted or bulged. - Accept
b) Axial cracks more than 1.00 inch (25.4 mm) long but less than 2.00 inch (50.8 mm) long with no material lifted or bulged. - Do inspections again at 500 hours.
c) Axial cracks more than 2.00 inch (50.8 mm) long or cracks that have lifted or bulged. - Reject the engine within 50 hours.
5) Accept axial cracks in the vane leading edge only if:
a) Each axial crack is not longer than 1.00 in. (25.4 mm), and,
b) They do not extend into the convex surface film cooling holes; and
c) The material has not lifted.
6) Accept radial cracks in the vane leading edge only if:
a) Each radial crack is not longer than 1.00 in. (25.4 mm); and,

Combustion Liners and HPNGV Inspection

b) They do not extend into the convex surface film cooling holes; and,
c) The material has not lifted.

7) Accept axial and/or radial cracks in the vane leading edge that are longer than 1.00 in. (25.4 mm) only if:
a) The material has not lifted; and,
b) You do the inspection again in less than 500 hours.

8) Accept axial and/or radial cracks in the vane leading edge that extend into the convex surface film cooling holes, only if:
a) The material has not lifted; and,
b) You do the inspection again in less than 500 hours.

9) Replace the engine in less than 50 hours if material has lifted.

10) Replace the engine in less than 50 hours if cracks connect and material can break away from the airfoil surface.

(b) Cracks in the inner and outer platform of the HPNGV.
1) Accept cracks in the ceramic layer.
2) Accept cracks in the inner and outer platform only if material cannot break away.
3) Replace the engine in less than 50 hours if material can break away.

(c) Material decrease on the HPNGV.
1) Replace the engine in less than 50 hours if material has lifted or can break away from the airfoil surface.

(d) Burns or erosion on the HPNGV.
1) Accept burns, erosion and a decrease in the quantity of the ceramic layer only if they have not gone into the inner or outer platform.
a) If you see burns to the inner or outer platform you must:

Make sure that the fuel spray nozzles are in the correct location in the heatshield seals, and

Do an inspection of the front combustion liner.

Combustion Liners and HPNGV Inspection

2) Replace the engine in less than 50 hours if burns or erosion have gone into the inner or outer platform.
3) Accept burns, erosion or holes that go into the vane leading edge only if:
   a) Less than 30 % of the leading edge has gone; and,
   b) No more of the leading edge material will go.
4) Accept burns, erosion or holes that go into the vane leading edge only if:
   a) Less than 40% of the leading edge has gone; and,
   b) No more of the leading edge material will go; and,
   c) You do the inspection again in less than 500 hours.
5) Replace the engine in less than 50 hours if more than 40% of the leading edge is gone.

(e) Foreign object damage to the HPNGV.
1) Accept dents in the airfoil section only if you do an inspection of the turbine blades.
2) Accept nicks and tears in the vane trailing edge only if:
   a) They do not extend forward of the rear row of film cooling holes; and,
   b) You can see no burns; and,
   c) You do an inspection of the turbine blades.
3) Reject the engine in less than 50 hours if cracks, nicks or tears in the vane trailing edge extend forward of the rear row of film cooling holes.
4) You must do an inspection of the turbine blades.
5) Replace the engine if you see any blockage between the vanes.

High Pressure Turbine Inspection

TASK 72-00-00-206-085-R01

7. High Pressure (HP) Turbine Inspection

A. General

(1) The subsequent operations give the HP turbine inspection procedure and the standards (limits) you can accept.

(2) With this inspection, you will examine the HP turbine for the conditions that follow:

(a) Burns or oxidation.
(b) Cracks.
(c) Dents.
(d) Erosion.
(e) Foreign object damage.
(f) Interlock damage.

(3) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 609).

(4) Use an impact extractor if it is not easy to remove the access plugs for the borescope.

(5) Inspection through borescope access holes.

NOTE: Deterioration of the HP NGV support ring heatshield may allow axial and circumferential movement of the heatshield over the support ring, after removal of the borescope plug. This may partially obscure the HP turbine borescope hole 'G'. The heatshield may be repositioned by hand to allow ease of entry of borescope. Looseness of the heatshield will not affect engine integrity.

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure

S 846-172-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 846-173-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 426-174-R01

(3) Attach the tool to turn the HP system (AMM 72-00-00/201).

High Pressure Turbine Inspection

S 296-171-R01

(4) Do an inspection of the HP turbine (Fig. 609) for the conditions that follow:

(a) Cracks in the concave and convex airfoil surfaces (Area C) of the HP turbine.

1) Axial cracks.

a) Reject axial cracks.

2) Radial cracks.

a) Accept radial cracks that are not more than 0.250 in. (6.35 mm) in length.

b) Accept radial cracks that are between 0.250 in. (6.35 mm) and 0.500 in. (12.7 mm) in length with no signs of burns or holes, only if you examine them again before 100 hours.

c) If the radial cracks are longer than 0.500 in. (12.7 mm) and burns or holes are not seen, replace the engine before 50 hours of engine operation is completed.

(b) Dents in the airfoil surfaces of the HP turbine.

1) Accept one dent with a round bottom on one of the two surfaces if it has no related cracks or holes.

2) If the dent damage is larger than the limits given above, then you must replace the engine.

(c) Cracks in the HP turbine shroud (Fig. 609).

1) Accept radial cracks from the rear face if they are not more than 0.200 in. (5.08 mm) in length and they do not turn axial.

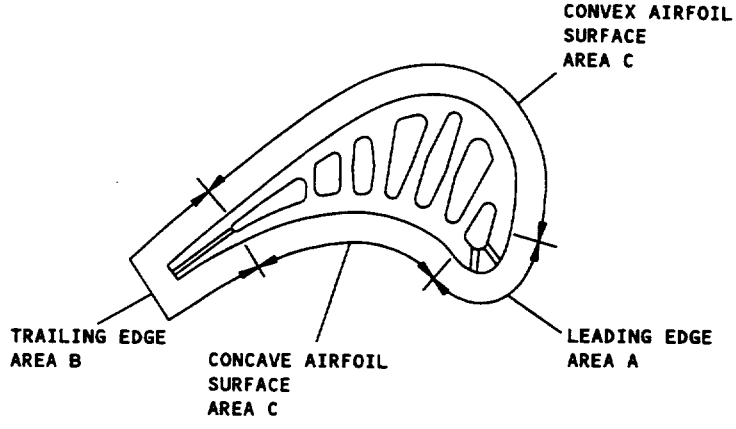
2) Accept radial cracks on the rear face that are between 0.200 in. (5.08 mm) and 0.250 in. (6.35 mm) only if:

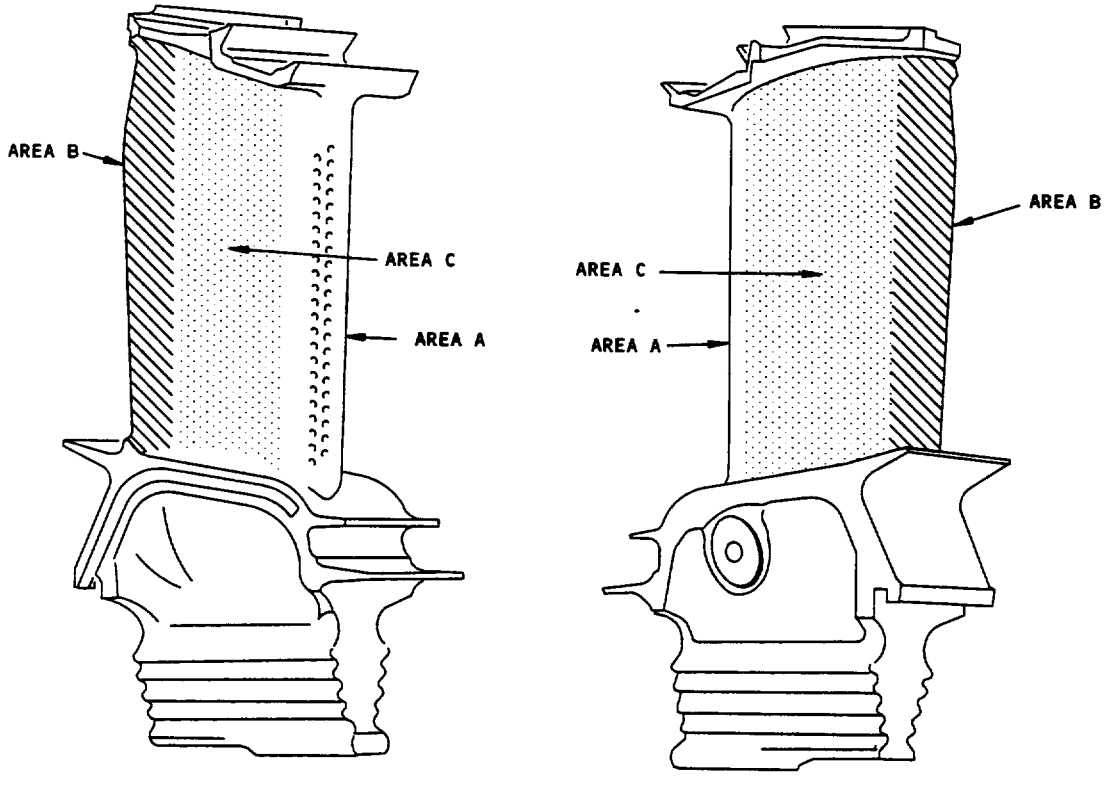
a) The radial cracks do not run in the axial direction, and,

b) You do an inspection again before 250 hours of engine operation is completed.

3) If you find cracks that are more than the limits above, you must replace the engine before 250 hours.

4) Accept cracks that are not open, and that extend from the interlock acute corner but do not extend to the airfoil.





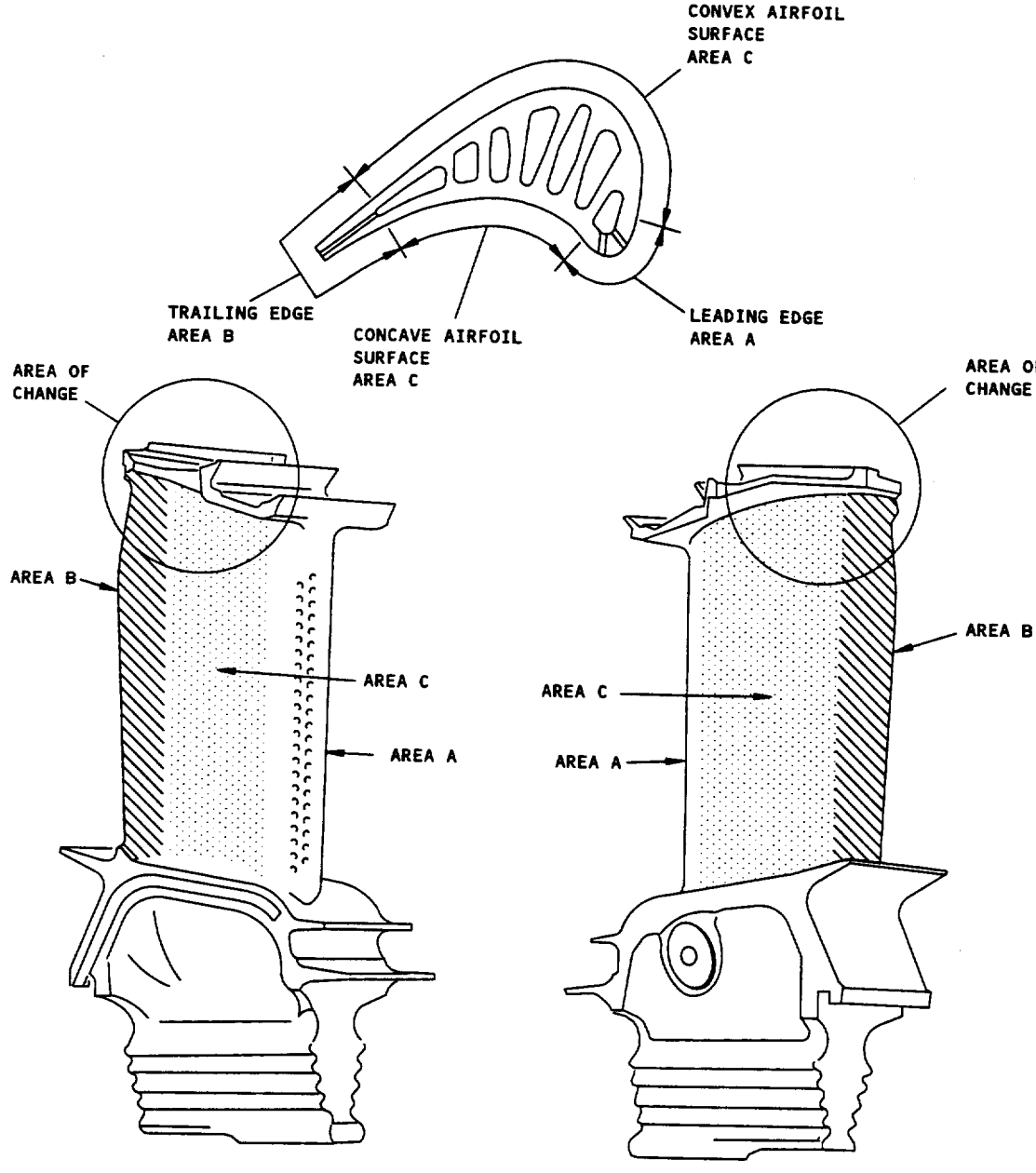
ENGINES PRE-RR-SB 73-9143

DE000A7310

HP Turbine Blades
Figure 609 (Sheet 1)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H6D688



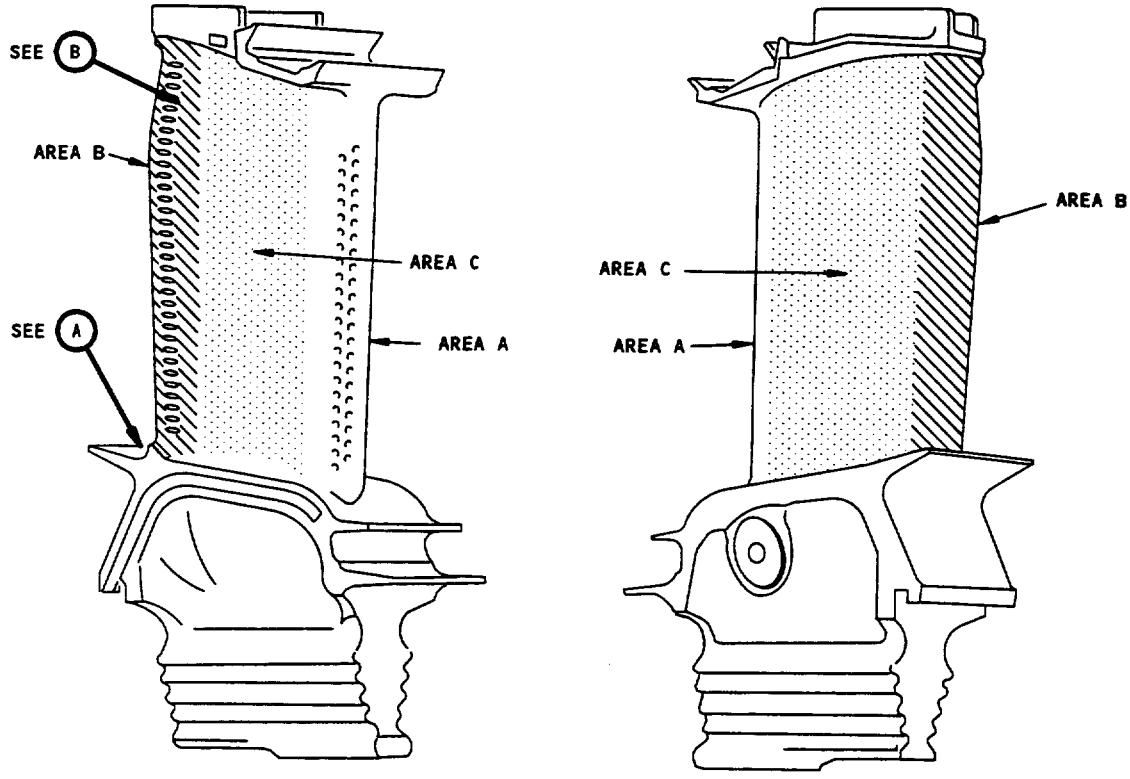
ENGINES POST-RR-SB 72-9143 AND PRE-RR-SB 72-9677

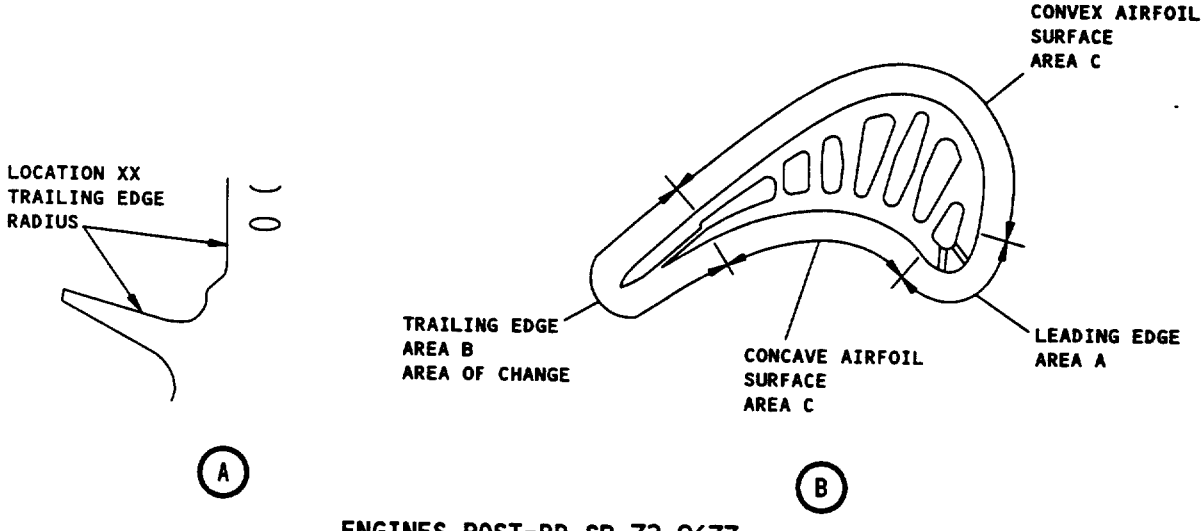
DE000C8222

HP Turbine Blades
Figure 609 (Sheet 2)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60713





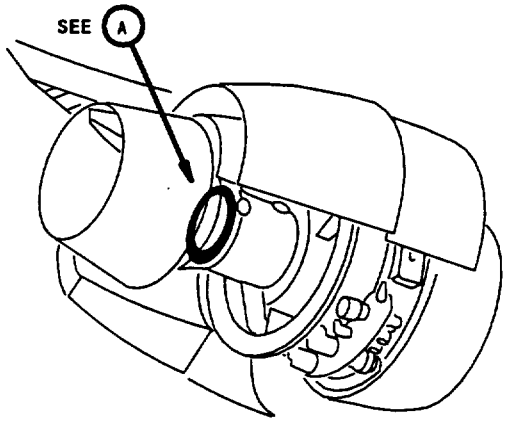
ENGINES POST-RR-SB 72-9677

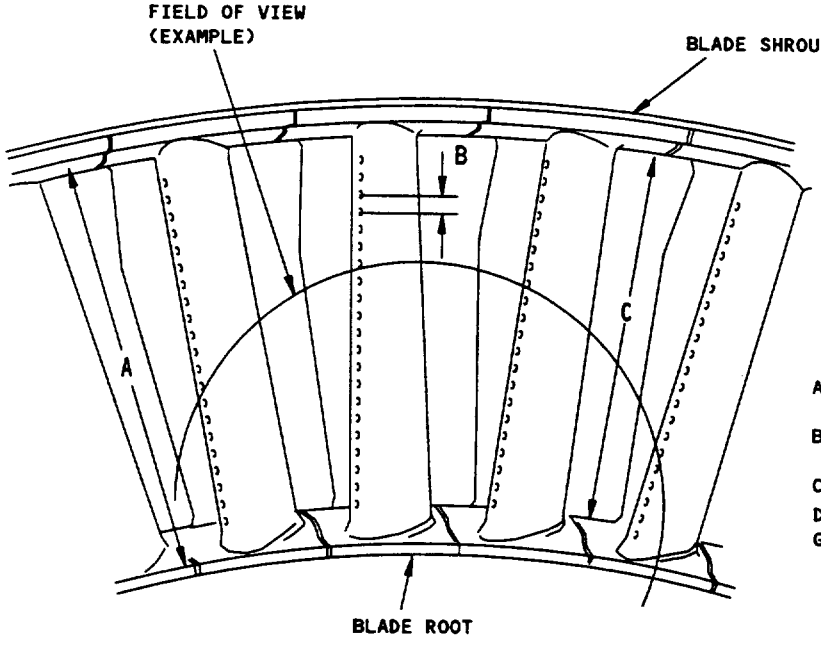
DE000C8223
DEE0004568

HP Turbine Blades
Figure 609 (Sheet 3)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60740





A = 2.401 INCHES (61.0 mm)
0.078 INCH (2.0 mm)
B = APPROXIMATELY BETWEEN
FILM COOLING AIR HOLES
C = 2.519 INCHES (64.0 mm)
DIMENSIONS SPECIFIED ARE A
GUIDE TO ASSESSING DAMAGE

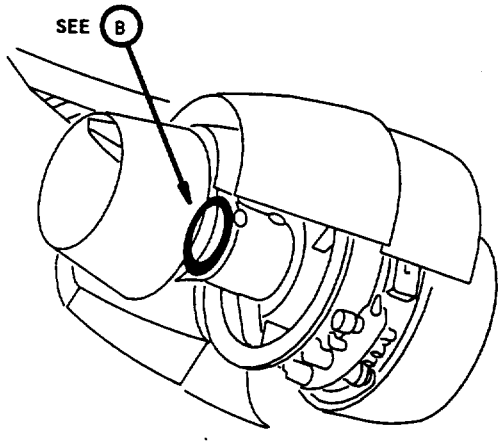
LEADING EDGE VIEW

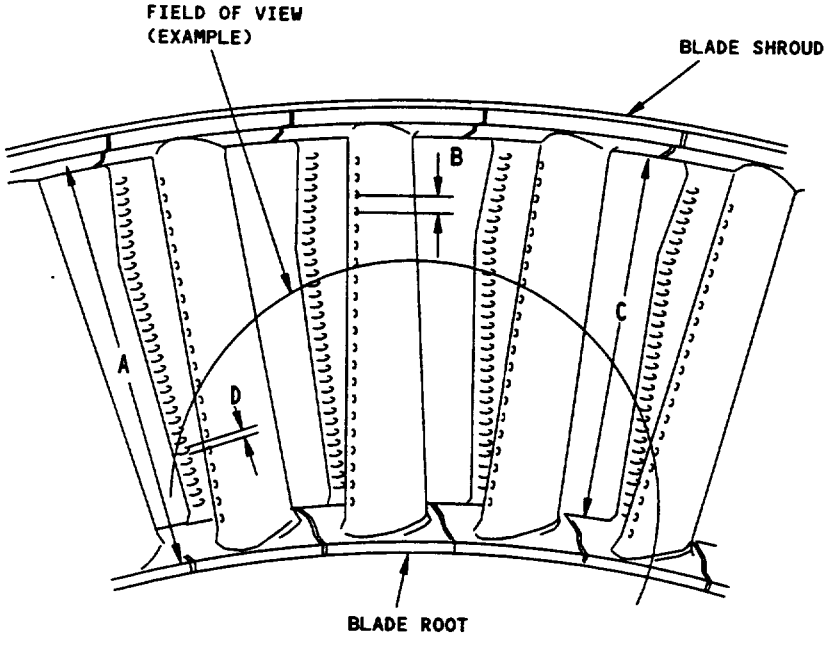
ENGINES POST-RR-SB 72-9677

A

DE000C8224

HP Turbine Blades
Figure 609 (Sheet 4)





A = 2.401 INCHES (61.0 mm)
B = 0.078 INCH (2.0 mm) APPROXIMATELY BETWEEN FILM COOLING AIR HOLES
C = 2.519 INCHES (64.0 mm)
D = 0.051 INCH (3.1 mm) BETWEEN TRAILING EDGE COOLING AIR HOLES

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

ENGINES POST-RR-SB 72-9677

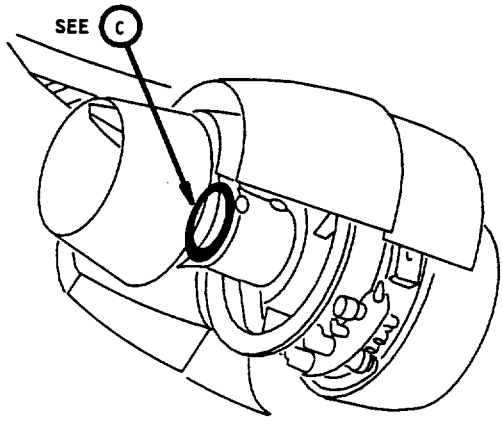
B

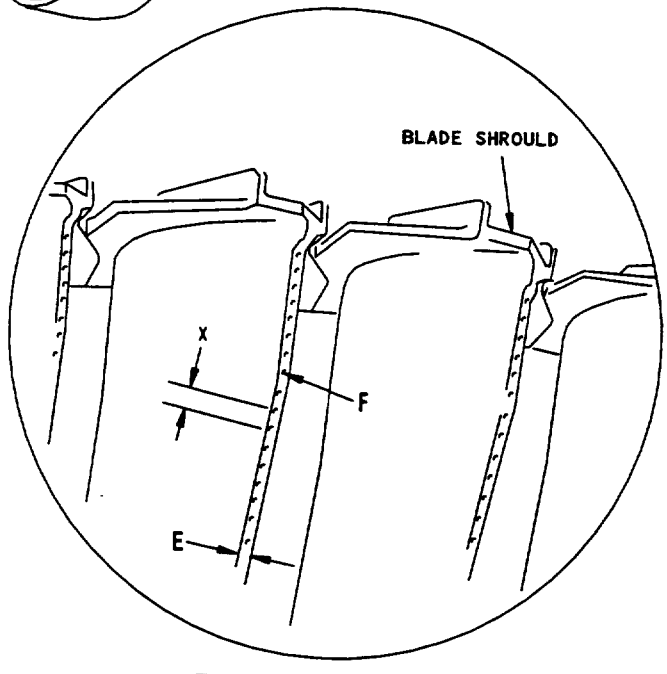
DE000C8225

HP Turbine Blades
Figure 609 (Sheet 5)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H60768





TRAILING EDGE VIEW
FIELD OF VIEW AS
VIEW THROUGH ITEM 14
(EXAMPLE)

C

ENGINES PRE-RR-SB 72-9677

NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

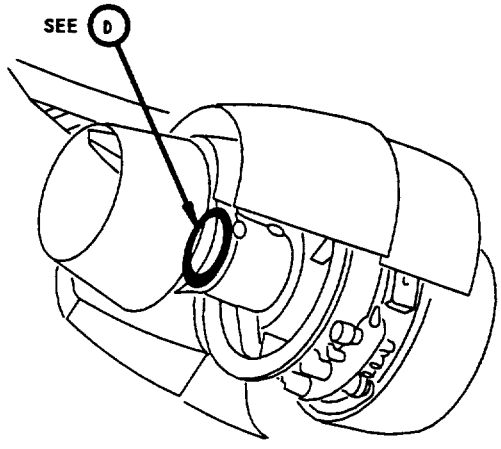
E = TRAILING EDGE THICKNESS 0.042 INCH (1.07 mm)
F = HOLE SIZE 0.018 INCH (0.46 mm) DIAMETER
X = 0.094 INCH (2.4 mm) BETWEEN CENTER OF TRAILING EDGE COOLING HOLES

DE000C8226

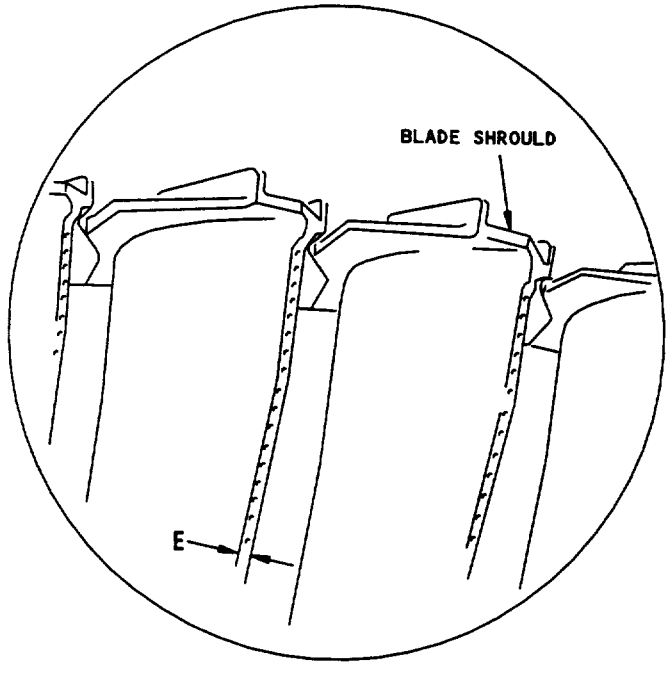
HP Turbine Blades
Figure 609 (Sheet 6)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H61194



DIMENSIONS SPECIFIED ARE A
GUIDE TO ASSESSING DAMAGE
E = TRAILING EDGE THICKNESS 0.025 INCH (0.64 mm)



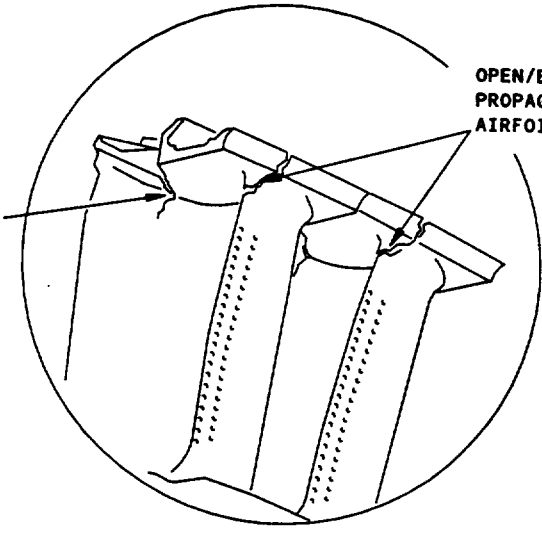
TRAILING EDGE VIEW
FIELD OF VIEW AS
VIEW THROUGH ITEM 14
(EXAMPLE)

D

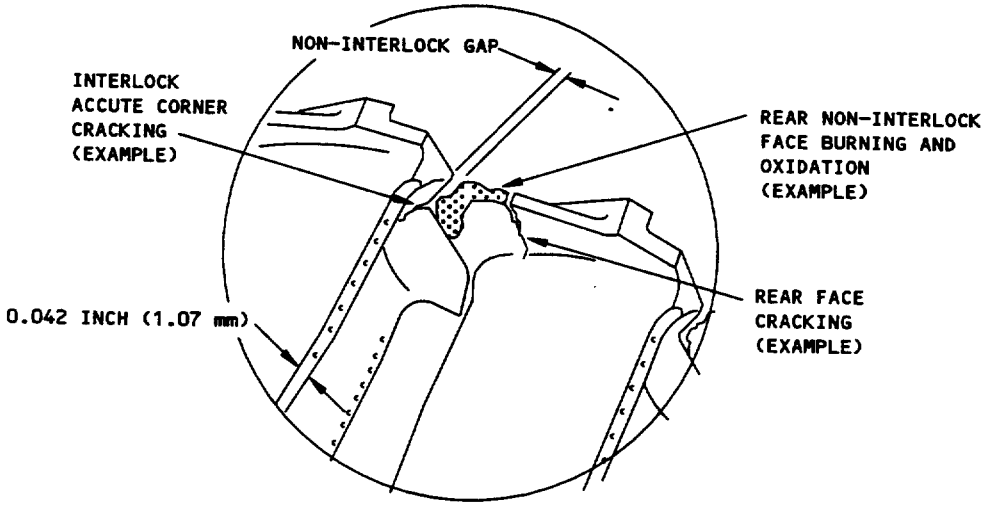
ENGINES POST-RR-SB 72-9677

DE000C8227

HP Turbine Blades
Figure 609 (Sheet 7)



LEADING EDGE VIEW
FIELD OF VIEW AS
VIEWED THROUGH ITEM 15



TRAILING EDGE VIEW
FIELD OF VIEW AS
VIEWED THROUGH ITEM 15

ENGINES PRE-RR-SB 72-9143 AND PRE-RR-SB 72-9677

DE000C8228

HP Turbine Blades
Figure 609 (Sheet 8)

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

High Pressure Turbine Inspection

5) Accept cracks that are not open, and that run from the interlock acute corner but do not extend more than 0.100 in. (2.54 mm) in length to the airfoil, only if:
   a) The cracks are not axial; and,
   b) You do an inspection again before 100 hours of engine operation is completed
6) If the cracks are more than the limits given above, you must replace the engine.
7) Reject open or burned cracks that extend from the interlock acute corner.

(d) Burns or Oxidation.
1) Accept burns or oxidation on the bottom of the outer shroud near the rear non-interlock faces only if you find these conditions:
   a) The increased clearance between the adjacent rear non-interlock faces is not more than 0.035 in. (0.89 mm) around the rotor.
   b) The increased clearance is more than 0.035 in. (0.89 mm) around, but less than 50% around the rotor.

   NOTE: The decrease of material caused by burns and oxidation causes the increased clearance between the rear non-interlock faces.

2) If the damage from the burns or oxidation is more than the limits given above, you must replace the engine before 100 hours

(e) Interlock Damage.
1) If sections of the interlock or shroud are gone, replace the engine before 25 hours of engine operation is completed.

(f) Cracks in the leading edge (Area A).
1) Accept cracks that are not open, and that extend from the leading edge of the concave airfoil to the shroud fillet radius and is adjacent to the airfoil.
2) Reject open or burnt cracks that extend from the leading edge of the concave airfoil to the shroud fillet radius and is adjacent to the airfoil (Fig. 609).
3) Reject axial cracks other than cracks that are not open.
4) Accept one radial crack only if you obey the limits that follow:
   a) The radial crack must not be more than 0.250 in. (6.35 mm) in length; and,
   b) The radial crack must not connect more than four cooling holes; and,
   c) The radial crack must not extend to the airfoil fillet radius.

High Pressure Turbine Inspection

5) Accept radial cracks only if you obey the limits that follow:
   a) The radial cracks must not be more than 0.50 in. (12.7 mm) in length; and,
   b) The radial cracks must not connect more than eight cooling holes; and,
   c) The radial cracks must not extend to the radius of the aft airfoil fillet; and,
   d) You do an inspection again before 100 hours of engine operation is completed.
6) Replace the engine before 50 hours of engine operation if you find the conditions that follow:
   a) Radial cracks that are more than 0.50 in. (12.7 mm).
   b) There are more than eight cooling holes that are connected.
7) Replace the engine before 50 hours of engine operation if you find radial cracks that are open or burned, or that extend to the airfoil fillet radius.

(g) Foreign object damage (Area A).
1) Accept foreign object damage only if you obey the limits that follow:
   a) There must not be holes or cracks caused by other damage; and,
   b) You must do an inspection again before 100 hours of engine operation is completed.
2) Replace the engine before 50 hours of engine operation if you find the conditions that follow:
   a) Holes or cracks caused by foreign object damage.
   b) Axial cracks.
3) Replace the engine if you find holes or cracks with related axial cracks caused by foreign object damage.

(h) Erosion (Area A).
1) Accept erosion if there are no signs of holes caused by erosion.
2) If you find holes caused by erosion, you must replace the engine before 50 hours of engine operation is completed.

(i) Cracks in the trailing Edge (Area B).
1) Accept more than one crack in the root radius of the trailing edge (location xx) only if it is not more than 0.10 inches (2.54 mm) in length.
2) Accept one axial crack in the root radius of the trailing edge (location xx) only if you obey the limits that follow:
   a) The crack is more than 0.10 inches (2.54 mm) but not more than 0.150 inches (3.81 mm) in length; and,
   b) You do an inspection again before 500 hours of engine operation is completed.

High Pressure Turbine Inspection

c) If the crack is more than 0.150 inches (3.81 mm) the engine must be rejected in less than 50 hours.

3) Accept more than one crack that extends from the trailing edge shroud radius if you obey the limits that follow:
   a) The cracks are not more than 0.050 inches (1.27 mm).
   b) If the cracks are more than 0.050 inches (1.27 mm) but less than 0.100 inches (2.54 mm) you must do an inspection again in less than 100 hours.
   c) If the cracks are more than 0.100 inches (2.54 mm) the engine must be rejected in less than 50 hours.
4) Accept a single axial crack that is longer than 0.050 in. (1.27 mm) and that extends from the trailing edge outer shroud radius, only if you obey the limits that follow:
   a) The length of the axial crack must not be more than 0.100 in. (2.54 mm); and,
   b) You do another inspection before 900 hours of engine operation is completed.
5) Accept a single axial crack that is longer than 0.100 in. (2.54 mm) and that extends from the trailing edge outer shroud radius, only if you obey the limits that follow:
   a) The length of the axial crack must not be more than 0.150 in. (2.81 mm); and,
   b) You do another inspection before 450 hours of engine operation is completed.
6) Accept cracks from the trailing edge at positions other than the root radius or outer shroud radius, only if you obey the limits that follow:
   a) The crack's length must not be more than 0.050 in. (1.27 mm); and,
   b) You do another inspection before 100 hours of engine operation is completed.
7) If you find cracks in the trailing edge that are more than the above limits, you must replace the engine before 50 hours of engine operation is completed.
8) Accept burns or oxidation with no material decrease, at the trailing edge root or outer shroud, only if you obey the limits that follow:
   a) The radial length of the burn or oxidation must not be more than 0.400 in. (10.16 mm); and,
   b) The axial length from the trailing edge must not be more than 0.400 in. (10.16 mm); and,
   c) You must do another inspection before 450 hours of engine operation is completed.
9) Accept temporarily burns or oxidation with material decrease on the trailing edge, only if you obey the limits that follow:
   a) The axial length of the missing material from the trailing edge must not be more than 0.080 in. (2.03 mm).

High Pressure Turbine Inspection

b) If you see this condition, then you must replace the engine before 50 hours of engine operation is completed.

10) Accept smooth, round bottomed dents only if there are no related holes or cracks.

11) If you see holes or cracks that are caused by the dents, and there is no related axial cracking, you must replace the engine before 50 hours of engine operation.

12) If you find axial cracks related to the dents, you must replace the engine.

(j) Burns or oxidation (Area B).

1) Accept burns or oxidation at the trailing edge only if you obey the limits that follow:

a) There is not more than 0.40 in. (10.16 mm) radially and 0.40 in. (10.16 mm) axially from the trailing edge, and,

b) The material decrease from the trailing edge must not be more than 0.020 in. (0.508 mm) axial length.

2) Accept burns and oxidation with the limits given in the step above, only if you obey the limits that follow:

a) The material decrease from the trailing edge must not be more than 0.080 in. (2.03 mm) axial length; and,

b) Do the inspection again before 500 hours of engine operation is completed.

3) If you find burns and oxidation, or decrease in material than is more than the limits given above, replace the engine before 50 hours of engine operation is completed.

(k) Foreign object damage (Area B).

1) Accept dents with smooth, circular bottoms if you do not see other related holes or cracks.

2) Replace the engine before 50 hours is completed if you see the conditions that follow:

a) Dents with related holes or cracks.

b) No axial cracks.

3) Replace the engine if you find of axial cracks caused by dents.

Intermediate Pressure Turbine Inspection

TASK 72-00-00-206-102-R01

8. Intermediate Pressure (IP) Turbine Inspection

A. General

(1) The operations that follow give the procedure for the IP Turbine inspection and the standards (limits) you can accept.

(2) With this inspection, you will examine the IP turbine for the conditions that follow:

(a) Cracks.

(b) Damage near the blade root, or changes in the contour of the leading or trailing edges.

(c) Dents.

(d) Nicks or scratches.

(e) Spatter.

(3) Use an impact extractor if it is not easy to remove the access plugs for the borescope.

(4) The access location, view area, and number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
LP 1S	Trailing Edge - IP	112
LP 1S	Leading Edge - LP1	78

(5) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 609).

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

D. Procedure

S 846-183-R01

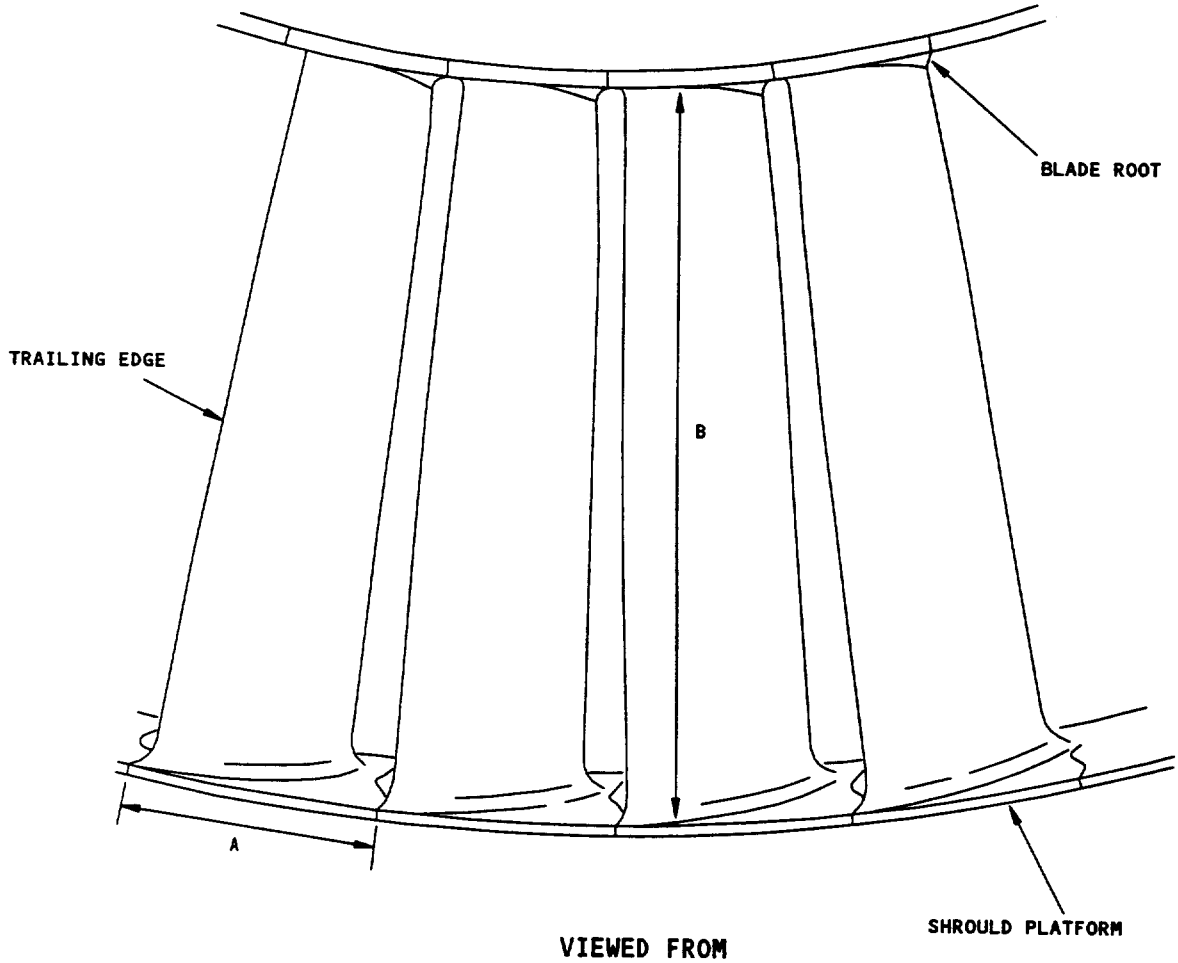
(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-184-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 296-175-R01

(3) Do an inspection of the IP turbine (Fig. 610) for the conditions that follow:



VIEWED FROM
THE REAR

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE
QUANTITY 112 BLADES
A = 1.149 INCHES (29.185 mm)
B = 4.493 INCHES (114.13 mm)

DE00067962

IP Turbine Blades
Figure 610

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H61267

Intermediate Pressure Turbine Inspection

(a) Cracks.
  1) Reject cracks.
(b) Changes in the leading or trailing edge contours.
  1) Reject sharp or sudden changes in the leading or trailing edge contour.
(c) Damage to the blade root or blade shroud platform.
  1) Reject any damage within 0.500 in. (12.7 mm) of the blade root or 0.200 in. (5.08 mm) of the blade shroud platform.
(d) Dents
  1) Accept more than one smooth bottomed dent only if you obey the limits that follow:
    a) Leading edge dents must not be more than 0.050 in. (1.27 mm) in length and there must be a minimum of 0.100 in. (2.54 mm) between dents.
    b) Trailing edge dents must not be more than 0.020 in. (0.51 mm) in length and there must be a minimum of 1.500 in. (38.1 mm) between dents.
    c) Airfoil dents must not be more than 0.100 in. (2.54 mm) in diameter.
  2) Accept a single smooth bottomed dent to leading edge only if its length is not more than 0.125 in. (3.175 mm).
(e) Nicks or scratches on the airfoil surface.
  1) Accept nicks and/or scratches on the airfoil surface only if the individual widths are not more than 0.020 in. (0.51 mm) and the individual lengths are not more than 0.050 in. (1.27 mm).
(f) Spatter.
  1) Accept foreign object spatter.

Low Pressure Turbine Inspection

TASK 72-00-00-206-115-R01

9. Low Pressure (LP) Turbine Inspection

A. General

(1) The subsequent operations give the procedure for the LP turbine inspection and the standards (limits) you can accept.

(2) With this inspection, you will examine the LP turbine for the conditions that follow:

(a) Cracks.

(b) Damage near the blade root, or changes in the contour of the leading or trailing edges.

(c) Dents.

(d) Nicks or scratches.

(e) Spatter.

(3) Use an impact extractor if it is not easy to remove the access plugs for the borescope.

(4) The access location, view area, and number of blades for each compressor stage are as follows (Fig. 602):

NOTE: You can view the trailing edge of the stage 3 turbine blades through the tail bearing housing with the aid of an inspection lamp.

Access	View Area	Number of Blades
LP 2S	Trailing Edge - LP1	78
LP 2S	Leading Edge - LP2	64
LP 3S	Trailing Edge - LP2	64
LP 3S	Leading Edge - LP3	64

(5) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 610).

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

D. Procedure

S 846-181-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

Low Pressure Turbine Inspection

S 946-182-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 296-176-R01

(3) Do an inspection of the LP turbine (Fig. 611) for the conditions that follow:

(a) Cracks.

1) Reject cracks.

(b) Damage near the blade root, or changes in the contour of the leading or trailing edges.

1) Reject any damage within 0.500 in. (12.7 mm) of the blade root, or causing sharp deformation to the leading or trailing edge contour.

(c) Dents.

1) Accept a single smooth bottomed dent to leading edge only if its length is not more than 0.250 in. (6.35 mm) and its depth is not more than 0.020 in. (0.51 mm).

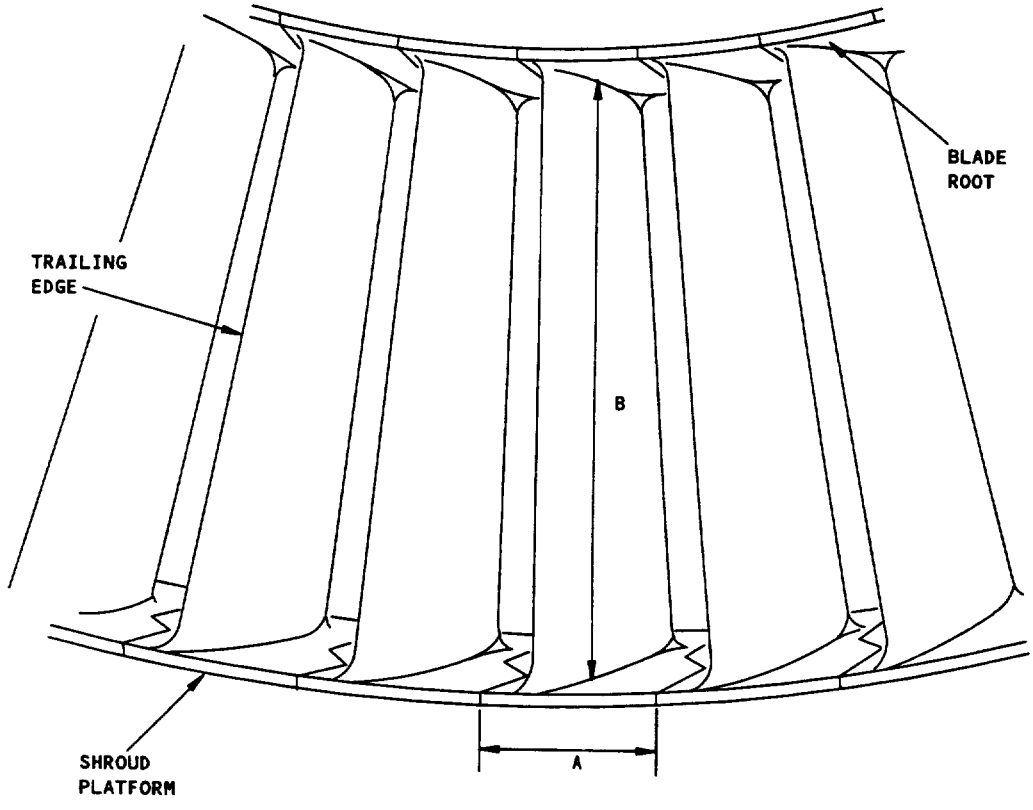
2) Accept a maximum of two smooth bottomed dents to trailing edge only if the individual length is not more than 0.300 in. (7.62 mm) and there is a minimum of 1.500 in. (38.1 mm) between dents.

(d) Nicks or scratches to the airfoil surfaces.

1) Accept nicks and/or scratches to airfoil surface only if the individual length is not more than 0.050 in. (1.27 mm) and depth is not more than 0.010 in. (0.25 mm).

(e) Spatter.

1) Accept foreign object spatter.



VIEWED FROM THE REAR

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

STAGE	QTY	DIMENSION A	DIMENSION B
1	78	2.268 INCHES (57.63 MM)	6.768 INCHES (171.92 mm)
2	64	2.265 INCHES (57.54 mm)	9.200 INCHES (233.69 mm)
3	64	1.795 INCHES (45.60 mm)	11.143 INCHES (283.05 mm)

DE00059369

LP Turbine Blades
Figure 611

EFFECTIVITY
RB211-535E4 AND E4-B ENGINES POST RR SB72-C230 (PHASE V COMBUSTOR) AND RB211-535E4-C ENGINES

H61277

LPT Stage 3 Nozzle Guide Vane Inspection

TASK 72-00-00-206-126-R01

10. Low Pressure Turbine (LPT) Stage 3 Nozzle Guide Vane (NGV) Inspection

A. General

(1) The operations that follow give the procedure for the LPT Stage 3 NGV inspection and the standard (limits) you can accept.

(2) With this inspection you will examine the LPT Stage 3 NGV for the conditions that follow:

(a) Cracks.
(b) Tears.
(c) Nicks.
(d) Dents.

(3) The access location, view area, and number of blades for the LPT Stage 3 are as follows (Fig. 602):

NOTE: You can view the trailing edge of the stage 3 turbine blades through the tail bearing housing with the aid of an inspection lamp.

Access	View Area	Number of Blades
LP 3S	Rear - Stage 3	64

(4) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 610).

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

(2) Access panels

415AL Thrust Reverser
416AR Thrust Reverser
425AL Thrust Reverser
426AR Thrust Reverser

D. Procedure

S 846-178-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-179-R01

(2) If not already done, do the procedure to prepare the boreescope equipment for the inspection.

LPT Stage 3 Nozzle Guide Vane Inspection

S 426-180-R01

(3) Attach the tool to turn the IP system (AMM 72-00-00/201).

S 296-177-R01

(4) Do an inspection of the LPT Stage 3 NGV for the conditions that follow:

(a) Cracks.

1) Accept axial cracks not more than 0.75 in. (19.05 mm) in length only if the cracks are not closer than 0.050 in. (12.0 mm) from the leading or the trailing edge.

2) Reject engine within 50 hours provided radial cracks do not exceed 1.000 in. (25.4 mm), there is a minimum of 1.000 in. (25.4 mm) between cracks, they are non-convergent and are not within 0.500 in. (12.7 mm) of trailing edge.

(b) Nicks or dents.

1) Accept dents or nicks only if they do not penetrate the vane and are not within 0.500 in. (12.7 mm) of the trailing edge.

Put the Airplane Back to Its Usual Condition

TASK 72-00-00-846-143-R01

11. Put the Airplane Back to Its Usual Condition

A. References

(1) AMM 70-42-12/201, Local Surface Protection
(2) AMM 70-51-00/201, Torque Tightening Technique
(3) AMM 72-00-00/201, Engine
(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 73-11-05/401, Fuel Spray Nozzles
(6) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

210	Control Cabin
411	No. 1 Engine
421	No. 2 Engine

C. Procedure

S 296-035-R01

CAUTION: MAKE SURE YOU CORRECTLY INSTALL THE BLANKING PLUG AFTER YOU DO A BORESCOPE INSPECTION. IF YOU DO NOT DO THIS, ENGINE DAMAGE CAN OCCUR.

(1) Install the fuel spray nozzle (AMM 73-11-05/401).

S 296-022-R01

(2) Clean the borescope access details (Fig. 602).

WARNING: WHEN YOU USE DEGREASING FLUID, MAKE SURE YOU HAVE GOOD VENTILATION IN THE WORK AREA. DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID.

KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAME, AND HEAT. DEGREASING FLUID IS A FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Clean the borescope access details.
1) Make a lint free cloth moist with degreasing fluid.
2) Clean the surfaces of the borescope access details that will touch the outer faces of the engine case when assembled. Let the surfaces dry.

Put the Airplane Back to Its Usual Condition

3) Clean the surfaces of the engine case that will touch the borescope access details when they are assembled. Let the surfaces dry.

NOTE: Make sure you remove all the used jointing compound or anti-seize compound from the engine case and borescope access details.

S 296-023-R01

(3) Install the borescope access details (Fig. 602).

(a) Install the access details at location B (Fig. 602).

CAUTION: BOLTS THAT HOLD THE BLANKING PLUGS MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

1) Apply the jointing compound to the mating faces of the plug and spacers.
2) Make sure no jointing compound goes into the central passageway of the plug or spacers.
3) Put the spacers and the plug in the correct position on the LP compressor inner case.
4) Make sure the blanking plugs are in the correct position at their inner end.
5) Make sure the blanking plug mating flanges fully touch the compressor case.
6) Apply clean approved engine oil to the threads of the bolts.
7) Install the washers and the bolts. Tighten the bolts to the standard torque limits (AMM 70-51-00/201).

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS AT LOCATIONS G AND F (FIG. 602) MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

8) Apply the jointing compound to the mating faces of the access details.
9) Put the access details in their correct positions on the engine.
10) Make sure the blanking plugs at locations G and F (Fig. 602) are in the correct position at their inner end.
11) Make sure the blanking plug mating flanges at locations G and F (Fig. 602) fully touch the compressor case.
12) Apply clean approved engine oil to the threads of the bolts.

Put the Airplane Back to Its Usual Condition

13) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

(b) Install the access details at locations G, D, E and F (Fig. 602).

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS AT LOCATIONS G, AND F (FIG. 602) MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

1) Apply jointing compound to the mating faces of the access details.
2) Put the access details in their correct positions on the engine.
3) Make sure the blanking plugs at locations G and F (Fig. 602) are in the correct position at their inner end.
4) Make sure the blanking plug mating flanges at locations G and F (Fig. 602) fully touch the compressor case.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

(c) Install the access details at location K (Fig. 602).

CAUTION: YOU MUST NOT GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN. THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND IS HARMFUL. USE APPLICABLE GLOVES. IF YOU GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN REMOVE IT WITH SOAP AND WATER. IF THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND GOES THROUGH YOUR SKIN THERE CAN BE A HEALTH RISK.

1) Apply anti-seize compound to the threads and the mating faces of the HP NGV blanking plug.
2) Install the blanking plug and torque tighten to 370 pound-inches (41.81 Newton-meters).
3) Apply anti-seize compound to the mating faces of the HP NGV blanking cover.
4) Put the blanking cover into the correct position on the engine.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

(d) Install the access details at locations J, L, C, A and H (Fig. 602).

Put the Airplane Back to Its Usual Condition

WARNING: YOU MUST NOT GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN. THE HIGH TEMPERAUTE ANTI-SEIZ SEIZE COMPOUND IS HARMFUL. USE APPLICABLE GLOVES. IF YOU GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN REMOVE IT WITH SOAP AND WATER. IF THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND GOES THROUGH YOUR SKIN THERE CAN BE A HEALTH RISK.

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS MUST NOT BE USED TO PULL THE PLUG INTO POSITION IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

1) Use a brush to apply a thin layer of anti-seize compound to the mating faces of the access details.
2) Put the access details into their correct position on the engine.
3) Make sure the blanking plugs are in the correct position at their inner end.
4) Make sure the blanking plug mating flanges fully touch the combustion case.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

S 296-024-R01

(4) Remove the IP and HP system turning tools (AMM 72-00-00/201).

S 296-025-R01

(5) Install the right-hand lower compressor fairing panel (AMM 72-03-01/401).

S 296-036-R01

(6) Close the right-hand and left-hand thrust reverser 'C' ducts (AMM 78-31-00/201).

S 866-144-R01

(7) For the left engine, remove the DO-NOT-CLOSE tags and close the following circuit breakers:
(a) P11 Overhead Circuit Breaker Panel
1) 11D7, ENGINES STBY IGN LEFT 1
2) 11D8, ENGINES STBY IGN LEFT 2
3) 11L1, LEFT ENGINE IGN 1
4) 11D12, LEFT T/R CONT
5) 11D17, LEFT ENG SYNC LOCK CONT
6) 11K5, LEFT ENG T/R IND

Put the Airplane Back to Its Usual Condition

7) 11K6, LEFT ENG T/R DCV SEC

S 866-145-R01

(8) For the right engine, remove the DO-NOT-CLOSE tags and close the following circuit breakers:

(a) P11 Overhead Circuit Breaker Panel

1) 11D9, ENGINES STBY IGN RIGHT 1
2) 11D10, ENGINES STBY IGN RIGHT 2
3) 11L28, RIGHT ENGINE IGN 1
4) 11B30, RIGHT ENG T/R CONT ALTN
5) 11K31, RIGHT ENG T/R IND
6) 11K32, RIGHT ENG SYNC LOCK
7) 11K33, RIGHT ENG T/R CONT
8) 11K34, RIGHT ENG T/R DCV SEC

(b) On the P6 power distribution panel:

1) 6D12, R ENG SYNC LOCK ALTN (BAT BUS)

TEMPORARY REVISION STATUS REPORT FOR DOCUMENT D633N132

THIS LIST CONTAINS ALL TRs WITH TR DATES AFTER SEP 28/00. THIS LIST CREATED AT 2001/07/13.16:11:01 UTC

TR NUMBER	TR DATE	DATE INCORPORATED	SUBJECT
12-1001	JUL 18/01	* ACTIVE	12-21-09
27-1002	FEB 02/01	# 27-1003	27-62-00
27-1003	MAR 07/01	MAY 28/01	27-62-00
28-1001	SEP 29/00	JAN 28/01	28-22-11
32-1001	OCT 26/00	JAN 28/01	32-42-11
35-1001	JAN 29/01	MAY 28/01	35-21-04
70-1001	DEC 14/00	JAN 28/01	70-12-04
72-1002	JUL 20/01	* ACTIVE	72-00-00

TR NUMBER	TR DATE	DATE INCORPORATED	SUBJECT

* INDICATES TR WAS ACTIVE AT THE TIME OF THIS REPORT;
REMOVE IT WHEN YOU RECEIVE THE REGULAR REVISION DATED SEP 28/01.
\# INDICATES TR WAS SUPERSEDED BY THE TR LISTED.

757 MAINTENANCE MANUAL

TEMPORARY REVISION No. 72-578

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA) AND COMPLIES WITH BCAR'S CHAPTER A5-3, B5-3 AND/OR TSS No. 0-2 AS REQUIRED. CAA DESIGN APPROVAL No. DAI/8566/78.

For CHIEF ENGINEER QUALITY AND TRAINING

Manual Reference 72-31-13 Page 701

REASON FOR REVISION

Additional information.

ACTION

LP COMPRESSOR ROTOR BLADES - CLEANING/PAINTING

1. General
   A. Clean the LP Compressor Rotor (Fan) Blades.
   B. This procedure contains the data to clean the LP compressor rotor (fan) blades.

TASK 72-31-13-107-001-R00

2. Clean the LP Compressor Rotor (Fan) Blades
   A. Equipment
      (1) Rolls Royce - 289200 Protective Work Mats
   B. Consumable Materials
      (1) Degreasing fluid (Inhibited and stabilized 1.1.1 trichlorethane)

          British Spec/Ref - B.S. 4487, 1969
          American Spec/Ref - MIL-T-81533
          OMat No. 1/21

          BA approved material:
          AMBERKLENE in aerosol form or GENKLENE available in 5 liter cans (P/N GENCLENE N X 5 LI)
   C. References
      (1) AMM 71-00-00/501, Power Plant
          AMM 72-31-1/401, LP Compressor Rotor Blades
   D. Prepare to clean the blades.

      S 047-002-R00
      (1) Make sure the applicable FUEL CONTROL switch on control stand P10 is in the CUTOFF position and attach a DO-NOT-OPERATE identifier.

S 127-003-R00
(2) Make sure the applicable ENGINE START switch on the pilots overhead panel P5 is in the OFF position and attach a DO-NOT-OPERATE identifier.

E. Clean the blades.

S 097-004-R00

WARNING: SMOKING MUST NOT BE ALLOWED WHEN USING DEGREASING FLUIDS AS THE VAPOR DECOMPOSES TO FORM PRODUCTS WHICH ARE EXTREMELY TOXIC. WHEN USING DEGREASING FLUID, ENSURE ADEQUATE VENTILATION AND AVOID SKIN CONTACT AND INHALATION OF VAPOR.

(1) Position the protective work mats in the air intake.

S 117-005-R00
(2) Wipe both sides of the blade with clean cloth moistened with degreasing fluid.

NOTE: BLADE BEING CLEANED MUST BE TURNED TO THE 6 'CLOCK## POSITION TO PREVENT THE INGRESS OF DIRT AND CLEANING FLUID INTO THE BLADE ROOT.

S 827-006-R00
(3) Turn the rotor and clean each blade.

S 167-007-R00
(4) Clean the intake surfaces which may have been contaminated by the blade cleaning process.

S 847-008-R00
(5) Remove the protective work mat from the air intake.

S 847-009-R00
(6) Remove the DO-NOT-OPERATE identifier from the applicable FUEL CONTROL and ENGINE START switches on panel P10 and P5 respectively.

ATP TEMPORARY REVISION

AIRPLANE

NB322

20 October, 1998

757 MAINTENANCE MANUAL

TEMPORARY REVISION No. 72-582

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G Litchfield For CHIEF ENGINEER QUALITY AND TRAINING

Manual Reference 72-34-10 Page 607

REASON FOR REVISION

To call for more immediate repairs to be carried out to a damaged attrition lining to avoid secondary damage.

ACTION

E. Acceptance Standards

(8) Impact damage to filled honeycomb and/or missing filler of the attrition lining

Ignore the existing step (a) and (b) and read the following

(a) Not more than 5 damage areas to the honeycomb which can extend to the full depth of the attrition lining to the containment case are permitted, with these conditions provided FRS5151 is actioned at the next main base night stop, weather permitting:

1) The maximum dimension of each area is not more than 9.0 square inches (5806 sq. mm)

2) The distance between the damaged areas is more than 4.0 inches (101.6 mm) of lining that is not damaged.

(b) Unlimited number of damage areas to the honeycomb which extend to the full depth of the attrition lining to the containment case are permitted, with these conditions provided FRS5151 is actioned at the next main base night stop, weather permitting:

1) The maximum dimension of each area is not more than 4.0 square inches (2580 sq. mm).

2) The distance between the damaged areas is more than 4.0 inches (101.6 mm) of lining that is not damaged.

Originator: K.BROWNE
Reference: 3308
Workbook: ENG-403

757 MAINTENANCE MANUAL

ALERT No. 72-588

THIS TEMPORARY REVISION IS ISSUED BY BRITISH AIRWAYS ENGINEERING (TECHNICAL INFORMATION SERVICES, G2, TBA, S401, P. O. BOX 10, HEATHROW AIRPORT, HOUNSLOW, MIDDLESEX TW6 2JA).
CAA DESIGN APPROVAL No. DAI/8566/78.

Manual Reference 72-62-01 Pages 401 and 408

REASON FOR REVISION

Rolls-Royce mandatory non-modification SB RB211-72-C930 highlights a possible misalignment condition being introduced with the radial drive shaft and/or bearing being replaced, which may result in the bearing cage lapping against the bearing inner race and loss of drive. In order to control and monitor the 'on-wing' replacement of these components prior consent of Powerplant Engineering is required.

ACTION

1. Page 401

   TASK 72-62-01-004-001-R00
   2. Remove the High Speed Gearbox Radial Drive Shaft

   Add the following Caution:

   CAUTION: MANDATORY - UNDER NO CIRCUMSTANCES MUST THE FOLLOWING PROCEDURE BE ACTIONED WITHOUT THE PRIOR CONSENT OF POWERPLANT ENGINEERING.

2. Page 408

   TASK 72-62-01-404-019-R00
   3. Install the High Speed Gearbox Radial Drive Shaft

   Add the following Caution:

   CAUTION: MANDATORY - UNDER NO CIRCUMSTANCES MUST THE FOLLOWING PROCEDURE BE ACTIONED WITHOUT THE PRIOR CONSENT OF POWERPLANT ENGINEERING.

757 MAINTENANCE MANUAL

TEMPORARY REVISION No. 72-577

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G Litchfield

For CHIEF ENGINEER QUALITY AND TECHNICAL SERVICES.

Manual Reference 72-62-01 Page 601

REASON FOR REVISION

To add a radial drive oil leak check.

ACTION

Ref Para 2.

Read the following additional check.

D. Radial Drive Oil Leak Check

(1) Engines Without RR SB72-9008 or 72-9246 (Sealing sleeves).

Visually inspect around the radial drive shaft shroud tube (See Fig 1) for oil wetness. View through the gap at the rear of the shroud tube fairing (Ref 72-03-01).

(a) If an oil leak is evident replace both centre and lower O-ring seals (Ref 72-62-01 R/I).

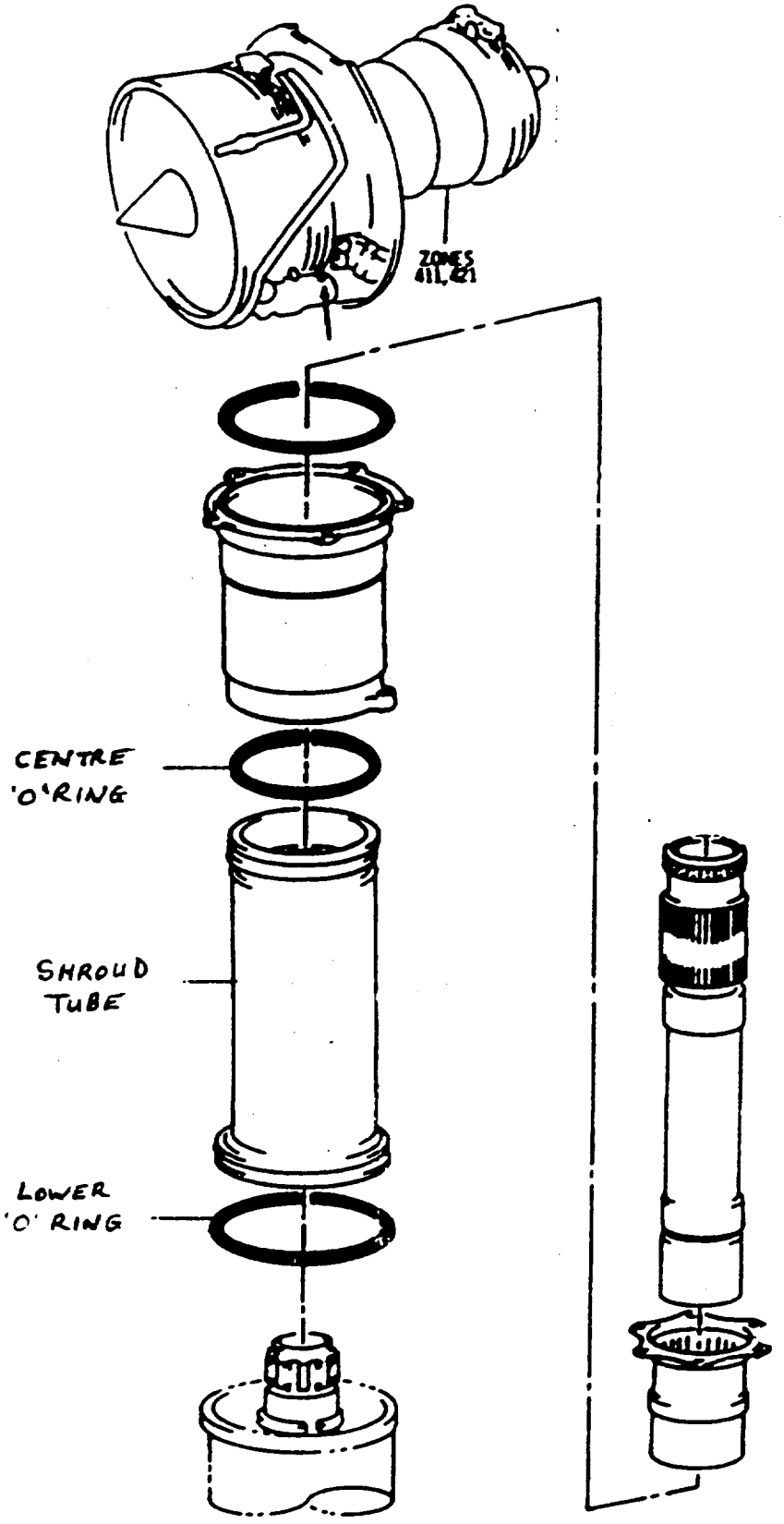
(2) Engines With RR SB72-9008 or 72-9246 (Sealing sleeves).

Remove shroud tube fairing (Ref 72-03-01) and inspect for fretting. Visually inspect the inner and outer sealing sleeves (See Fig 2) for condition and location. Visually inspect the shroud tube band clamps for condition, location and security.

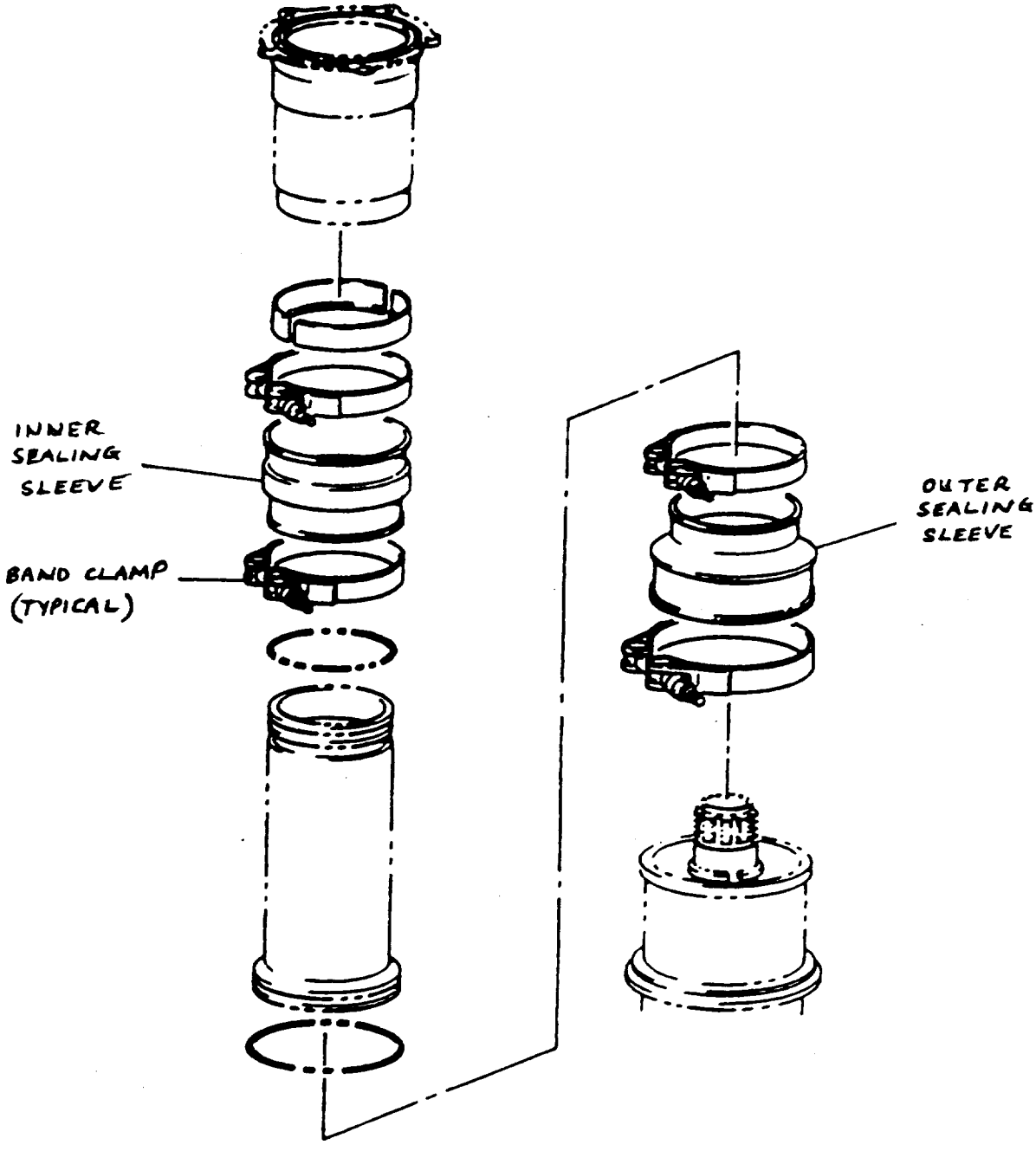
(a) If an oil leak is evident replace both centre and lower O-ring seals (Ref 72-62-01 R/I).

(b) Superficial wear on the sealing sleeves is acceptable. Replace split or damaged sleeves.

(c) Replace cracked or damaged band clamps.



HIGHSPEED GEARBOX RADIAL DRIVE
(WITHOUT SEALING SLEEVES)
Figure 1



HIGH SPEED GEARBOX RADIAL DRIVE
(WITH SEALING SLEEVES)
Figure 2

GPA Group plc

PAGE	DATE	CODE
CHAPTER 72 TAB		
ENGINE		
EFFECTIVE PAGES SEE LAST PAGE OF LIST FOR NUMBER OF PAGES		
72-CONTENTS		
R 1	JAN 20/09	RGUI.1
2	SEP 20/08	RGUI
R 3	JAN 20/09	RGUI.1
R 4	JAN 20/09	RGUI.1
R 5	JAN 20/09	RGUI.1
6	BLANK	
72-00-00		
1	JAN 28/02	R01
2	JAN 28/02	R01
3	SEP 20/93	R01
4	BLANK	
72-00-00		
201	SEP 20/93	R01
202	SEP 20/93	R01
203	SEP 20/93	R01
204	SEP 20/93	R01
205	SEP 20/93	R01
206	SEP 20/93	R01
207	SEP 20/93	R01
208	SEP 20/93	R01
209	SEP 20/93	R01
210	SEP 20/93	R01
72-00-00 CONFIG 1		
601	JAN 28/04	R01A
602	SEP 28/02	R01A
603	SEP 28/02	R01A
604	JAN 28/04	R01A
605	SEP 28/02	R01A
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616	SEP 28/05	R01A
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618	SEP 28/05	R01A
619	SEP 28/05	R01A
620	SEP 28/05	R01A
621	SEP 28/05	R01A
622	SEP 28/05	R01A

PAGE	DATE	CODE
72-00-00 CONFIG 1		CONT.
623	SEP 28/05	R01A
624	SEP 28/06	R01A
625	SEP 28/05	R01A
626	SEP 28/06	R01A
627	MAY 28/06	R01A
628	MAY 28/06	R01A
629	MAY 28/06	R01A
630	MAY 28/06	R01A
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664	MAY 20/08	R01A
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666	MAY 20/08	R01A
667	MAY 20/08	R01A
668	MAY 20/08	R01A
R 669	JAN 20/09	R01A.1
670	MAY 20/08	R01A
671	MAY 20/08	R01A
672	MAY 20/08	R01A
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677	MAY 20/08	R01A
678	MAY 20/08	R01A
679	MAY 20/08	R01A
680	MAY 20/08	R01A

PAGE	DATE	CODE
72-00-00 CONFIG 1		CONT.
680A	MAY 20/08	R01A
680B	MAY 20/08	R01A
680C	MAY 20/08	R01A
680D	MAY 20/08	R01A
72-00-00 CONFIG 2		
601	SEP 28/00	R01
602	MAY 28/01	R02
603	MAY 28/05	R01
604	SEP 28/00	R01
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608	SEP 28/00	R01
609	MAY 28/05	R03
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623	SEP 28/05	R01
624	SEP 28/05	R01
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629	SEP 28/05	R01
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631	MAY 28/06	R01
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648	JAN 20/08	R01
649	SEP 28/06	R01
650	SEP 20/08	R01
651	SEP 20/08	R01
652	SEP 20/08	R01

GPA Group plc

PAGE	DATE	CODE
72-00-00	CONFIG 2	CONT.
653	SEP 20/08	R01
654	SEP 20/08	R01
655	SEP 20/08	R01
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664	SEP 20/08	R01
665	SEP 20/08	R01
R 666	JAN 20/09	R01.1
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668	SEP 20/08	R01
669	SEP 20/08	R01
670	SEP 20/08	R01
R 671	JAN 20/09	R01.1
R 672	JAN 20/09	R03.1
R 673	JAN 20/09	R02.101
R 674	JAN 20/09	R01.101
R 675	JAN 20/09	R02.1
R 676	JAN 20/09	R02.101
R 677	JAN 20/09	R03.101
R 678	JAN 20/09	R03.101
R 679	JAN 20/09	R02.101
R 680	JAN 20/09	R03.101
R 680A	JAN 20/09	R02.101
R 680B	JAN 20/09	R01.101
R 680C	JAN 20/09	R01.101
R 680D	JAN 20/09	R01.101
R 680E	JAN 20/09	R01.101
R 680F	JAN 20/09	R01.101
R 680G	JAN 20/09	R01.101
R 680H	JAN 20/09	R03.101
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407	MAY 28/01	R01B
408	MAY 28/01	R01B
409	MAY 28/01	R01B
410	MAY 28/01	R01B

PAGE	DATE	CODE
72-00-61		CONT.
411	MAY 28/01	R01B
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414	MAY 28/01	R01B
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2	JAN 28/02	R01
3	SEP 15/85	R03
4	SEP 15/85	R03
5	SEP 15/84	R02
6	SEP 15/85	R02
72-02-01		
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72-02-01		
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2	BLANK	
72-03-00		
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72-03-01		
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402	MAR 20/94	R01
403	MAY 28/00	R01
404	SEP 20/93	R01
405	MAR 20/94	R01
406	MAY 28/00	R01

PAGE	DATE	CODE
72-03-01		
601	JAN 28/05	R01B
602	JAN 28/05	R01B
603	JAN 28/05	R01B
604	JAN 28/05	R01B
72-03-01		
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802	JAN 28/05	R01B
803	JAN 28/05	R01B
804	MAY 28/01	R01B
805	JAN 28/05	R01B
806	MAY 28/01	R01B
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813	MAY 28/01	R01B
814	MAY 28/01	R01B
815	MAY 28/01	R01B
816	MAY 28/01	R01B
817	JAN 28/05	R01B
818	MAY 28/01	R01B
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822	MAY 28/01	R01B
823	MAY 28/05	R01B
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845	JAN 28/05	R01B
846	JAN 28/05	R01B
847	JAN 28/05	R01B
848	JAN 28/05	R01B
849	JAN 28/05	R01B
850	JAN 28/05	R01B
851	JAN 28/05	R01B
852	JAN 28/05	R01B

GPA Group plc

PAGE	DATE	CODE
72-03-01		CONT.
853	JAN 28/05	R01B
854	JAN 28/05	R01B
855	JAN 28/05	R01B
856	JAN 28/05	R01B
857	JAN 28/05	R01B
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867	JAN 28/05	R01B
868	JAN 28/05	R01B
869	JAN 28/05	R01B
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871	JAN 28/05	R01B
872	JAN 28/05	R01B
873	SEP 28/05	R01B
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875	JAN 28/05	R01B
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72-03-02		
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405	JAN 28/05	R01
406	JAN 28/05	R01
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408	JAN 28/05	R01
409	JAN 28/05	R01
410	JAN 28/05	R01
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412	JAN 28/05	R01
413	JAN 28/05	R01
414	SEP 28/07	R01
415	JAN 28/05	R01
416	BLANK	
72-30-00		
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2	JAN 28/02	R01
3	JAN 28/02	R01
4	JAN 28/02	R01
5	JAN 28/01	R01
6	MAR 20/95	R01
7	MAR 20/95	R01
8	MAR 20/95	R01

PAGE	DATE	CODE
72-30-00		
101	MAR 20/93	R03
102	MAR 20/93	R01
72-30-00		
701	SEP 20/08	R01
702	SEP 20/08	R01
703	SEP 20/08	R01
704	SEP 20/08	R01
705	SEP 20/08	R01
706	SEP 20/08	R01
707	SEP 20/08	R01
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716	SEP 20/08	R01
717	SEP 20/08	R01
718	SEP 20/08	R01
719	SEP 20/08	R01
720	SEP 20/08	R01
721	SEP 20/08	R01
722	SEP 20/08	R01
723	SEP 20/08	R01
724	SEP 20/08	R01
725	SEP 20/08	R01
726	SEP 20/08	R01
727	SEP 20/08	R01
728	SEP 20/08	R01
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730	SEP 20/08	R01
731	SEP 20/08	R01
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733	SEP 20/08	R01
734	SEP 20/08	R01
735	SEP 20/08	R01
736	SEP 20/08	R01
737	SEP 20/08	R01
738	SEP 20/08	R01
739	SEP 20/08	R01
740	SEP 20/08	R01
741	SEP 20/08	R01
742	SEP 20/08	R01
72-31-10		
401	MAY 28/01	R01B
402	MAY 28/01	R01B
403	MAY 28/01	R01B
404	MAY 28/01	R01B
405	MAY 28/01	R01B
406	MAY 28/01	R01B
407	MAY 28/01	R01B
408	MAY 28/01	R01B
409	JAN 28/02	R01B
410	JAN 28/02	R01B

PAGE	DATE	CODE
72-31-10		CONT.
411	MAY 28/01	R01B
412	MAY 28/01	R01B
413	MAY 28/01	R01B
414	MAY 28/01	R01B
415	MAY 28/01	R01B
416	MAY 28/01	R01B
417	JAN 28/02	R01B
418	JAN 28/02	R01B
419	MAY 28/01	R01B
420	MAY 28/01	R01B
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437	MAY 28/01	R01B
438	MAY 28/01	R01B
439	MAY 28/01	R01B
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202	SEP 28/07	R01
203	SEP 28/03	R01
204	MAY 20/98	R01
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206	MAY 28/99	R01
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208	SEP 28/05	R01
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212	SEP 28/05	R01
213	SEP 28/05	R01
214	SEP 28/05	R01
215	SEP 28/05	R01
216	SEP 28/05	R01
72-31-13		
401	MAY 28/99	R01
402	SEP 28/05	R01
403	SEP 28/05	R01
404	SEP 28/05	R01
405	SEP 28/05	R01
406	SEP 28/05	R01
407	SEP 28/05	R01
408	SEP 28/05	R01

GPA Group plc

PAGE	DATE	CODE
72-31-13		CONT.
409	SEP 28/05	R01
410	SEP 28/05	R01
411	SEP 28/05	R01
412	SEP 28/05	R01
413	JAN 28/07	R01
414	SEP 28/05	R01
415	SEP 28/05	R02
416	SEP 28/05	R01
417	SEP 28/05	R01
418	SEP 28/05	R01
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427	SEP 28/05	R01
428	SEP 28/05	R01
429	SEP 28/05	R01
430	SEP 28/05	R01
431	SEP 28/05	R01
432	SEP 28/05	R01
72-31-13		
601	JAN 28/02	R01
602	MAR 20/94	R01
603	MAY 28/06	R01
604	MAY 28/05	R01
605	MAR 20/96	R01
606	MAY 28/05	R01
607	JAN 28/03	R01
608	JAN 28/04	R03
609	JAN 28/03	R01
610	SEP 28/06	R01
611	MAY 28/06	R01
612	JAN 28/03	R01
613	JAN 28/04	R04
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801	JAN 28/01	R01
802	JAN 28/05	R01
803	SEP 28/03	R01
804	MAY 28/06	R01
805	MAR 20/94	R01
806	MAR 20/94	R01
807	MAR 20/94	R01
808	SEP 20/93	R01
809	SEP 20/93	R01
810	SEP 28/03	R01
811	SEP 28/03	R01
R 812	JAN 20/09	R01.1
813	MAY 28/06	R01
R 814	JAN 20/09	R01.1
815	MAY 28/06	R01
816	MAY 28/06	R01

PAGE	DATE	CODE
72-31-13		CONT.
817	MAY 28/06	R01
818	MAY 28/06	R01
819	MAY 28/06	R01
820	MAY 28/06	R01
821	MAY 28/06	R01
822	MAY 28/06	R01
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404	MAY 28/03	R01
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406	MAY 20/08	R01
407	SEP 28/04	R01
408	SEP 28/04	R01
409	SEP 28/04	R01
410	SEP 28/04	R01

PAGE	DATE	CODE
72-31-14		CONT.
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72-31-14		
601	MAY 28/03	R01
602	MAY 28/03	R01
603	MAY 28/03	R01
604	MAY 28/03	R01
605	MAY 28/03	R01
606	MAY 28/03	R01
72-34-10		
601	MAY 28/02	R01B
602	SEP 28/04	R01B
603	MAY 28/07	R01B
604	JAN 20/08	R01B
605	MAY 28/06	R01B
606	SEP 28/04	R01B
607	JAN 28/05	R01B
608	JAN 28/05	R01B
609	JAN 28/05	R01B
610	MAY 28/07	R01B
611	MAY 28/07	R01B
R 612	JAN 20/09	R01B.1
613	MAY 28/07	R01B
614	MAY 28/07	R01B
615	MAY 28/07	R02B
616	MAY 28/01	R02B
617	MAY 28/01	R02B
618	MAY 28/07	R01B
619	MAY 28/07	R01B
620	MAY 28/07	R01B
72-34-10		
801	MAY 28/02	R01B
802	MAY 20/08	R01B
803	SEP 28/04	R01B
804	SEP 28/06	R01B
805	MAY 28/01	R01B
806	MAY 28/01	R01B
807	MAY 28/01	R01B
808	MAY 28/01	R01B
809	MAY 28/01	R01B
810	MAY 28/01	R01B
811	MAY 28/01	R01B
812	SEP 28/06	R01B
813	SEP 28/06	R01B
814	SEP 28/06	R01B
815	MAY 28/01	R01B
816	JAN 28/05	R01B
817	JAN 28/05	R01B
818	MAY 28/05	R01B
819	JAN 28/05	R01B
820	MAY 28/01	R01B
821	SEP 28/03	R01B
822	MAY 28/05	R01B
823	MAY 28/01	R01B
824	MAY 28/01	R01B

GPA Group plc

PAGE	DATE	CODE
72-34-10		CONT.
825	SEP 28/03	R01B
826	JAN 28/05	R01B
827	SEP 28/03	R01B
828	SEP 28/03	R01B
829	JAN 28/05	R01B
830	JAN 28/07	R01B
831	SEP 28/03	R01B
832	SEP 28/03	R01B
833	SEP 28/03	R01B
834	JAN 28/07	R01B
835	SEP 28/03	R01B
836	SEP 28/03	R01B
837	SEP 28/04	R01B
838	SEP 28/03	R01B
839	JAN 28/07	R01B
840	SEP 28/03	R01B
841	SEP 28/03	R01B
842	SEP 28/03	R01B
843	SEP 28/03	R01B
844	MAY 28/07	R01B
845	SEP 28/03	R01B
846	SEP 28/03	R01B
847	SEP 28/03	R01B
848	MAY 28/07	R01B
849	SEP 28/03	R01B
850	SEP 28/03	R01B
851	SEP 28/03	R01B
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853	JAN 28/07	R01B
854	SEP 28/03	R01B
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857	SEP 28/03	R01B
858	SEP 28/03	R01B
859	JAN 28/07	R01B
860	SEP 28/03	R01B
861	SEP 28/03	R01B
862	SEP 28/03	R01B
863	JAN 28/07	R01B
864	SEP 28/03	R01B
865	SEP 28/03	R01B
866	SEP 28/03	R01B
867	JAN 28/07	R01B
868	SEP 28/03	R01B
869	JAN 28/07	R01B
870	SEP 28/03	R01B
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873	JAN 28/07	R01B
874	SEP 28/03	R01B
875	SEP 28/03	R01B
876	SEP 28/03	R01B
877	JAN 28/05	R01B
878	SEP 28/03	R01B
879	SEP 28/03	R01B
880	SEP 28/03	R01B
880A	SEP 28/06	R01B
880B	SEP 28/03	R01B
72-34-10		CONT.
880C	SEP 28/03	R01B
880D	SEP 28/06	R01B
880E	MAY 28/07	R01B
880F	SEP 28/03	R01B
880G	SEP 28/03	R01B
880H	SEP 28/03	R01B
880I	SEP 28/03	R01B
880J	MAY 28/07	R01B
880K	SEP 28/03	R01B
880L	SEP 28/06	R01B
880M	SEP 28/03	R01B
880N	SEP 28/03	R01B
880O	SEP 28/03	R01B
880P	SEP 28/03	R01B
880Q	SEP 28/03	R01B
880R	SEP 28/04	R01B
880S	SEP 28/04	R01B
880T	SEP 28/04	R01B
880U	SEP 28/04	R01B
880V	SEP 28/04	R01B
880W	MAY 28/05	R01B
880X	SEP 28/04	R01B
880Y	SEP 28/04	R01B
880Z	SEP 28/04	R01B
881	SEP 28/04	R01B
882	SEP 28/04	R01B
882A	MAY 28/05	R01B
882B	MAY 28/05	R01B
882C	MAY 28/05	R01B
882D	MAY 28/05	R01B
882E	MAY 28/07	R01B
882F	MAY 28/07	R01B
882G	MAY 28/07	R01B
882H	SEP 28/04	R01B
882I	SEP 28/04	R01B
882J	SEP 28/04	R01B
882K	SEP 28/04	R01B
882L	SEP 28/04	R01B
882M	SEP 28/04	R01B
882N	SEP 28/04	R01B
882O	SEP 28/04	R01B
882P	SEP 28/04	R01B
882Q	SEP 28/03	R01B
882R	SEP 28/03	R01B
882S	SEP 28/03	R01B
882T	SEP 28/03	R01B
882U	SEP 28/03	R01B
882V	SEP 28/03	R01B
882W	SEP 28/03	R01B
882X	SEP 28/03	R01B
882Y	SEP 28/03	R01B
882Z	SEP 28/03	R01B
883	SEP 28/03	R01B
884	SEP 28/03	R01B
884A	SEP 28/03	R01B
884B	SEP 28/03	R01B
884C	SEP 28/03	R01B
884D	SEP 28/03	R01B
72-34-10		CONT.
884E	SEP 28/03	R01B
884F	SEP 28/03	R01B
884G	SEP 28/03	R01B
884H	SEP 28/03	R01B
884I	SEP 28/04	R01B
884J	MAY 28/07	R01B
884K	MAY 28/07	R01B
884L	MAY 28/07	R01B
884M	SEP 28/04	R01B
884N	SEP 28/04	R01B
884O	SEP 28/04	R01B
884P	JAN 28/06	R01B
884Q	MAY 28/07	R01B
884R	MAY 28/07	R01B
884S	MAY 28/07	R01B
884T	MAY 28/07	R01B
884U	MAY 28/07	R01B
884V	MAY 20/08	R01B
884W	JAN 28/06	R01B
884X	JAN 28/06	R01B
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885	JAN 28/06	R01B
886	MAY 20/08	R01B
886A	MAY 20/08	R01B
886B	MAY 20/08	R01B
886C	MAY 20/08	R01B
886D	MAY 20/08	R01B
886E	MAY 20/08	R01B
886F	MAY 20/08	R01B
886G	MAY 20/08	R01B
886H	MAY 20/08	R01B
886I	MAY 20/08	R01B
886J	MAY 20/08	R01B
886K	MAY 20/08	R01B
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72-34-11		
601	JAN 28/02	R01
602	SEP 20/93	R01
72-34-11		
801	SEP 28/06	R01
802	SEP 28/06	R01
803	SEP 20/93	R01
804	SEP 28/06	R02
805	SEP 20/90	R01
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72-35-01		
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402	JAN 28/05	R01B
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404	MAY 28/05	R01B
405	MAY 28/05	R01B
406	MAY 28/05	R01B
407	JAN 28/06	R01B
408	JAN 28/06	R01B

GPA Group plc

PAGE	DATE	CODE
72-35-01		CONT.
409	JAN 28/06	R01B
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72-35-01		
601	MAY 28/01	R01B
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72-35-01		
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802	SEP 28/06	R01
803	MAY 28/06	R01
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402	MAY 28/05	R01
403	MAY 28/05	R01
404	MAY 28/05	R01
405	MAY 28/05	R01
406	BLANK	
72-40-00		
1	SEP 28/01	R02
2	SEP 20/93	R01
72-40-00	CONFIG 1	
601	SEP 28/04	R01
602	JAN 28/00	R01
603	SEP 28/04	R01
604	SEP 28/04	R01
72-40-00	CONFIG 2	
601	SEP 28/04	R01
602	JAN 28/00	R01
603	SEP 28/04	R01
604	SEP 28/04	R01
605	SEP 28/04	R01
606	SEP 28/04	R01
72-41-00		
801	MAY 28/05	R01
802	MAY 28/05	R01
803	SEP 28/04	R01
804	SEP 28/04	R01
805	SEP 28/04	R01
806	SEP 28/04	R01
807	SEP 28/04	R01
808	SEP 28/04	R01
72-41-00		CONT.
809	MAY 28/05	R01
810	BLANK	
72-50-00		
1	JAN 28/02	R01
2	JAN 28/02	R01
3	SEP 20/93	R01
4	SEP 20/93	R01
72-50-00		
101	MAR 20/93	R03
102	MAR 20/93	R01
72-51-01		
401	SEP 20/90	R01
402	MAR 20/94	R01
403	MAR 20/92	R01
404	BLANK	
72-51-02		
401	MAY 28/99	R01
402	MAR 20/94	R01
72-51-02		
601	MAR 20/92	R01
602	BLANK	
72-51-03		
601	JAN 28/02	R01
602	SEP 20/93	R01
603	SEP 28/07	R01
604	SEP 28/07	R01
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606	BLANK	
72-52-01		
401	MAY 28/01	R01B
402	MAY 28/01	R01B
403	MAY 28/01	R01B
404	MAY 28/01	R01B
405	MAY 28/01	R01B
406	MAY 28/01	R01B
407	MAY 28/05	R01B
408	BLANK	
72-52-01		
701	SEP 20/93	R01
702	BLANK	
72-52-03		
601	SEP 20/98	R01
602	JAN 28/02	R01
603	DEC 20/93	R02
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72-52-03		
701	JAN 28/02	R01
702	JAN 28/02	R01
703	JAN 20/99	R02
704	JAN 28/02	R01
705	JAN 28/02	R01
706	JAN 28/02	R01
72-52-04		
401	MAY 28/99	R01
402	SEP 20/93	R01
403	SEP 20/93	R01
404	JAN 20/98	R01
405	DEC 20/93	R01
406	SEP 20/98	R01
407	DEC 20/93	R01
408	JAN 20/98	R01
409	MAY 28/99	R01
410	DEC 20/93	R01
411	DEC 20/93	R01
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72-52-05		
601	JAN 28/06	R01
602	JAN 28/05	R01
72-52-06		
401	SEP 28/06	R01
402	SEP 28/05	R01
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72-60-00		
1	SEP 20/93	R01
2	SEP 20/93	R01
72-61-72		
401	SEP 20/93	R01
402	SEP 20/93	R01
403	JUN 20/90	R01
404	BLANK	
72-61-74		
401	SEP 20/93	R01
402	SEP 20/93	R01
403	JUN 20/90	R01
404	BLANK	
72-62-01		
401	JAN 20/08	R01
402	SEP 28/01	R02
403	SEP 20/93	R01
404	DEC 20/95	R01
405	SEP 20/93	R01
406	SEP 20/93	R01
407	SEP 28/99	R02
408	MAR 20/93	R02
409	JAN 28/00	R02
410	JAN 20/08	R01

GPA Group plc

PAGE	DATE	CODE
72-62-01		CONT.
411	JAN 20/08	R02
412	JAN 28/00	R01
413	SEP 28/99	R01
414	SEP 28/99	R01
415	SEP 28/99	R01
416	SEP 28/01	R01
72-62-01		
601	SEP 28/01	R01
602	SEP 20/93	R01
603	SEP 20/93	R01
604	MAY 28/01	R01
605	MAY 28/01	R01
606	SEP 20/93	R01
607	SEP 20/93	R01
608	SEP 20/93	R01
609	SEP 20/93	R01
610	SEP 20/93	R01
611	SEP 20/93	R01
612	BLANK	

PAGE	DATE	CODE

PAGE	DATE	CODE

CHAPTER 72 - ENGINE

TABLE OF CONTENTS

CHAPTER 72 - ENGINE

TABLE OF CONTENTS

CHAPTER 72 - ENGINE

TABLE OF CONTENTS

CHAPTER 72 - ENGINE

TABLE OF CONTENTS

CHAPTER 72 - ENGINE

TABLE OF CONTENTS

ENGINE - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. Engine Data

(1)	Type of engine	RB211-535E4
(2)	Bare engine take-off thrust (I.S.A. sea level static)	40,100 lbf
(3)	Direction of rotation	Counterclockwise viewed from the rear
(4)	Pressure ratio	28.5:1
(5)	By-pass ratio (by-pass flow to gas generator flow)	4.1:1
(6)	Fuel specification	Refer to Chapter 12
(7)	Oil specification	Refer to Chapter 12

   B. Handling Data
      (1) Maximum diameter of engine:
         (a) Across the LP compressor case front flange. 79.2 inch (2012 mm)
         (b) Across the engine front mount and the high-speed external gearbox 94.4 inch (2397.76 mm)
      (2) Overall length of engine - from front of inlet cowl to rear of exhaust cone 223 inch (5664 mm)

2. Component Details
   A. The engine is a high by-pass ratio, three shaft turbofan, consisting of a fan system (cold stream) and a gas generator (hot stream). The engine being of modular structure consists of the following modules:

(1)	LP rotor	01
(2)	IP compressor	02
(3)	Intermediate case	03
(4)	HP system (HP compressor, combustion and HP turbine)	04
(5)	IP/LP turbine (IP turbine, LP turbine and exhaust case)	05

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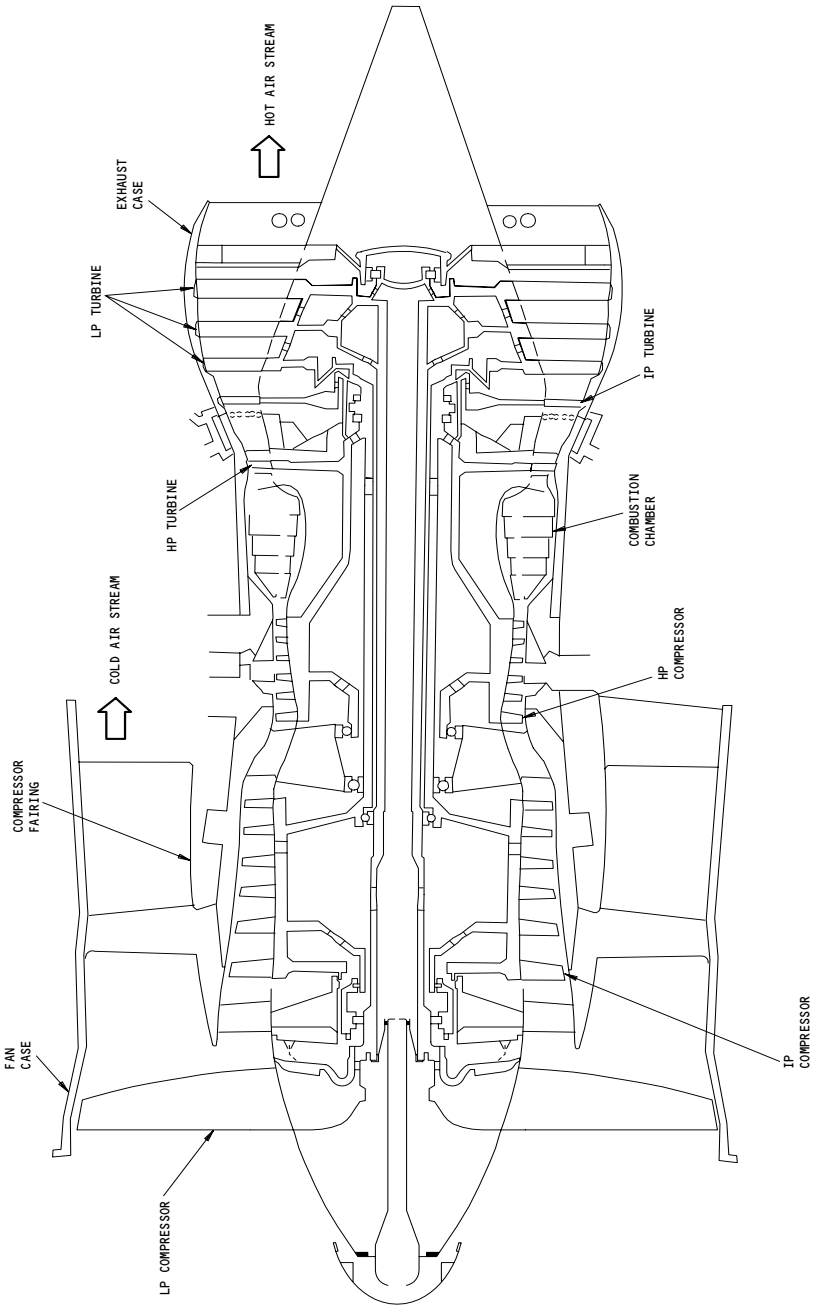


Engine General
Figure 1

(6) High speed external gearbox 06
(7) LP compressor case 07

B. The fan system consists of a single stage LP compressor (AMM 72-30-00), driven by a three stage LP turbine (AMM 72-50-00).

C. The gas generator system has these components:
(1) A six stage IP compressor and a six stage HP compressor (AMM 72-30-00).
(2) An annular combustion section (AMM 72-40-00).
(3) Single stage IP and HP turbines (AMM 72-50-00).

D. The two systems, cold and hot stream, exhaust through a common propelling nozzle.

E. Noise reduction is achieved by the use of acoustic materials of the LP compressor case, IP compressor fairings and the thrust reverser.

F. Vibration is suppressed by oil squeezed film damping of the engine main roller bearings (AMM 79-21-00).

3. Operation

A. Functional Description
(1) Air received by the LP compressor is compressed and discharged rearward through the fan stream duct. A proportion of LP compressor air is directed into the gas generator where it is further compressed by the IP and HP compressors prior to it entering the combustion section.
(2) Atomized fuel injected into the combustion chamber mixes with the air and is ignited and burned. The resultant increase in temperature expands and accelerates the gas stream rearward through the turbine section.
(3) Each turbine extracts energy from the hot gas stream to drive its compressor. The gas is then discharged to atmosphere through the common nozzle exhaust collector.

ENGINE - MAINTENANCE PRACTICES

1. General
   A. This section contains the three tasks that follow:
      (1) Turn the low pressure (LP) system on the engine.
      (2) Turn the intermediate pressure (IP) system on the engine.
      (3) Turn the high pressure (HP) system on the engine.

TASK 72-00-00-982-001-R00

2. Turn the Low Pressure (LP) System on the Engine
   A. Equipment
      (1) 289200 Protective Work Mat, Rolls-Royce
   B. Access
      (1) Location Zones
          412/422 Nose Cowl

   C. Turn the LP System on the Engine

      S 862-002-R00
      (1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D19, ENGINE START CONT LEFT

      S 862-003-R00
      (2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D20, ENGINE START CONT RIGHT

      S 942-004-R00
      (3) Put the protective work mat in the inlet cowl.

      S 982-005-R00

      WARNING: BE VERY CAREFUL WHEN YOU TURN THE LP COMPRESSOR SYSTEM. INJURY TO FINGERS AND HANDS CAN OCCUR.

      (4) Go into the inlet cowl and turn the LP compressor rotor in the necessary direction.

      S 942-006-R00
      (5) If no more turns of the LP system are necessary, remove the protective work mat from the inlet cowl.

      S 862-007-R00
      (6) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D19, ENGINE START CONT LEFT

S 862-008-R00
(7) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

TASK 72-00-00-982-009-R00

3. Turn the Intermediate Pressure (IP) System on the Engine

A. Equipment
(1) 289200 Protective Work Mat, Rolls-Royce
(2) E2J57129 Turning Tool - IP System, Rolls-Royce
(3) LJ29934 Exhaust Collector Cover, Rolls-Royce
(4) LJ34372 LP Fan Exhaust Cover, Rolls-Royce

B. Access
(1) Location Zones
412/422 Nose Cowl

C. Turn the IP System on the Engine

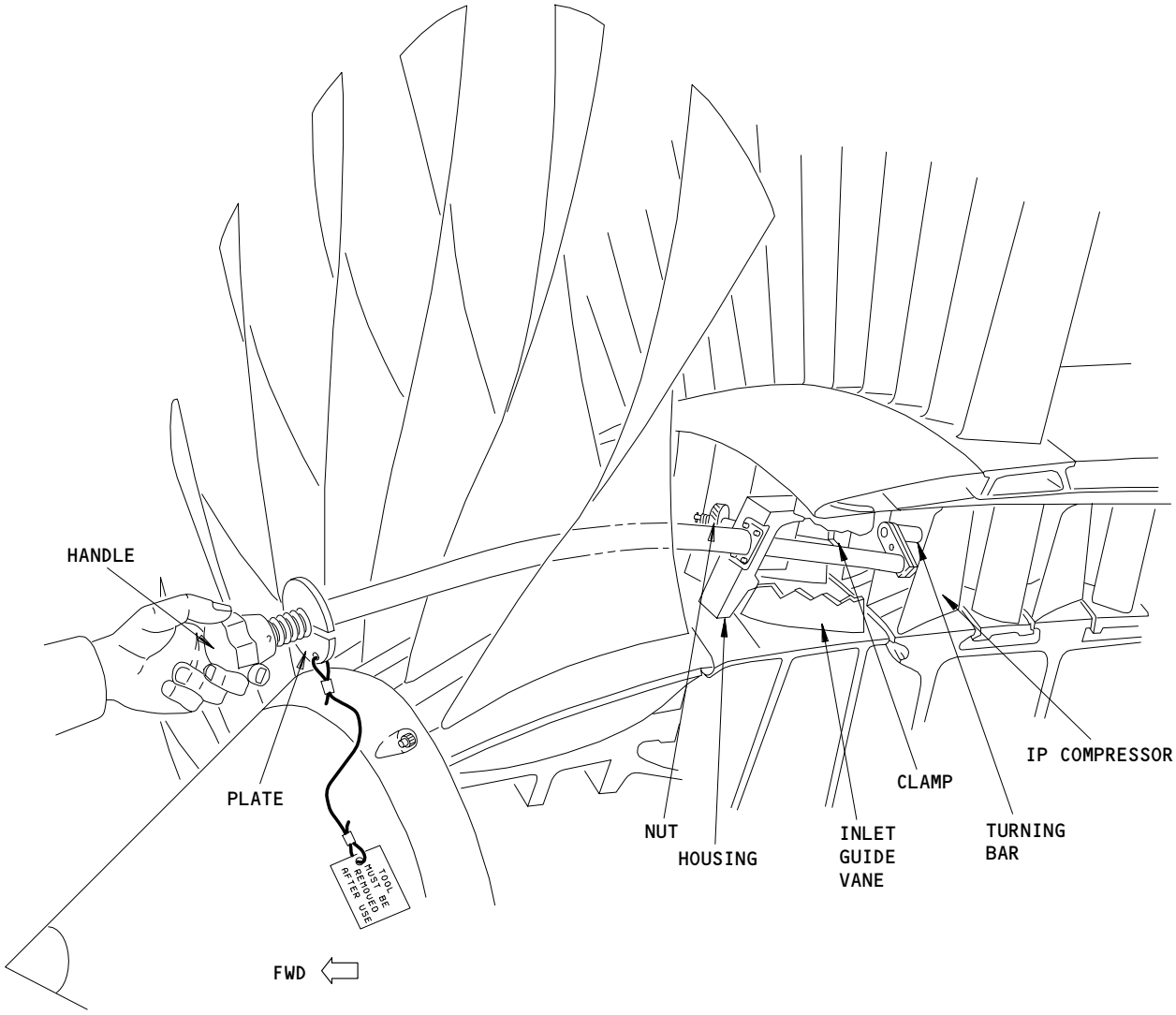
S 862-010-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

S 862-011-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

S 942-012-R00
(3) Install the covers on the hot and cold exhaust openings.

S 942-013-R00
(4) Put the protective work mat in the inlet cowl.

S 492-014-R00
(5) Install the IP turning tool as follows (Fig. 201):
(a) Align the red lines on the handle (1) and the plate (2) of the turning tool.
(b) Loosen the nut (6).



IP System Hand Turning Tool
Figure 201

(c) Push the clamp mechanism against the spring load.
(d) Turn the clamp spindle through 90 degrees in one of the two directions.
(e) Release the clamp mechanism.
(f) Put the turning tool through the LP compressor blades and the inlet guide vanes on the IP compressor at approximately the 12 o'clock position.
1) Make sure the red line on the plate (2) points to the center of the engine.
(g) After the turning tool is in position, hold the housing (5) against the leading edge of inlet guide vanes on the IP compressor.
(h) Push and turn the clamp spindle through 90 degrees to release the clamp mechanism.
(i) Feel through the inlet guide vanes to make sure the clamp (4) engages the trailing edge of the vane.
(j) Tighten the knurled nut (6).

S 982-017-R00

(6) Turn the IP system as follows:
(a) Turn the handle (1) until the red line is at the 9:00 o'clock position.
(b) Push the handle (1) against the spring load to engage the turn mechanism.
(c) Slowly turn the handle clockwise until the red line is at the 3:00 o'clock position to turn the IP compressor.
(d) Release and turn the handle (1) until the red line is at the 9:00 o'clock position.
(e) Do the steps above again if it is necessary to turn the IP compressor more.

S 092-019-R00

(7) Remove the IP turning tool from the engine.
(a) Push and turn the handle (1) to align the red lines on the handle and the plate (2).
(b) Release the handle (1).

(c) Loosen the knurled nut (6).
(d) Push the clamp mechanism against the spring load and turn the clamp spindle 90 degrees.

NOTE: This disengages the clamp (4) from the trailing edge of inlet guide vane on the IP compressor.

(e) Remove the turning tool from the engine through the inlet guide vanes and the LP compressor blades.

S 942-022-R00
(8) Remove the protective work mat from the inlet cowl.

S 942-023-R00
(9) Remove the covers from the hot and cold exhaust openings.

S 862-024-R00
(10) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

S 862-025-R00
(11) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

TASK 72-00-00-982-026-R00
4. Turn the High Pressure (HP) System on the Engine
A. General
(1) This task contains two procedures to turn the HP system on the engine. The first procedure turns the HP system through the mounting pad on the pneumatic starter. The second procedure turns the HP system through the breather outlet on the high speed gearbox.
(2) Use the procedures in 70-51-00/201 to tighten the fasteners.

(3) Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is specified in this procedure.
(4) Use the procedure in 70-02-01/201 to install the seal rings.

B. Equipment
(1) E2J54584 Turning tool - HP system (through the mounting pad), Rolls-Royce
(2) E2J52189 Turning tool - HP system (through breather outlet), Rolls-Royce

C. References
(1) AMM 71-11-04/201, Fan Cowl Panels
(2) AMM 80-11-01/401, Pneumatic Starter
(3) AMM 80-11-07/401, Starter QAD Adapter

D. Access
(1) Location Zones
413/423 Fan Cowl Panel (Left)
414/424 Fan Cowl Panel (Right)

E. Turn the HP System through the Mounting Pad on the Pneumatic Starter (Fig. 202)

S 862-027-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

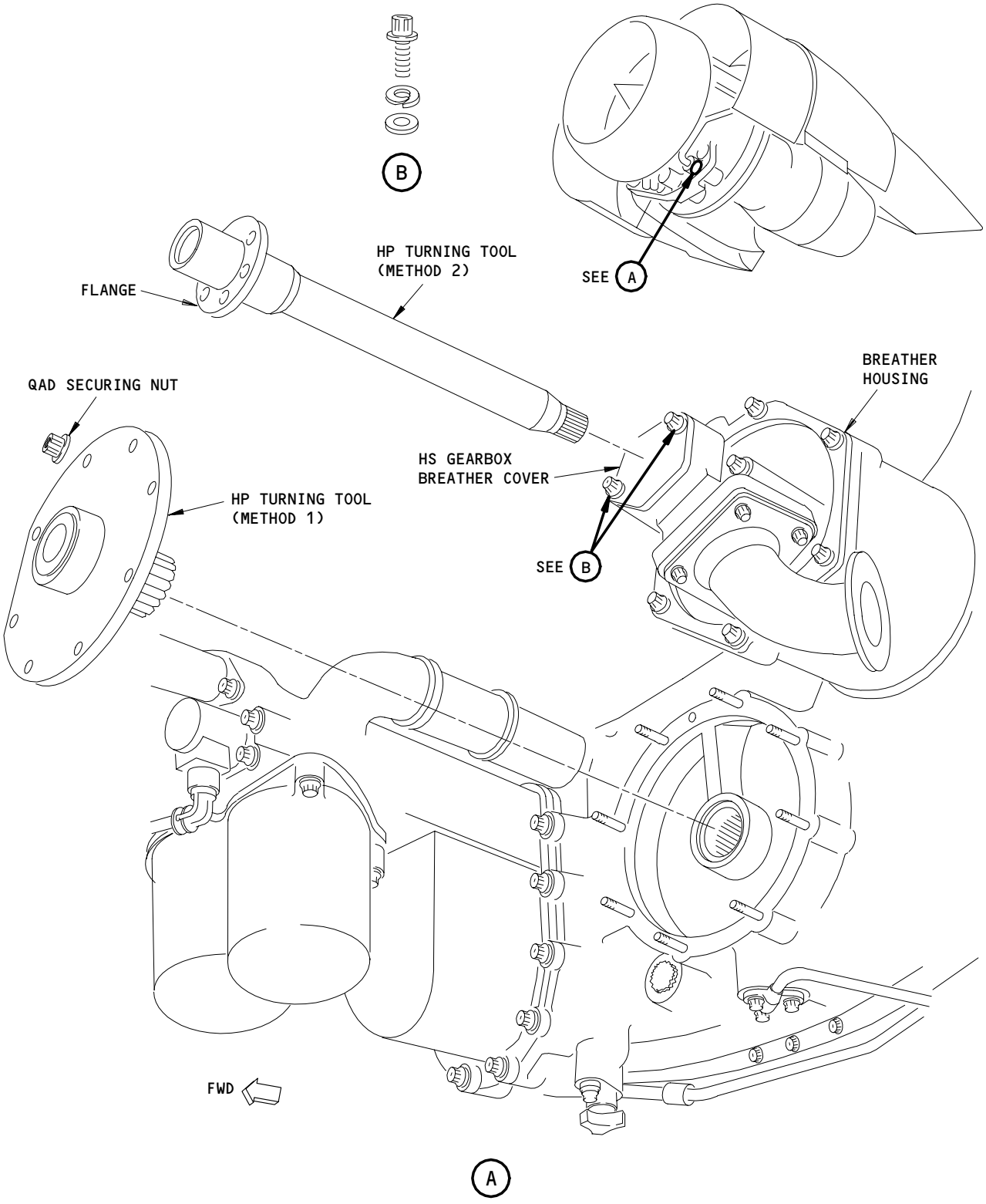
S 862-028-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

S 012-029-R00
(3) Remove the pneumatic starter (AMM 80-11-01/401).

S 012-030-R00
(4) Remove the QAD adapter (AMM 80-11-07/401).

S 492-031-R00
(5) Put the HP turning tool on the HS gearbox (Fig. 202).
(a) Make sure the splines on the turning tool engage the splines in the HS gearbox correctly.

S 492-032-R00
(6) Install the nuts used to attach the QAD adapter.



HP System – Rotation Methods
Figure 202

S 492-056-R00
(7) Tighten the nuts to safety the HP turning tool to the HS gearbox.

S 982-033-R00
(8) Turn the HP turning tool to turn the HP system in the necessary direction.
(a) Make sure the load necessary to turn the HP system is not more than 200 pound-feet (271.16 Newton meters).

S 092-034-R00
(9) If no more turns of the HP system are necessary, remove the nuts from the HP turning tool.

S 092-035-R00
(10) Remove the HP turning tool from the HS gearbox.

S 412-036-R00
(11) Install the QAD adapter (AMM 80-11-07/401).

S 412-037-R00
(12) Install the pneumatic starter (AMM 80-11-01/401).

S 862-038-R00
(13) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

S 862-039-R00
(14) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

F. Turn the HP System through the Breather Outlet on the High Speed Gearbox (Fig. 202)

S 862-040-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

S 862-041-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

S 012-042-R00
(3) Open the fan cowl panel on the left side of the engine (AMM 71-11-04/201).

S 012-043-R00
(4) Remove the details at positions 'B' on the breather cover of the HS gearbox.

S 012-044-R00
(5) Remove the breather cover from the HS gearbox.

S 492-045-R00
(6) Carefully put the HP turning tool through the breather assembly until the flange touches the breather housing.

S 492-046-R00
(7) Install the details at positions 'B' to safety the flange to the breather housing.

S 982-047-R00
(8) Turn the HP turning tool to turn the HP system in the necessary direction.
    (a) Make sure the load necessary to turn the HP system is not more than 70 pound-feet (94.90 Newton meters).

S 092-048-R00
(9) If no more turns of the HP system are necessary, remove the details at positions 'B' on the breather housing.

S 092-049-R00
(10) Remove the HP turning tool from the breather housing.

S 432-050-R00
(11) Install a new seal ring on the breather cover.

S 412-051-R00
(12) Install the breather cover as follows:
    (a) Install the breather cover on the breather housing.
    (b) Install the details at positions 'B'.

(c) Tighten the details.

S 412-052-R00

(13) Close the fan cowl panel on the left side of the engine (AMM 71-11-04/201).

S 862-053-R00

(14) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

S 862-054-R00

(15) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

ENGINE - INSPECTION/CHECK

1. General
   A. The first procedure gives the instructions for the preparation and use of the equipment necessary for the borescope inspection.
   B. The second procedure prepares the airplane for the inspection.
   C. The following procedures are the inspections covered here:
      (1) Intermediate Pressure (IP) Compressor Inspection,
      (2) High Pressure (HP) Compressor Inspection,
      (3) Combustion Liners and High Pressure Nozzle Guide Vanes (HPNGV) Inspection,
      (4) High Pressure (HP) Turbine Inspection,
      (5) Intermediate Pressure (IP) Turbine Inspection,
      (6) Low Pressure Turbine (LPT) Inspection,
      (7) LPT Stage 3 Nozzle Guide Vanes (NGV) Inspection.
   D. The last procedure gives instructions to restore the plane to its usual condition.
   E. For the inspection of engine areas not contained in this section, refer to the Inspection/Check page block for the correct chapter.

      - LP compressor rotor blades, AMM 72-31-13/601
      - LP compressor case, AMM 72-34-10/601
      - LP compressor intake rotating fairing, AMM 72-35-01/601
      - Exhaust plug, AMM 72-51-01/401

TASK 72-00-00-206-136-R01

2. Borescope Equipment Preparation and Use

A. General

(1) This task lists the inspection equipment, the light-source functional test, and the installation of the borescope equipment used in the engine inspection.

B. Equipment

(1) Borescope Inspection Equipment (Fig. 601).

Supplier	Part No.	Description	Item No. (Fig. 601)
Rolls-Royce	1702322	Light source box and case (NDT LSB-05-150) For use with all borescopes	1 and 2
Rolls-Royce	1017358	Light source box box (NDT LSB 100/ QH) used with 10120948 carrying case	1 and 2
Rolls-Royce	1702227	Cable - light guide (NDT FLGG/10/15A)	3
Rolls-Royce	1702375	Endoprobe (Green) (NDT 8, 120, 55, 270)	4
Rolls-Royce	1702379	Endoprobe (Blue) (NDT 8, 180, 55, 270)	5
Rolls-Royce	1702374	Endoprobe (Red) (NDT 8, 90, 55 270)	6

Borescope Equipment Preparation and Use

Rolls-Royce	1702376	Endoprobe (Yellow) (NDT 8, 70, 55 270)	7
Rolls-Royce	1702377	Endoprobe (Red) (NDT 11, 90, 30 265F)	14
Rolls-Royce	1702378	Endoprobe (Red) (NDT 11, 90, 10 265F)	15
Rolls-Royce	1702368	Location Stop (NDT A3101E) use with 1702378	-
Rolls-Royce	1702422	Location Stop (NDT 11, 90, 55, 185F)	-
Rolls-Royce	1702394	Eye Piece (EF/12)	13
Rolls-Royce	1702371	Protable light source box (NDT KVB-MK.1) For use with all borescope except 1702319	10
Cable (For use with item 10)			11

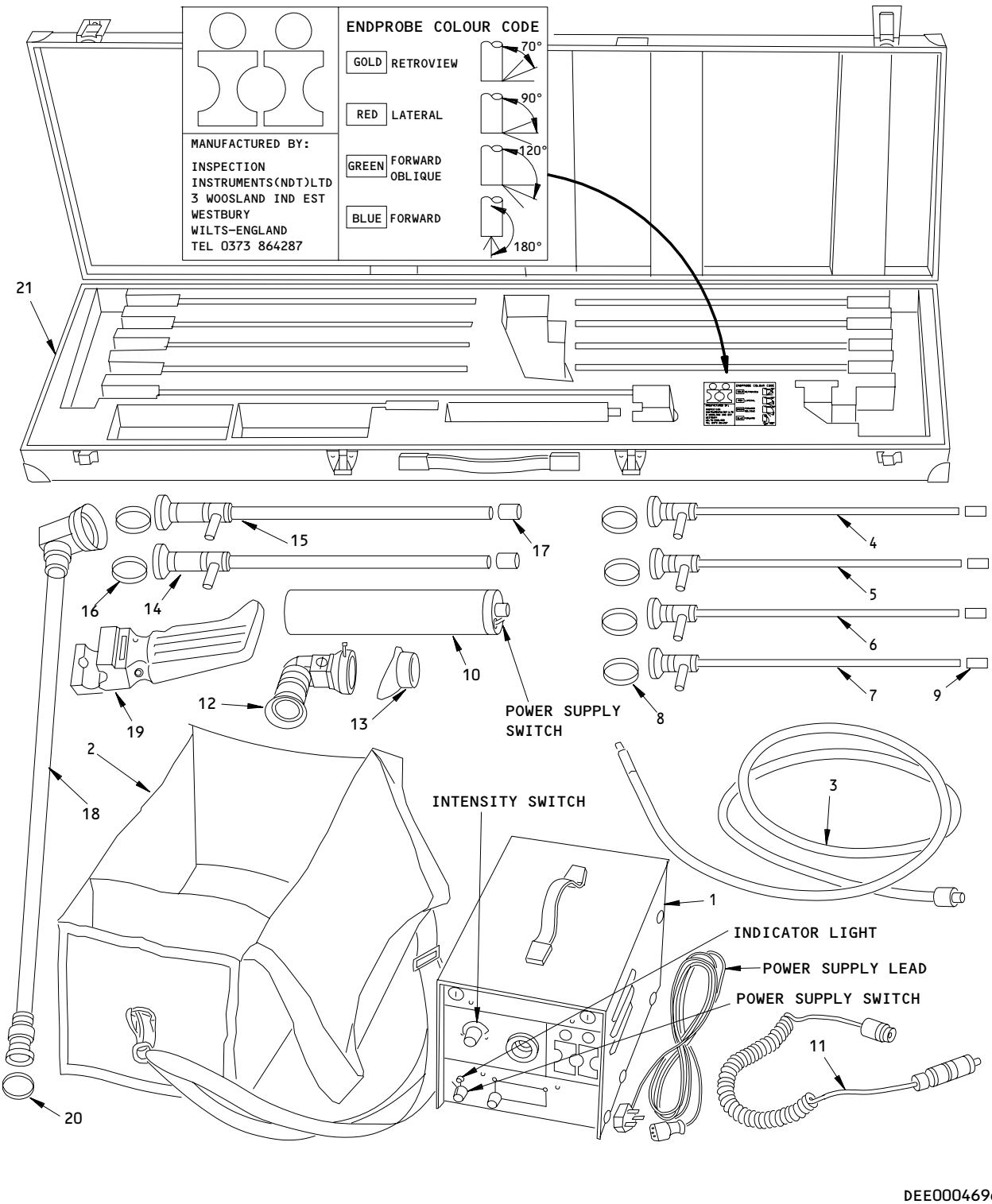
Rolls-Royce	1702393	Right angle viewer (NDT 2/RA3)	12
Rolls-Royce	1702380	Right angle viewer (NDT RAV535)	18
Rolls-Royce	1702381	Carrying Case (NDT CC/3)	21
Rolls-Royce	1702319	Flexible Borescope	
Rolls-Royce	HU19036/1	Impact extractor	
Rolls-Royce	89200	Protective workmat	

(2) Inspection lamp
(3) Clean, stiff bristled brush

C. Consumable Materials
(1) Refer to the table that follows:

Consumable	British Spec./Ref.	American Spec./Ref	OMat Item No.
Degreaser Fluid Acetone OR Isopropyl Alcohol OR Cleaning Solvent Desoclean 45 P-D-680TY1	B.S.509 1964	MIL-D-6998	150 1/40 1/257
Jointing compound	DTD.900/4586 PL.32 (light)	-	4/46
High temperature anti-seize compound	Rocol ASC251T	-	4/62
Lockwire	DTD.189A 22 S.W.G.	21 A.W.G.	238

D. References
(1) AMM 12-13-01/301, Engine Oil Replenishing
(2) AMM 70-51-00/201, Torque Tightening Technique
(3) AMM 72-00-00/201, Engine



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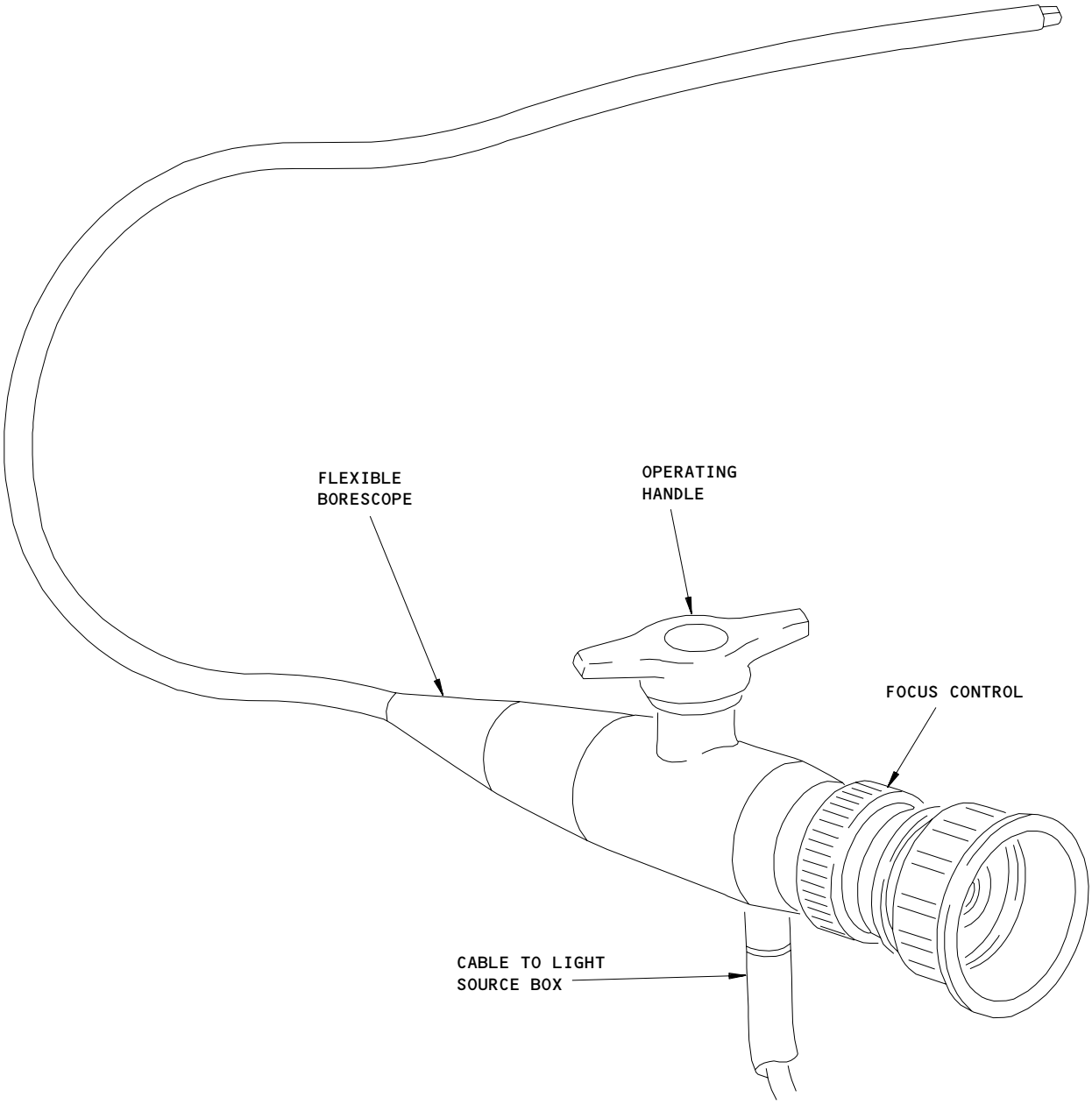
Borescope Equipment
Figure 601 (Sheet 1)



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Borescope Equipment
Figure 601 (Sheet 2)

Borescope Equipment Preparation and Use

(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 73-11-05/401, Fuel Spray Nozzles
(6) AMM 78-31-00/201, Thrust Reverser System

E. Procedure

S 846-138-R01

(1) Prepare the borescope equipment (Fig. 601).
  (a) Use the switch at the rear of the light source box (1) to select the correct voltage.
  (b) Connect the power supply to the light source box.
  (c) Set the intensity switch to the lowest light setting.
  (d) Do a functional check of the light source box.
    1) Set the power supply switch to ON and make sure the red indication light comes on. Return the switch to OFF.
  (e) Attach the light cable (3) to the light source box.

    NOTE: The flexible borescope has an integral light cable and does not require the attachment of light cable (3).

  (f) If you use the portable light source , attach the cable (11) to the portable light source box (10).

    NOTE: The portable light source is used with all borescopes except 1702319.

  (g) Select and attach a borescope to a light cable, or attach a flexible borescope to a light source box.
  (h) Set the power supply switch to ON.

S 846-140-R01

(2) Do these steps to use the borescope equipment:

  NOTE: Deterioration of the HPNGV support ring heatshield may allow axial and circumferential movement of the heatshield over the support ring, after removal of the borescope plug. This may block access to the HP turbine borescope hole 'K'. The heatshield may be repositioned by hand to allow ease of entry of borescope. Looseness of the heatshield will not affect engine integrity.

  (a) Put the borescope through the applicable opening for the inspection to be done (Fig. 602).
  (b) Rotate the IP or HP system (AMM 72-00-00/201), if you do either the compressor or turbine system inspection.

Borescope Equipment Preparation and Use

(c) Refer to the applicable inspection task given in this procedure:

- IP Compressor
- HP Compressor
- Combustion liners and HPNGV
- HP Turbine
- IP Turbine
- LP Turbine
- LP Turbine, stage 3 NGV

(d) Withdraw the borescope from the engine.

S 216-141-R01

(3) Do an inspection through the fuel spray nozzle aperture (Fig. 602).

(a) Remove the borescope stop adapter, if it is attached.

CAUTION: MAKE SURE THE BORESCOPE DOES NOT MOVE FORWARD OF THE HP OUTLET GUIDE VANES. IF YOU DO NOT, THE BORESCOPE WILL HIT THE HP COMPRESSOR STAGE 6 ROTOR BLADES WHEN THE HP SYSTEM IS TURNED.

MAKE SURE THE FLEXIBLE BORESCOPE DOES NOT CATCH THE INTERNAL PARTS OF THE ENGINE.

IF YOU DO NOT DO THIS, DAMAGE TO THE BORESCOPE COULD OCCUR. ALSO, DAMAGE TO THE POWER PLANT COULD OCCUR IF THE BORESCOPE BECOMES BROKEN INSIDE THE ENGINE.

(b) Insert the flexible borescope through the fuel spray nozzle aperture and pass it carefully through the outer diffuser of the combustion liner head section. Then, pass the boresope between the HP outer guide vanes at their inner platform.

(c) Rotate the HP system (AMM 72-00-00/201).

(d) Refer to the HP Compressor inspection given in this procedure.

Borescope Equipment Preparation and Use

CAUTION: MAKE SURE THE FLEXIBLE BORESCOPE DOES NOT CATCH THE INTERNAL DETAILS OF THE ENGINE. IF YOU DO NOT, DAMAGE TO THE BORESCOPE COULD OCCUR. ALSO, DAMAGE TO THE POWERPLANT COULD OCCUR IF THE BORESCOPE BECOMES BROKEN INSIDE THE ENGINE.

(e) Withdraw the flexible borescope from the engine.

S 846-142-R01

(4) Disassemble the borescope equipment.
  (a) Select power supply switch to OFF. Let the power supply cool for at least 30 seconds.
  (b) Remove the borescope and light cable from the light source box.
  (c) Disconnect the power supply from the light source box.

Prepare the Airplane for the Inspection

TASK 72-00-00-846-137-R01

3. Prepare the Airplane for the Inspection

A. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings
(3) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

210 Control Cabin
411 No. 1 Engine
421 No. 2 Engine

C. Procedure

S 866-152-R01

(1) For the left engine, open these circuit breakers and install a DO-NOT-CLOSE tag:
(a) On the P11 Overhead Circuit Breaker Panel:
1) 11D7, ENGINES STBY IGN LEFT 1
2) 11D8, ENGINES STBY IGN LEFT 2
3) 11L1, LEFT ENGINE IGN 1
4) 11D12, LEFT T/R CONT
5) 11D17, LEFT ENG SYNC LOCK CONT
6) 11K5, LEFT ENG T/R IND
7) 11K6, LEFT ENG T/R DCV SEC

S 866-153-R01

(2) For the right engine, open these circuit breakers and install a DO-NOT-CLOSE tag:
(a) On the P11 Overhead Circuit Breaker Panel:
1) 11D9, ENGINES STBY IGN RIGHT 1
2) 11D10, ENGINES STBY IGN RIGHT 2
3) 11L28, RIGHT ENGINE IGN 1
4) 11B30, RIGHT ENG T/R CONT ALTN
5) 11K31, RIGHT ENG T/R IND
6) 11K32, RIGHT ENG SYNC LOCK
7) 11K33, RIGHT ENG T/R CONT
8) 11K34, RIGHT ENG T/R DCV SEC
(b) On the P6 power distribution panel:
1) 6D12, R ENG SYNC LOCK ALTN (BAT BUS)

S 016-154-R01

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Open the thrust reversers (AMM 78-31-00/201).

Prepare the Airplane for the Inspection

S 016-155-R01

(4) Remove the lower-right compressor fairing panel (AMM 72-03-01/401).

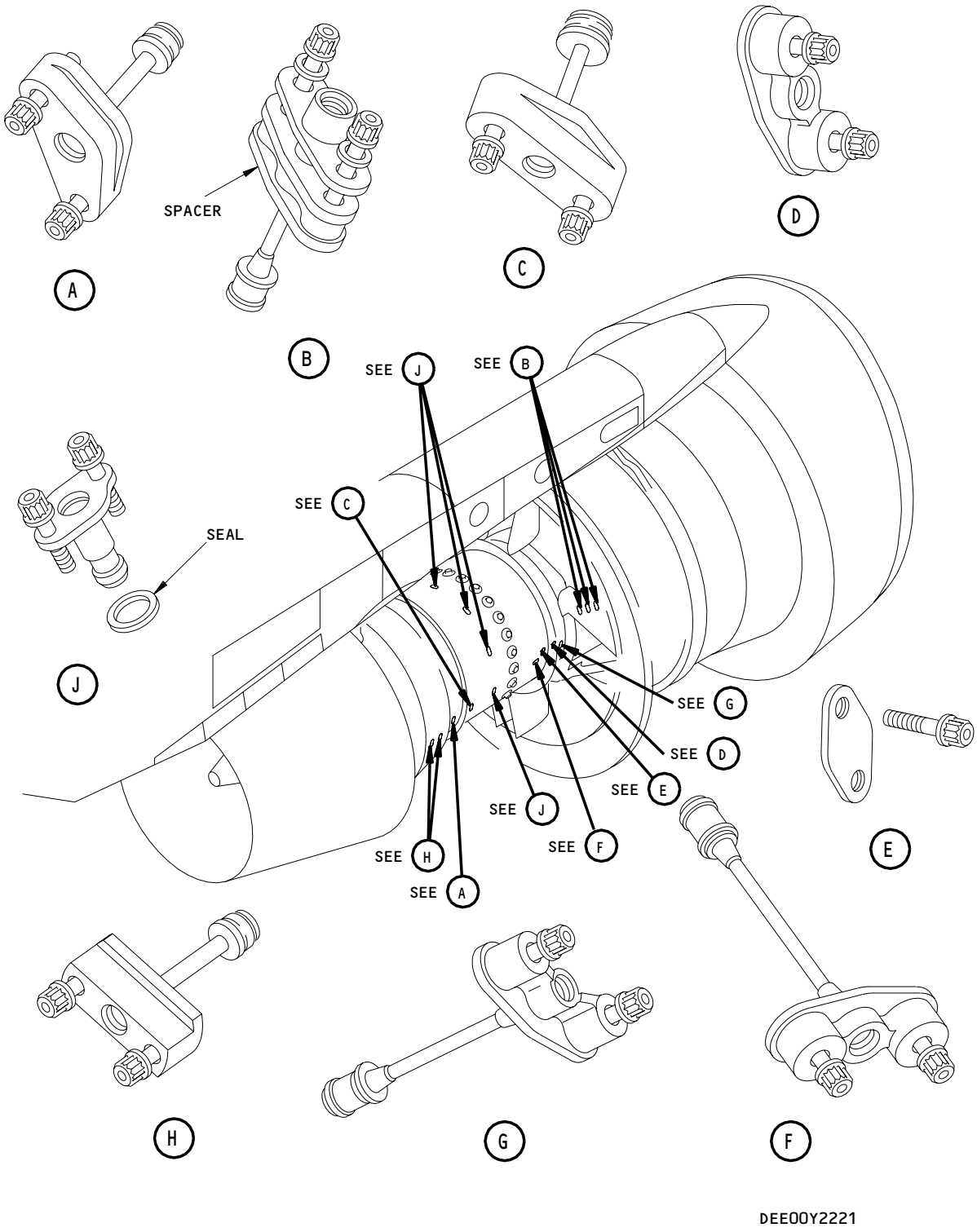
S 416-156-R01

(5) Install the IP and HP system turning tools (AMM 72-00-00/201).

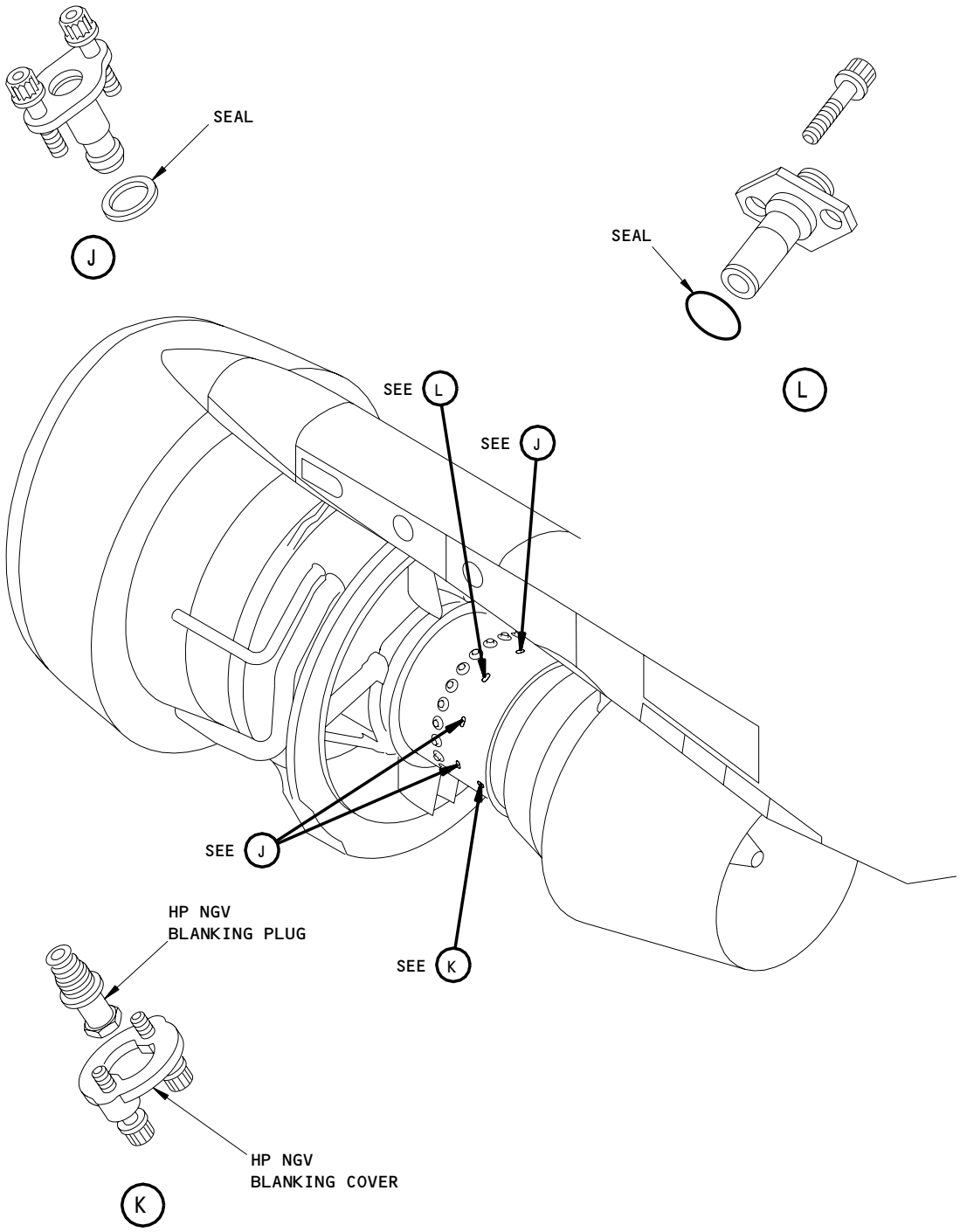
S 016-157-R01

(6) Remove the applicable borescope plugs for the inspection (Fig. 602). Use the impact extractor to withdraw the plug(s) if necessary.

NOTE: For the combustion section inspection, remove the blanking plugs at the rear of fuel spray nozzles 2, 5, 8, 11, 14, 17, 20 and 23, which are numbered clockwise when you look from aft of the engine. The number 1 nozzle is to the right of the engine top. Make sure that the C-ring seals have been removed with the blanking plugs.



Borescope Access Details
Figure 602 (Sheet 1)



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Borescope Access Details
Figure 602 (Sheet 2)

MAINTENANCE

INSPECTION AREA	LOCATION OF ACCESS DETAILS	ENGINE IDENTIFATION
IP COMPRESSOR, STAGE 2 REAR, STAGE 3 FRONT	B	IP2S
IP COMPRESSOR, STAGE 4 REAR, STAGE 5 FRONT	B	IP4S
IP COMPRESSOR, STAGE 6 REAR	B	IP6S
HP COMPRESSOR, STAGE 1 REAR STAGE 2 FRONT	G	HP1S
HP COMPRESSOR, STAGE 2 REAR, STAGE 3 FRONT	D	HP2S
HP COMPRESSOR, STAGE 3 REAR, STAGE 4 FRONT	E	-
HP COMPRESSOR, STAGE 5 REAR, STAGE 6 FRONT	F	HP5S
COMBUSTION CHAMBER AND HPNGV LEADING EDGE	J	-
HP TURBINE LEADING EDGE	K	-
HP TURBINE TRAILING EDGE IP TURBINE LEADING EDGE	C	-
IP TURBINE TRAILING EDGE LP1 TURBINE LEADING EDGE	A	LP1S
LP1 TURBINE TRAILING EDGE LP2 TURBINE LEADING EDGE	H	LP2S
LP2 TURBINE TRAILING EDGE LP3 TURBINE LEADING EDGE	H	LP3S

Borescope Access Details
Figure 602 (Sheet 3)

Intermediate Pressure Compressor Inspection

TASK 72-00-00-206-026-R01

4. Intermediate Pressure (IP) Compressor Inspection

A. General

(1) Examine the IP compressor blades for the conditions that follow:
  (a) Missing annulus filler.
  (b) Airfoil cracks, nick, tears.
  (c) Airfoil dents, bends.
  (d) Airfoil tip damage.
  (e) Material missing from the airfoil leading and trailing edges.

(2) Examine the 1st Stage Compressor blades through the front of the engine.

(3) Examine the 2nd-through-6th stage compressor blades with the borescope equipment (Fig. 602).

(4) Use an impact extractor if you cannot easily remove the plugs.

(5) It is not possible to examine these areas of the IP Compressor:
  (a) The rear of the 1st stage rotor blades.
  (b) The front of the 2nd stage rotor blades.
  (c) The rear of the 3rd stage rotor blades.
  (d) The front of the 4th stage rotor blades.
  (e) The rear of the 5th stage rotor blades.
  (f) The front of the 6th stage rotor blades.

(6) The access location, the view area, and the number of blades for each compressor stage are as follows:

Access	View Area	Number of Blades
Engine Front	Front - 1st-Stage	50
IP 2S	Rear - 2nd-Stage	57
IP 2S	Front - 3rd-Stage	48
IP 4S	Rear - 4th-Stage	53
IP 4S	Front - 5th-Stage	49
IP 6S	Rear - 6th-Stage	46

Note: Borescope access bosses IP 2S, IP 4S, and IP6S will not look in the center position of the adjacent thickened section of the case. This is acceptable.

(7) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 604).

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

Intermediate Pressure Compressor Inspection

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure (Fig. 602, 603, and 604)

S 846-146-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-191-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 496-190-R01

(3) Attach the tool to turn the IP system (AMM 72-00-00/201).

S 296-163-R01

(4) Examine the IP Compressor Blades (Fig. 604).

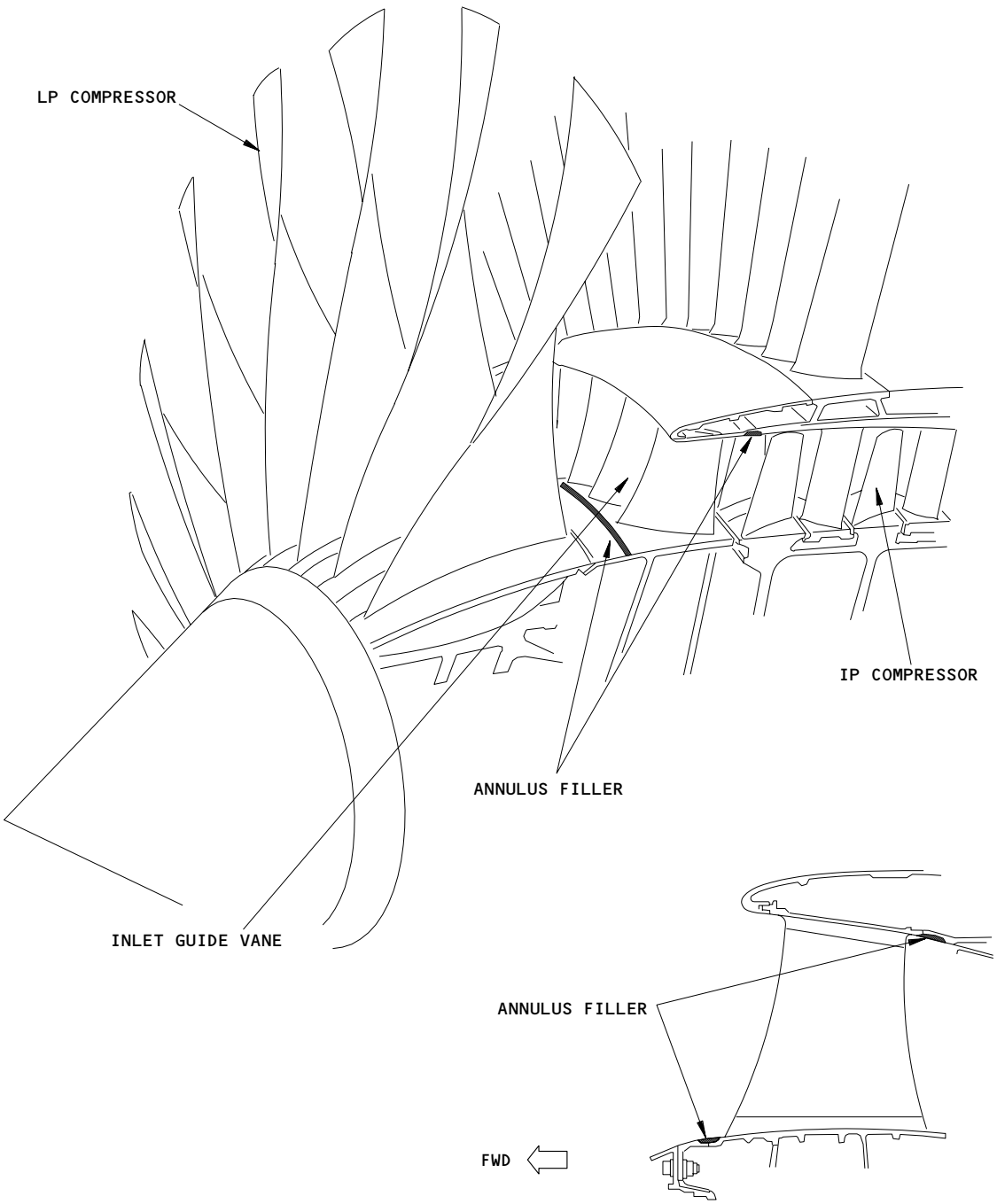
NOTE: To examine the 1st stage IP Compressor blades, use a light source through the LP and IP Compressor inlet guide vanes. Damaged or missing annulus filler is permitted.

NOTE: If you find damage which extends between different zones, compare the chordal width of the damage in each zone to the limit for that zone.

(a) Damage is permitted to the limits that follow:

1) Material missing up to a depth of 0.015in (0,38mm) with no related cracks.
2) Nicks and tears from the leading and trailing edges up to 0.015in (0,38mm) in depth with no related cracks.

NOTE: If you use digital optical measuring equipment, this limit is increased to 0.025in (0,64mm).



INLET GUIDE VANE
CROSS-SECTION SHOWING
ANNULUS FILLER LOCZTION

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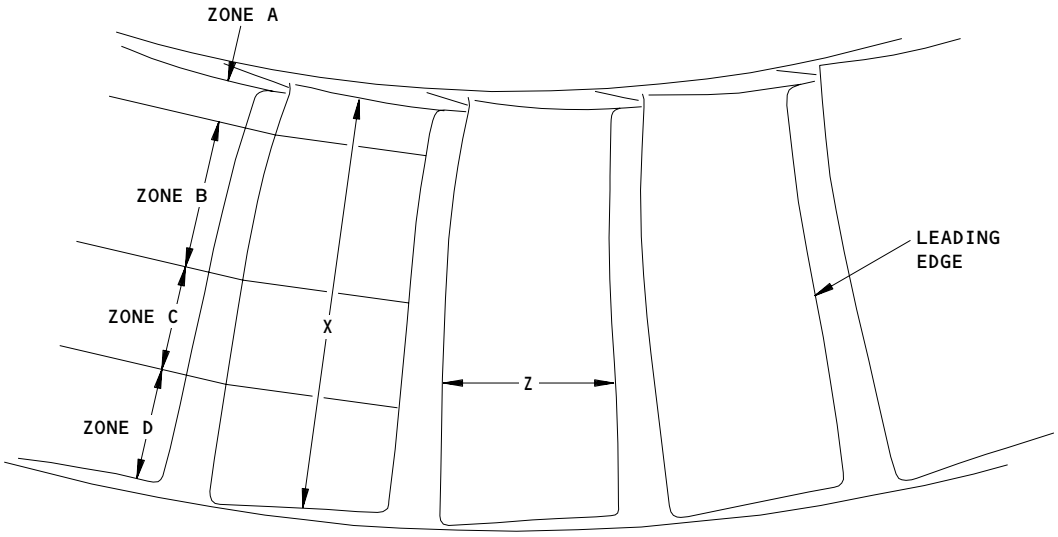
IP Compressor Inlet Guide Vanes and Front Bearing Housing Support
Figure 603



STAGE 2
(VIEW IN THE FORWARD DIRECTION)

STAGE	QTY	DIMENSION X	DIMENSION Z (TRUE CHORD)
1	50	5.100 INCHES (129.54 mm)	2.97 INCHES (75.38 mm)
2	57	4.700 INCHES (119.38 mm)	2.52 INCHES (64.08 mm)
3	48	4.300 INCHES (109.22 mm)	2.36 INCHES (60.00 mm)
4	53	3.900 INCHES (99.06 mm)	2.19 INCHES (55.59 mm)
5	49	3.700 INCHES (93.98 mm)	2.21 INCHES (56.06 mm)
6	46	3.500 INCHES (88.9 mm)	2.31 INCHES (58.79 mm)

ZONE A = 10% OF BLADE AIRFOIL
ZONE B = 40% OF BLADE AIRFOIL
ZONE C = 25% OF BLADE AIRFOIL
ZONE D = 25% OF BLADE AIRFOIL

67934A

IP Compressor Blade Dimensions
Figure 604

Intermediate Pressure Compressor Inspection

3) The material missing is from a previous repair.

NOTE: Missing material from a previous repair will have a smooth contour appearance.

4) Dents or bends on the 1st stage compressor blades are permitted to the limits that follow:
   a) No related cracks, nicks or tears.
   b) No more than 25 blades with dents or bends along the leading edge that are more than 1.0in (25,4mm) in radial length.
   c) No more than 5 blades with dents or bends that change the shape of the blade more than 0.25in (6,35mm) away from the correct airfoil position.
   d) No more than 10 blades with dents or bends in an arc of 12 blades.
   e) No more than 4 blades, in an arc of 12 blades, with dents that change the shape of the blade more than 0.25in (6,35mm) away from the correct airfoil position.
   f) Reject any blade that touches a different blade.
5) Dents or bends on the 2nd stage to 6th stage compressor blades are permitted to the limits that follow:
   a) No related cracks, nicks or tears.
   b) No large bends if the blade touched a different blade.
6) Tip damage in zone D
   a) Heat discolouration because of blade tip rub is permitted.
   b) Burrs on the trailing edge tip due to blade tip rub is permitted if they are on 25 percent or less of the blade chord width.
   c) Bends or curls are permitted if there is no other damage.
   d) Tip missing up to the limits below (30 percent true chord width) is permitted only if you examine the subsequent stages for damage.

      Stage 1: 0.89 inch (22,6mm)
      Stage 2: 0.76 inch (19,3mm)
      Stage 3: 0.71 inch (18,0mm)
      Stage 4: 0.66 inch (16,7mm)
      Stage 5: 0.66 inch (16,7mm)
      Stage 6: 0.69 inch (17,5mm)

Intermediate Pressure Compressor Inspection

(b) Damage is permitted to the limits that follow if you do the inspection procedure:

1) Blade cracks, bends or curls are permitted up to the limits that follow:

a) One radial crack from the blade tip is permitted if it is not more than 10% of the true chord width:

Stage 1	0.30 in.	(7.6 mm)
Stage 2	0.25 in.	(6.4 mm)
Stage 3	0.24 in.	(6.1 mm)
Stage 4	0.22 in.	(5.6 mm)
Stage 5	0.22 in.	(5.6 mm)
Stage 6	0.23 in.	(5.9 mm)

b) The crack must not be related to other damage on the blade.

c) Axial cracks, nicks, or tears on one edge in Zone A, B and C are permitted if the length is not more than 5% of the true chord width:

Stage 1	0.15 in.	(3.8 mm)
Stage 2	0.13 in.	(3.3 mm)
Stage 3	0.12 in.	(3.0 mm)
Stage 4	0.11 in.	(2.8 mm)
Stage 5	0.11 in.	(2.8 mm)
Stage 6	0.09 in.	(2.3 mm)

d) Accept cracks, nicks, or tears on both edges in Zone A, B and C are permitted if the length is not more than 2.5% of the true chord width:

Stage 1	0.07 in.	(1.8 mm)
Stage 2	0.06 in.	(1.5 mm)
Stage 3	0.06 in.	(1.5 mm)
Stage 4	0.06 in.	(1.5 mm)
Stage 5	0.06 in.	(1.5 mm)
Stage 6	0.06 in.	(1.5 mm)

e) Axial cracks, nicks, or tears on one edge in Zone D, are permitted if the length is not more than 15% of the chord width:

Stage 1	0.45 in.	(11.4 mm)
Stage 2	0.38 in.	(9.6 mm)
Stage 3	0.35 in.	(8.8 mm)
Stage 4	0.33 in.	(8.3 mm)
Stage 5	0.34 in.	(8.6 mm)
Stage 6	0.35 in.	(8.8 mm)

Intermediate Pressure Compressor Inspection

f) Axial cracks, nicks, or tears on both edges within Zone D are permitted if the individual lengths are not more than 7.5% of the true chord width:

Stage 1	0.23 in.	(5.8 mm)
Stage 2	0.19 in.	(4.8 mm)
Stage 3	0.18 in.	(4.5 mm)
Stage 4	0.17 in.	(4.3 mm)
Stage 5	0.17 in.	(4.3 mm)
Stage 6	0.17 in.	(4.3 mm)

g) Bends or curls together with cracks or tears are permitted if each individual crack or tear is not longer than 20 percent of the true chord width:

Stage 1	0.60 in.	(15.2 mm)
Stage 2	0.50 in.	(12.7 mm)
Stage 3	0.47 in.	(11.9 mm)
Stage 4	0.44 in.	(11.1 mm)
Stage 5	0.44 in.	(11.1 mm)
Stage 6	0.46 in.	(11.6 mm)

2) Do 3 inspections at intervals of between 250 and 350 flight hours and 1 inspection at between 800 and 1000 flight hours.
   a) If there is no increase in deterioration or damage, the next inspection is subject to airlines decision.

(c) Dress the blade by borescope blending - refer to FRS7161 (AMM TASK 72-00-00-300-XXX).

1) It is not necessary to do the inspection procedure if you repair all nicks, cracks and tears.

NOTE: It is permitted to do this repair once only on each blade.

NOTE: Make sure that the total number of repaired blades in both the IP and HP Compressor blades is not more than 10.

Intermediate Pressure Compressor Inspection

2) All axial cracks, nicks or tears can be blended if they are in the limits that follow:
   a) Edges that can be blended are listed below:

Compressor Stage	IP Compressor Access Leading Edge	Trailing Edge
1	No	No
2	No	Yes
3	Yes	No
4	No	Yes
5	Yes	No
6	Yes	Yes

3) Axial cracks, nicks or tears with length that is not more than 5 percent of the true chord width on one edge in zone B can be blended:

   Stage 1: 0.15 inch (3,8mm)
   Stage 2: 0.13 inch (3,2mm)
   Stage 3: 0.13 inch (3,2mm)
   Stage 4: 0.11 inch (2,8mm)
   Stage 5: 0.11 inch (2,8mm)
   Stage 6: 0.11 inch (2,8mm)

4) Axial cracks, nicks or tears with length that is not more than 5 percent of the true chord width on one edge in zone B can be blended:

   Stage 1: 0.15 inch (3,8mm)
   Stage 2: 0.13 inch (3,2mm)
   Stage 3: 0.13 inch (3,2mm)
   Stage 4: 0.11 inch (2,8mm)
   Stage 5: 0.11 inch (2,8mm)
   Stage 6: 0.11 inch (2,8mm)##
   a) Axial cracks, nicks or tears with length that is not longer than 10 percent of the true chord width on one edge in zone C and D can be blended.

      Stage 1: 0.30 inch (7,6mm)
      Stage 2: 0.25 inch (6,4mm)
      Stage 3: 0.24 inch (6,1mm)
      Stage 4: 0.22 inch (5,6mm)
      Stage 5: 0.22 inch (5,6mm)
      Stage 6: 0.23 inch (5,8mm)

Intermediate Pressure Compressor Inspection

(d) If necessary, the acceptance limits for cracks in zone D can be increased if you do the steps that follow:
1) Damage limits to blades in zone D can be increased by 50 percent of the inspection limits for that zone.
a) Repair before 5 cycles or 24 flight hours. Use the limit that occurs first.

(e) Damage more than the limits in this procedure must be repaired immediately.

S 846-201-R01

(5) Do the procedure to put the airplane back to its usual condition.

High Pressure Compressor Inspection

TASK 72-00-00-206-038-R01

5. High Pressure (HP) Compressor Inspection

A. General

(1) This inspection gives the procedure to examine the HP compressor blades for the conditions that follow:
   (a) Airfoil cracks, nicks or tears.
   (b) Airfoil dents and bends.
   (c) Material loss on the airfoil leading and trailing edges.
   (d) Airfoil tip damage and discoloration.

(2) It is not possible to examine these areas of the HP compressor:
   (a) The rear of the 4th-stage rotor blades.
   (b) The front of the 5th-stage rotor blades.
   (c) The rear of the 6th-stage rotor blades.

(3) The access location, the view area, and the number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
HP 1S	Rear - Stage 1	57
HP 1S	Front - Stage 2	82
HP 2S	Rear - Stage 2	82
HP 2S	Front - Stage 3	94
-----	Rear - Stage 3	94
-----	Front - Stage 4	97
HP 5S	Rear - Stage 5	76
HP 5S	Front - Stage 6	74

NOTE: Borescope access bosses HP 1S and HP 2s will not look in the center position of the adjacent thickened section of the case. This is acceptable.

High Pressure Compressor Inspection

(4) To help you make an estimate of the damage, refer to the acceptance zones in Fig. 605

B. References
(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access
(1) Location Zones:
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure

S 846-158-R01
(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-189-R01
(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 496-188-R01
(3) Attach the tool to turn the HP system (AMM 72-00-00/201).

S 296-162-R01
(4) Do an inspection of the HP compressor blades. Use the limits that follow (Fig. 605):
(a) Damage is permitted to the limits that follow:
1) Accept missing material up to a depth of 0.015 inch (0,38mm) with no related cracks.
2) The material missing is from a previous repair.

NOTE: Material missing from a previous repair will have a smooth contour appearance. Check the module log book.

High Pressure Compressor Inspection

3) Accept nicks or tears that start on the leading or trailing edges, only if:
   a) There are no cracks.
   b) The maximum depth of the nick or tear is 0.015 inch (0.38 mm).

      NOTE: If digital optical measurement equipment is used, the limit is increased to 0.025 inch (0.64mm).

4) Dents or bends are permitted if:
   a) There are no related cracks, nicks or tears.
   b) The blade does not touch a different blade.
5) Blade tip damage and discoloration in zone D.
   a) Accept blade tip discoloration caused by blade tip rub.
   b) Accept material that is bonded to the blade tip or leading edge.
   c) Accept bonds or curls that do not have related cracks or tears.
   d) Tip missing up to the limits below (33 percent true chord width) is permitted only if you examine the subsequent stages for damage.

      Stage 1 0.55 inch (13.9 mm)
      Stage 2 0.46 inch (11.7 mm)
      Stage 3 0.40 inch (10.1 mm)
      Stage 4 0.45 inch (11.4 mm)
      Stage 5 0.44 inch (11.1 mm)
      Stage 6 0.42 inch (10.6 mm)

   e) The radial length from the tip of the missing piece has no limit. The missing tip can go from Zone D into Zone C (Fig. 605).

High Pressure Compressor Inspection

1 Cracks from the tip, which are initially radial and then become axial, are permitted.

NOTE: This condition can cause tip corner loss.

2 Cracks which start at the leading or trailing edges and then extend radially towards the tip are also permitted.

NOTE: This condition can cause tip corner loss.

3 Cracks which start at the leading or trailing edges and then extend radially towards the fillet radius are not permitted. For limits on tip corner material lose, see the limits above.

(b) Damage is permitted to the limits that follow if you do the inspection procedure.

1) Blade cracks, bends or curls are permitted up to the limits that follow.

a) Axial cracks, nicks, tears and material loss on one edge in Zone A, B and C are permitted if the length of each crack is not more than 10% of the true chord width

Stage 1 0.17 inch (4.3 mm)
Stage 2 0.14 inch (3.5 mm)
Stage 3 0.12 inch (3.0 mm)
Stage 4 0.14 inch (3.5 mm)
Stage 5 0.13 inch (3.3 mm)
Stage 6 0.13 inch (3.3 mm)

b) Axial cracks, nicks, tears, and material loss on the two edges in Zone A, B and C are permitted if the length is not more than 5% of the true chord width.

Stage 1 0.08 inch (2.0 mm)
Stage 2 0.07 inch (1.7 mm)
Stage 3 0.06 inch (1.5 mm)
Stage 4 0.07 inch (1.7 mm)
Stage 5 0.07 inch (1.7 mm)
Stage 6 0.06 inch (1.5 mm)

High Pressure Compressor Inspection

c) Axial cracks, nicks, tears and material loss on one edge in Zone D are permitted if the length is not more than 20% of the true chord width.

Stage 1 0.33 inch (8.4 mm)
Stage 2 0.28 inch (7.1 mm)
Stage 3 0.24 inch (6.1 mm)
Stage 4 0.27 inch (6.8 mm)
Stage 5 0.27 inch (6.8 mm)
Stage 6 0.25 inch (6.4 mm)

d) Axial cracks, nicks, tears and material loss on two edges in Zone Dare not permitted if the length is not more than 10% of the true chord width

Stage 1 0.17 inch (4.3 mm)
Stage 2 0.14 inch (3.5 mm)
Stage 3 0.12 inch (3.0 mm)
Stage 4 0.14 inch (3.5 mm)
Stage 5 0.13 inch (3.3 mm)
Stage 6 0.13 inch (3.3 mm)

2) Do 3 inspections at intervals of between 250 and 350 flight hours and 1 inspection at between 800 and 1000 flight hours.
   a) If there is no increase in deterioration or damage, the next inspection is subject to airlines decision.

(c) Dress the blade by borescope blending - Refer to FRS7161 (AMM TASK 72-00-00-300-XXX)

1) It is not necessary to do the inspection procedure if you repair all cracks, nicks and tears.

NOTE: It is permitted to do this repair once only on each blade.

NOTE: Make sure that the total number of repaired blades in both the IP and HP Compressor is not more than 10.

NOTE: Make sure that the number of repaired blades in HP Compressor stage 1 is not more than 10.

High Pressure Compressor Inspection

2) All axial cracks, nicks or tears can be blended if they are in the limits that follow:
   a) Edges that can be blended are listed below:

Compressor Stage	HP Compressor Access Leading Edge	Trailing Edge
1	No	Yes
2	Yes	Yes
3	Yes	Yes
4	Yes	No
5	No	Yes
6	Yes	No

3) HP Compressor stage 1 blades only:
   a) Axial cracks, nicks or tears with length that is not more than 0.09inch (2,5mm) of the true chord width on one edge in zone B and C can be blended.
4) HP Compressor stage 2 to 6 blades only:
   a) Axial cracks, nicks or tears with length that is not more than 5 percent of the true chord width on one edge in zone B can be blended:

      Stage 2: 0.07 inch (1,8mm)
      Stage 3: 0.06 inch (1,5mm)
      Stage 4: 0.07 inch (1,8mm)
      Stage 5: 0.07 inch (1,8mm)
      Stage 6: 0.06 inch (1,5mm)

   b) Axial cracks, nicks or tears with length that is not longer than 10 percent of the true chord width on one edge in zone C can be blended.

      Stage 2: 0.14 inch (3,6mm)
      Stage 3: 0.12 inch (3,0mm)
      Stage 4: 0.14 inch (3,6mm)
      Stage 5: 0.13 inch (3,3mm)
      Stage 6: 0.13 inch (3,3mm)##

High Pressure Compressor Inspection

5) All HP Compressor stages:
   a) Axial cracks, nicks or tears with length that is not longer than 10 percent of the true chord width on one edge in zone D can be blended.

      Stage 1: 0.34 inch (8,6mm)
      Stage 2: 0.28 inch (7,1mm)
      Stage 3: 0.24 inch (6,1mm)
      Stage 4: 0.28 inch (7,1mm)
      Stage 5: 0.26 inch (6,6mm)
      Stage 6: 0.25 inch (6,4mm)

(d) If necessary, the acceptance limits for cracks in zone D can be increased if you do the steps that follow:
   1) Damage limits to blades in zone D can be increased by 50 percent of the inspection limits for that zone.
      a) Repair before 5 cycles or 24 flight hours. Use the limit that occurs first.

(e) All damage that is more than the limits given - Do not operate the engine until the engine is repaired.

Inspection of the Stage 2 (HP) Compressor Rotor Liners

TASK 72-00-00-726-202-R01

6. Inspection of HP Compressor Rotor Liners Stages 1 to 4

A. General

(1) Do an inspection of the HP compressor rotor path liners stages 1 to 4 if the engine has had high power surge.

NOTE: "High Power Surge" is defined as a surge at cruise power and above. Top of Descent deceleration surges are not included.

(2) Access locations are as follows:

Access	Location	View Area
HP1S	B	Stage 1
HP2S	C	Stages 2 and 3
Blanking Plate, HP 3 Air Supply	D	Stage 4

B. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

C. Procedure

S 946-203-R01

(1) If not already done, do the procedure to prepare the engine for the inspection.

S 946-204-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 026-209-R01

(3) Remove the engine from service if:

(a) It was not possible to examine a minimum of 90% of all stages of the HP compressor rotor path liners.

Inspection of the Stage 2 (HP) Compressor Rotor Liners

(b) On one individual stage, the liner material has a total missing area greater than 6.20 sq. inches (4000 sq. mm).
(c) One individual area of material loss is greater than 2.325 sq. inches (1500 sq. mm).

NOTE: It is not necessary to measure individual areas of lining loss less than 0.078 sq. inches (50 sq. mm).

(d) The nominal width and area between the blades of the rotor path liner are given below. This will help to calculate the damage to the rotor path liner.

		Width of Rotor Path Liner		Area Between Blades	
Stage	No. of blades	Inch	mm	sq. inches	sq. mm
1	57	1.81	46.0	71.65	1820.0
2	82	1.42	36.0	38.58	980.0
3	94	1.06	27.0	25.20	640.0
4	97	1.06	27.0	24.41	620.0

S 296-212-R01

(4) Do an inspection of the Stage 1 HP compressor rotor path liner. Use a 6 mm flexible borescope.
(a) Put the borescope through the access HP1S (Location B).
1) Move the borescope forward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
(b) Slowly pull the borescope back and examine the surface of the rotor path liner.
1) Make sure that the full width is examined and record the dimensions of all missing rotor path liner.
(c) Remove the borescope from the engine.

S 296-211-R01

(5) Do an inspection of the Stage 2 HP compressor rotor path liner. Use a 6 mm flexible borescope.
(a) Put the borescope through the access HP2S (Location C).
1) Move the borescope forward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.

Inspection of the Stage 2 (HP) Compressor Rotor Liners

(b) Slowly pull the borescope back and examine the surface of the rotor path liner.
1) Make sure the full width is examined and record the dimensions of all missing rotor path liner.
(c) Remove the borescope from the engine.

S 296-213-R01
(6) Do an inspection of the Stage 3 HP compressor rotor path liner. Use a 6 mm flexible borescope.
(a) Put the borescope through the access HP2S (Loocation C).
1) Move the borescope rearwards through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
(b) Slowly pull the borescope back and examine the surface of the rotor path liner.
(c) Make sure that the full width is examined and record the dimensions of all missing rotor path liner.
(d) Remove the borescope from the engine.

S 296-207-R01
(7) Do an inspection of the Stage 4 HP compressor rotor path liner. Use a 6 mm flexible borescope.
(a) Put the borescope through the access HP3 air supply blanking plate (Location D).
1) Move the borescope rearward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
(b) Slowly pull the borescope back and examine the surface of the rotor path liner.
1) Make sure the full width is examined and record the dimensions of all missing rotor path lining,
(c) Remove the borescope from the engine.

NOTE: Do not let the borescope fall through the cooling air passages on the outer vane ring. If this happens, carefully twist the scope while it is slowly withdrawn from the passage back into the annulus between the compressor blades and the vanes.

Inspection of the Stage 2 (HP) Compressor Rotor Liners

S 946-208-R01

(8) Do the procedure to put the airplane back to its usual condition.

Combustion Liners and HPNGV Inspection

TASK 72-00-00-206-049-R01

7. Combustion Liners and High Pressure Nozzle Guide Vanes (HPNGV) Inspection

A. General

(1) The subsequent operations give the inspection procedure for the combustion liners and the the HPNGV; also given are the inspections standards (limits) you can accept.

(2) After 5 inspections at the times given in the limits that follow, you can multiply the inspection interval by two if:

(a) There is no increase in crack length and no new defects are found.

(3) With this inspection you will examine these parts of the combustion liners and HPNGV:

(a) The front liner inner and outer walls.

(b) Heatshields,

(c) Burner seals,

(d) Rear inner and outer discharge nozzles,

(e) Fuel spray nozzles,

(f) High pressure nozzle guide vanes (HPNGV).

(g) Subsequent to a birdstrike or if you think a bird has gone into the engine, you will do the following:

1) Carefully use a 0.32 in. (8.00 mm) diameter probe to look for damage to the following components:

a) Meter panel.

b) Heatshields.

c) Fuel spray nozzles.

(4) To help you make an estimate of the damage, the acceptance zones are given (Fig. 605, 606, and 607).

(5) It is not necessary to examine the convex surface of the HPNGV airfoil. You can see some of the NGV convex areas when you do an inspection of the HP turbine blades. If damage is seen, use the acceptance limits that are given.

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

(3) AMM 73-11-05/401, Fuel Spray Nozzles

C. Access

(1) Location Zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

D. Procedure

S 846-185-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

Combustion Liners and HPNGV Inspection

S 946-186-R01
(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

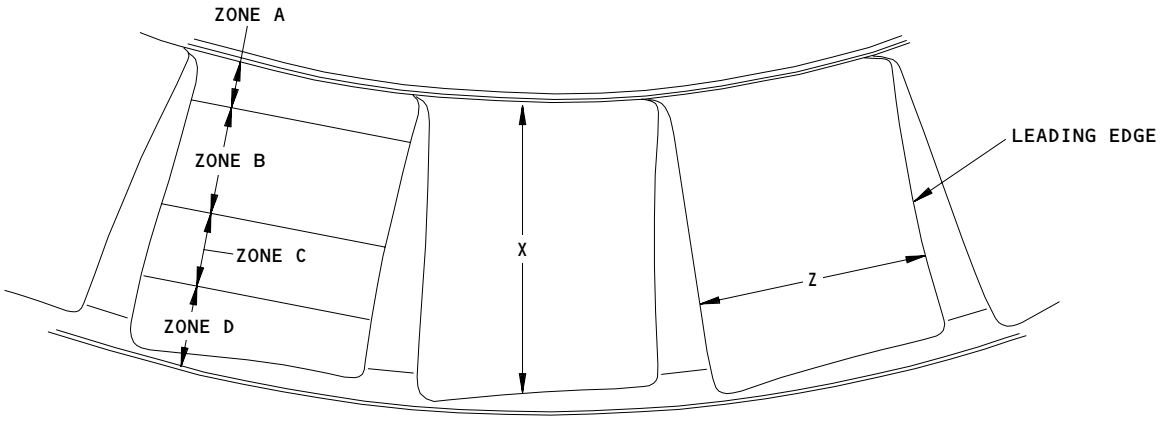
S 296-187-R01
(3) Do an inspection of the inner and outer walls of the front liner (Fig. 606) for the following:
(a) Cracks on the inner or outer walls of the front liner.

NOTE: Look carefully at the inner walls for cracks and at the areas around the dilution chutes.

1) Axial cracks in the cooling ring lip rearward of the cooling ring:
   a) Accept cracks that are less than 0.39 inches (10 mm) long only if they are more than 0.20 inches (5 mm) apart with crack-free material between them.
   b) If the cracks are less than 0.20 inches (5 mm) apart, you must do more inspections regularly, less than 300 flight cycles apart.
2) Circumferential cracks that connect two dilution chutes, if there are no other cracks that start from these chutes.
   a) If there are circumferential cracks that connect adjacent dilution chutes at up to five locations around the inner wall, you must do more inspections at regular intervals. Do the inspections before 250 hours or 75 flight cycles. Use the first limit that occurs.
   b) If there are circumferential cracks between adjacent dilution chutes at more than five locations around the inner wall, schedule engine removal in not more than 30 hours or 5 flight cycles. Remove the engine when the first limit occurs.
3) Isolated cracks in other areas:

NOTE: Cracks are isolated if they are 0.79 inches (20 mm) apart, with crack-free material between them.

   a) Accept if the cracks are less than 0.20 inches (5 mm) long.
   b) For axial cracks: Accept if the cracks do not extend through an adjacent cooling ring lip and do not connect. You must do more inspections regularly, less than 75 flight cycles apart.
   c) For axial cracks: Reject if the cracks connect or extend through an adjacent cooling ring lip. Remove the engine in less than 10 flight cycles.



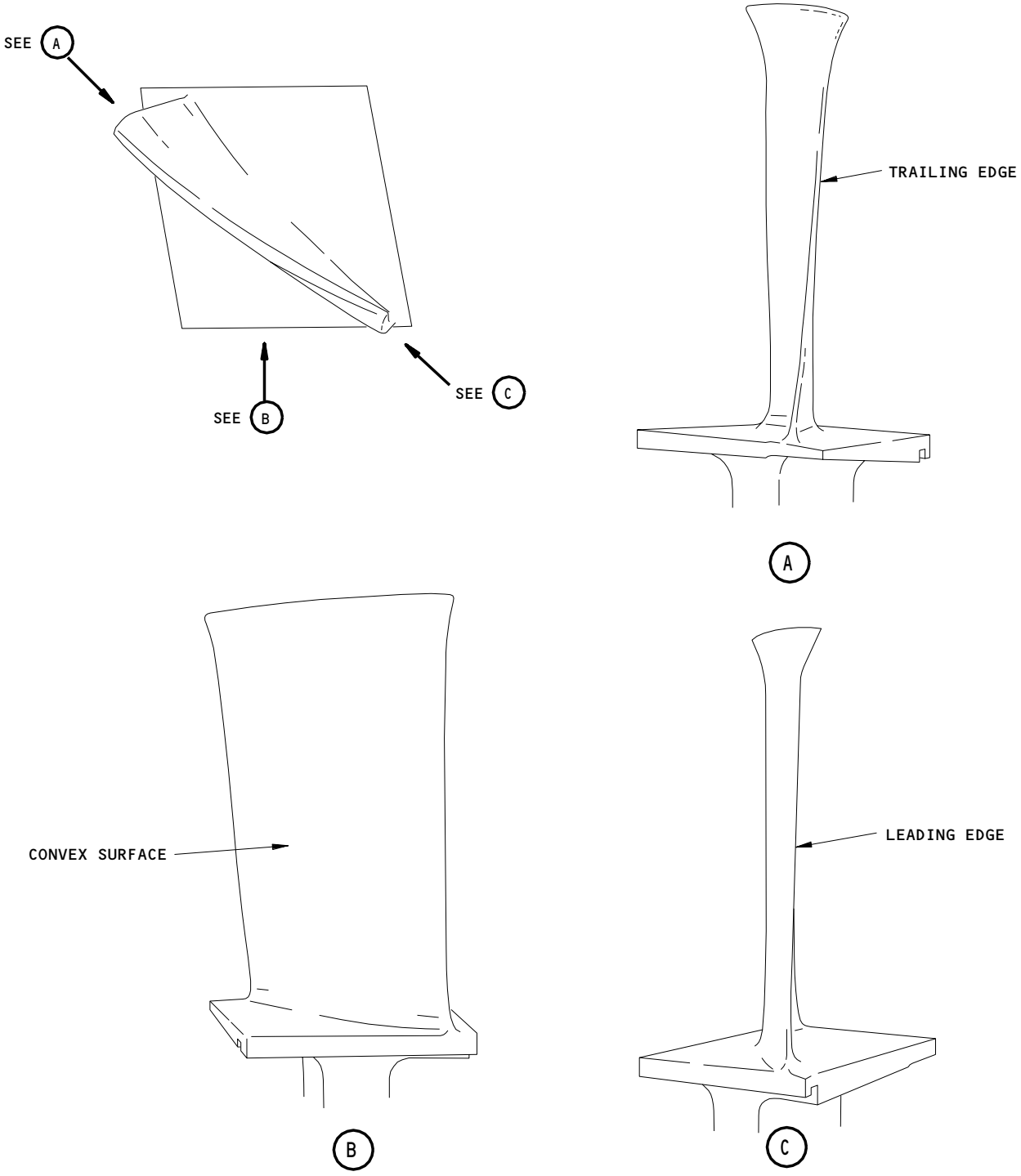
TYPICAL STAGES 4, 5 AND 6
(VIEW IN THE FORWARD DIRECTION)

STAGE	QTY	DIMENSION X	DIMENSION Z (TRUE CHORD)
1	57	2.30 INCHES (58.3 mm)	1.65 INCHES (41.91 mm)
2	82	1.91 INCHES (48.4 mm)	1.39 INCHES (35.31 mm)
3	94	1.57 INCHES (39.9 mm)	1.21 INCHES (30.83 mm)
4	97	1.34 INCHES (34.1 mm)	1.35 INCHES (34.29 mm)
5	76	1.20 INCHES (30.4 mm)	1.34 INCHES (34.00 mm)
6	74	1.06 INCHES (27.0 mm)	1.26 INCHES (32.13 mm)

ZONE A = 10% OF BLADE AIROFOIL
ZONE B = 40% OF BLADE AIROFOIL
ZONE C = 25% OF BLADE AIROFOIL
ZONE D = 25% OF BLADE AIROFOIL

67440B

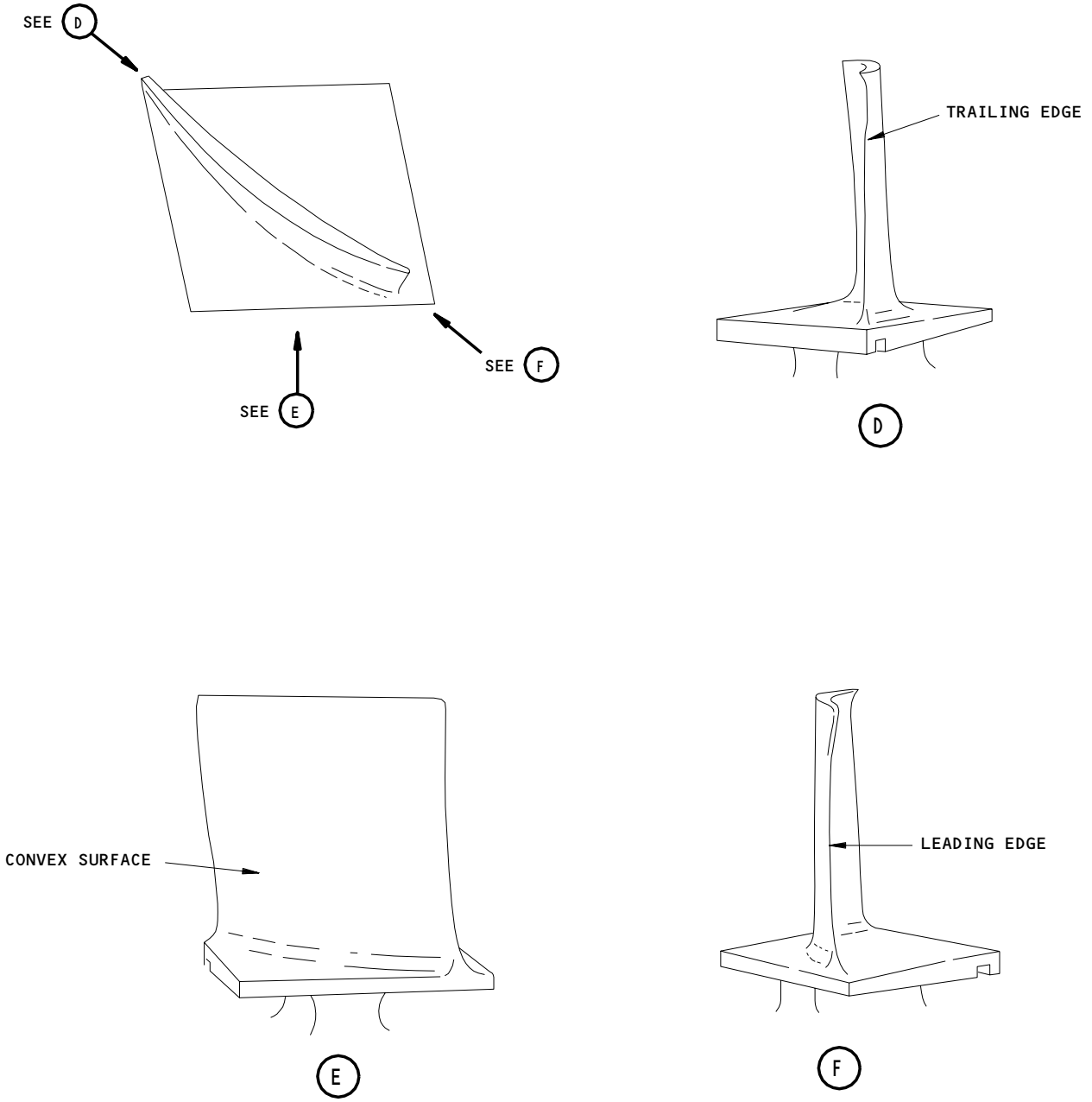
HP Compressor Blades
Figure 605 (Sheet 1)



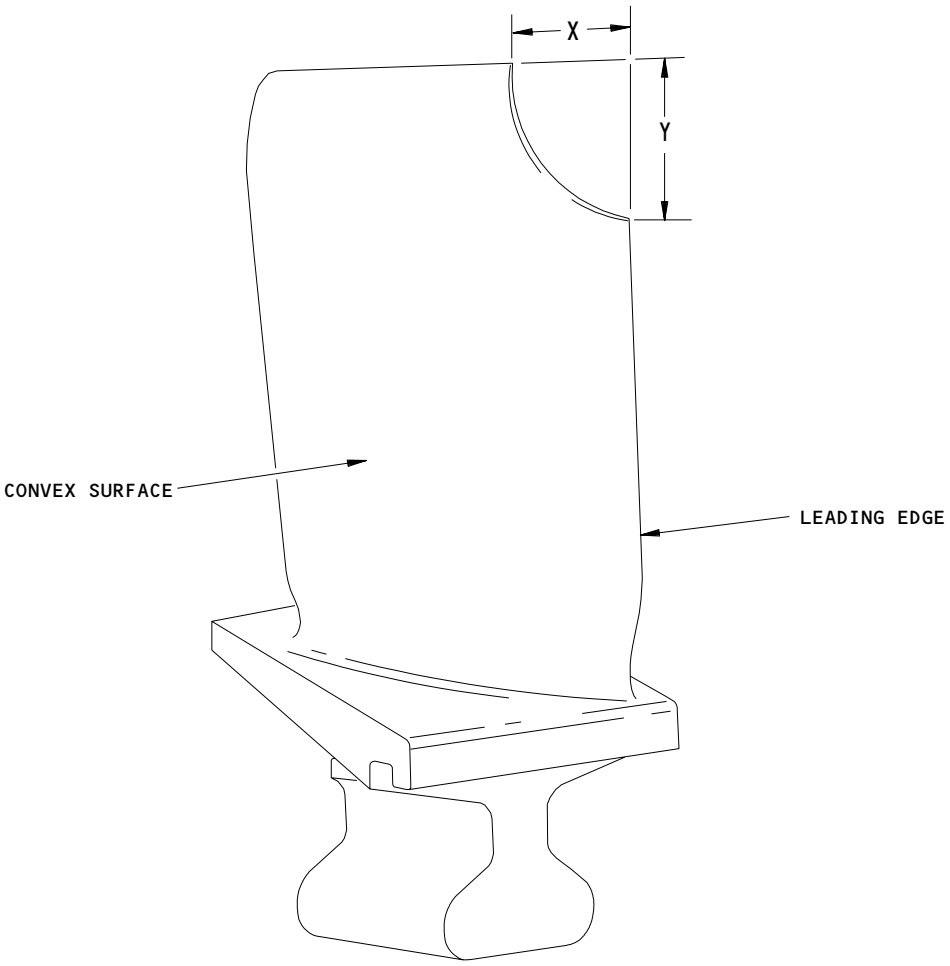
STAGE 1 (EXAMPLE)

DE00069088

HP Compressor Blades
Figure 605 (Sheet 2)



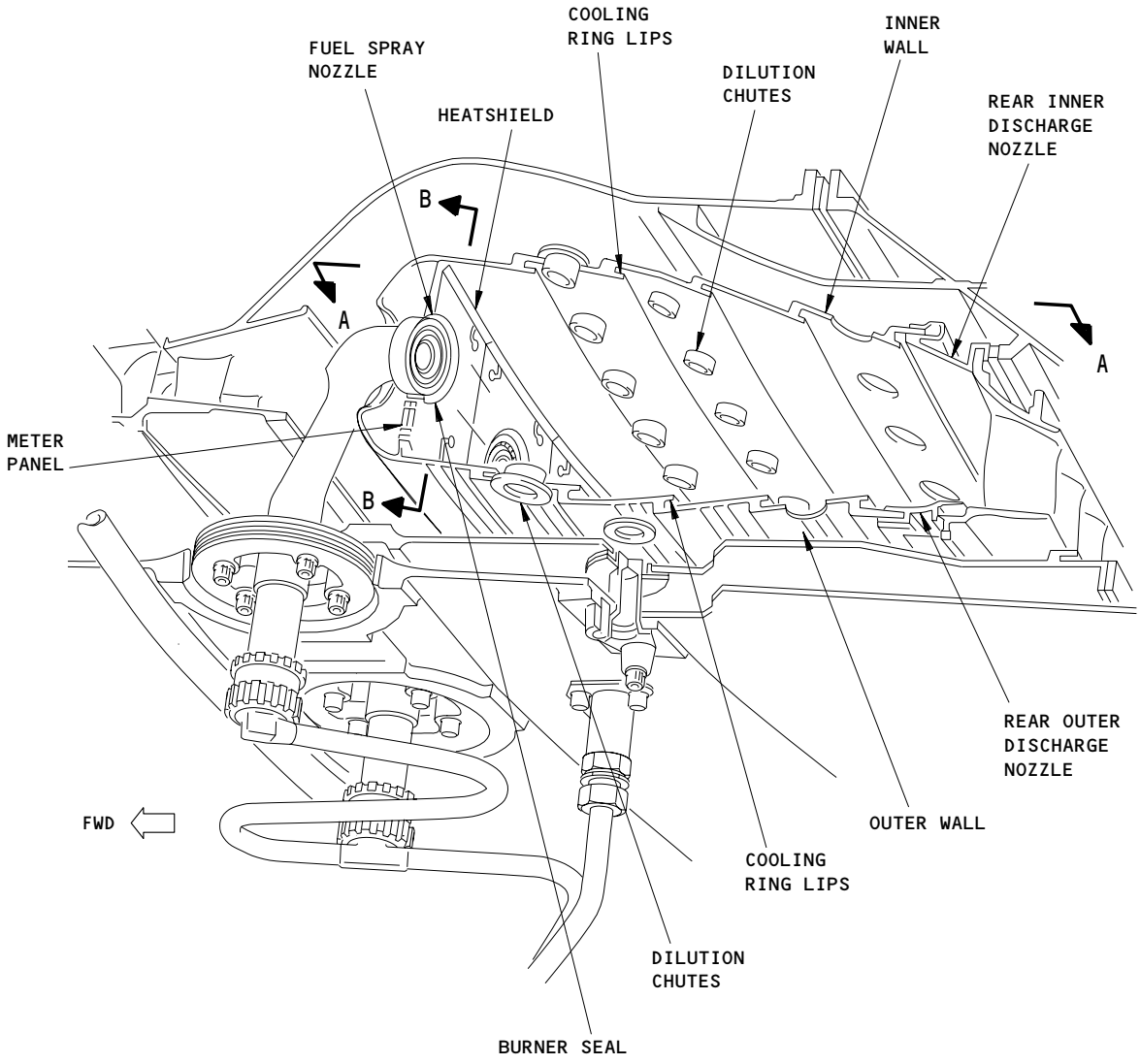
HP Compressor Blades
Figure 605 (Sheet 3)



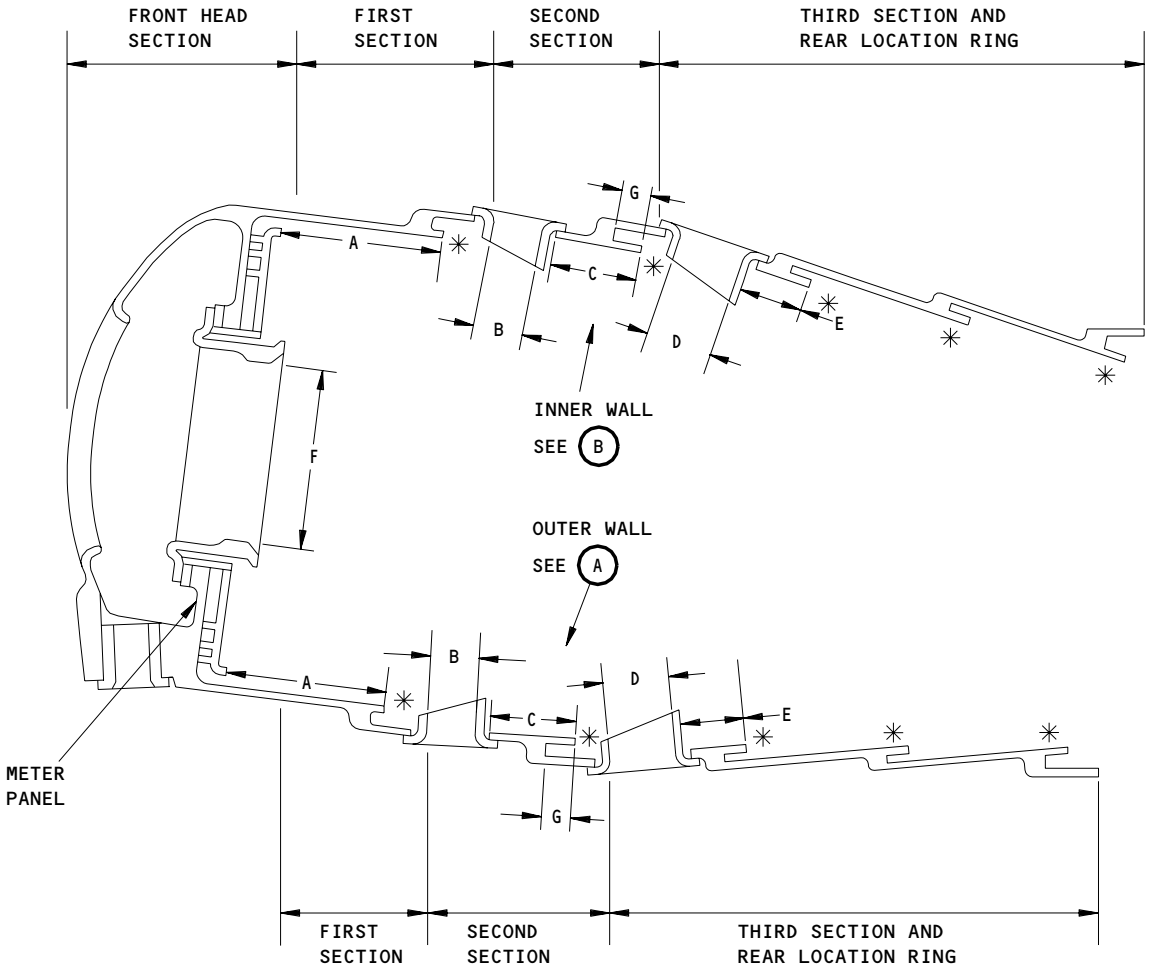
STAGE 3

X EXAMPLE TIP RELEASE 0.25 INCH (6.35 mm)
Y EXAMPLE TIP RELEASE 0.40 INCH (10.16 mm)

HP Compressor Blades
Figure 605 (Sheet 4)



Front Combustion Liner
Figure 606 (Sheet 1)



A-A

NOTE: DIMENSIONS SPECIFIED ARE TO BE USED AS AN AID WHEN YOU ESTIMATE THE DAMAGE.

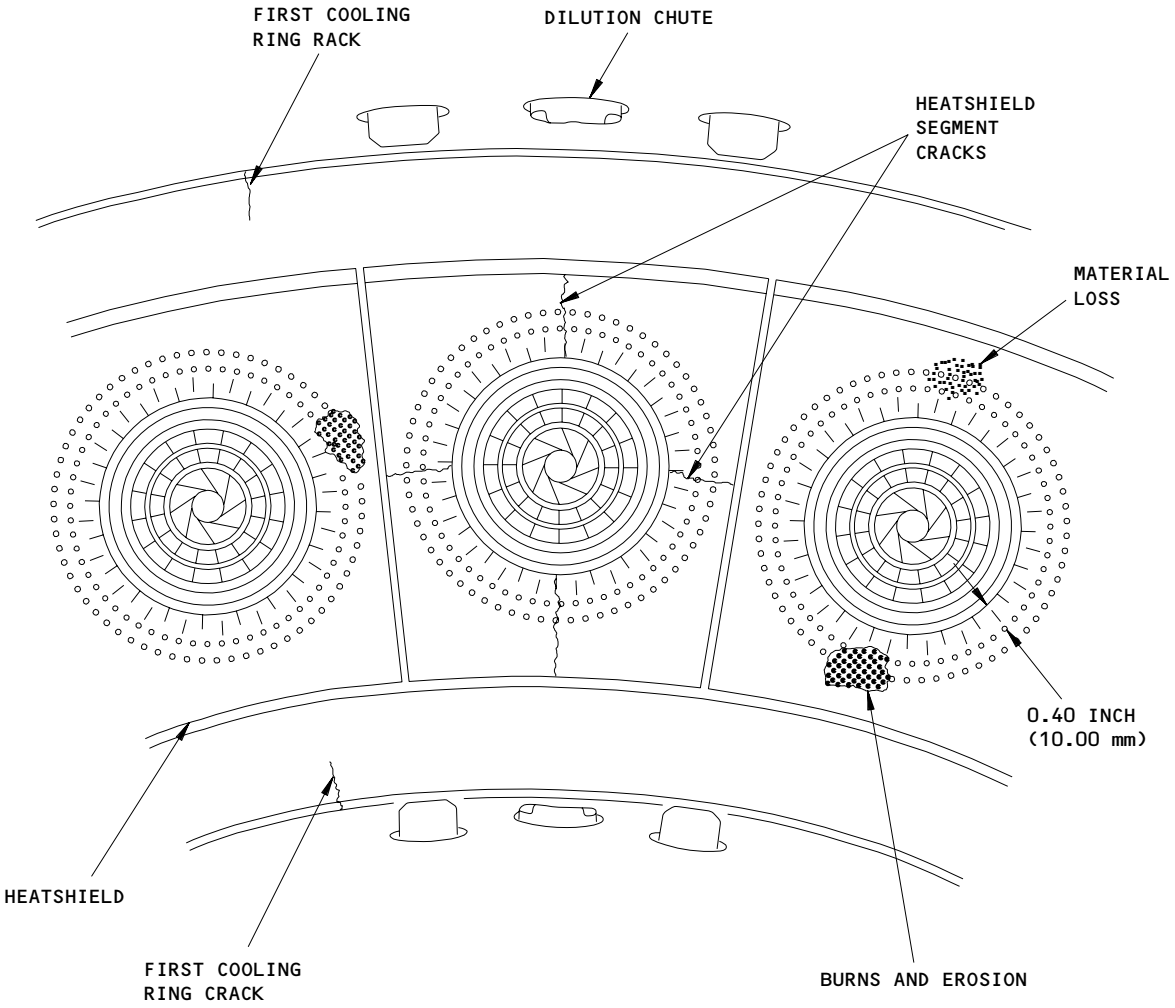
A = 1.56 INCH (39.56 mm)
B = 0.35 INCH (8.80 mm) DIAMETER
C = 0.91 INCH (23.09 mm)
D = 0.60 INCH (15.20 mm) DIAMETER
E = 0.77 INCH (19.50 mm)
F = 1.58 INCH (40.13 mm DIAMETER)
G = 0.28 INCH (7.00 mm)

✳ COOLING RING LIPS (10 LOCATIONS)

DEE0004808

Front Combustion Liner
Figure 606 (Sheet 2)

OUTER WALL

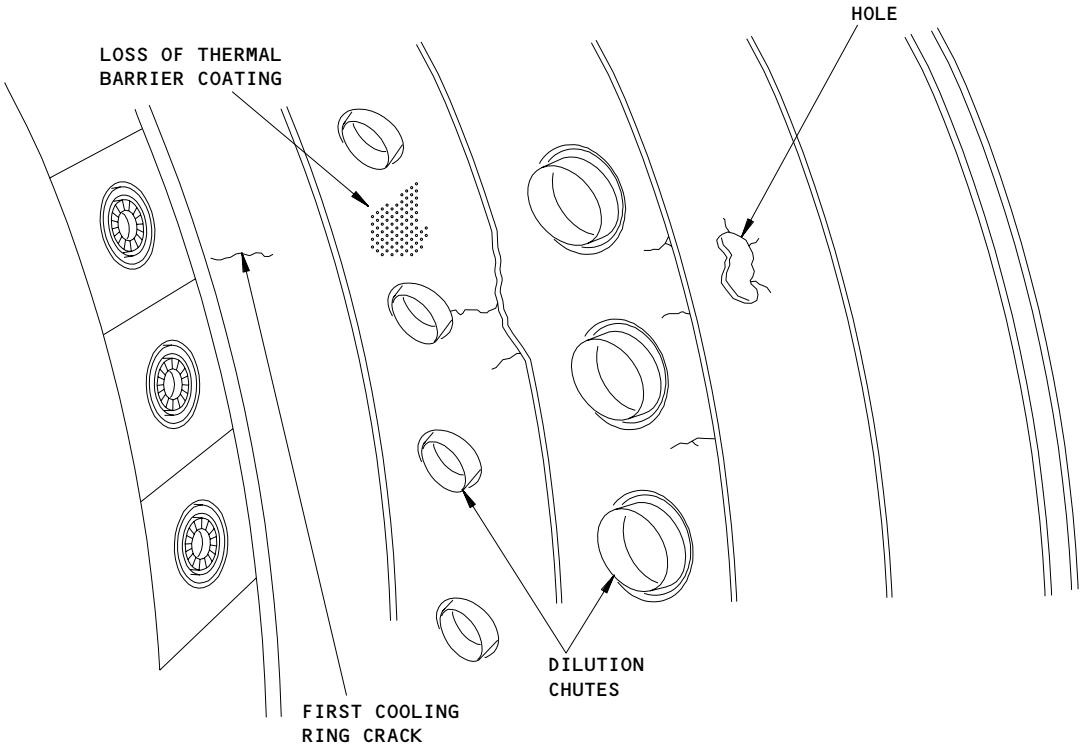


INNER WALL

B-B

DEF0004309

Front Combustion Liner
Figure 606 (Sheet 3)

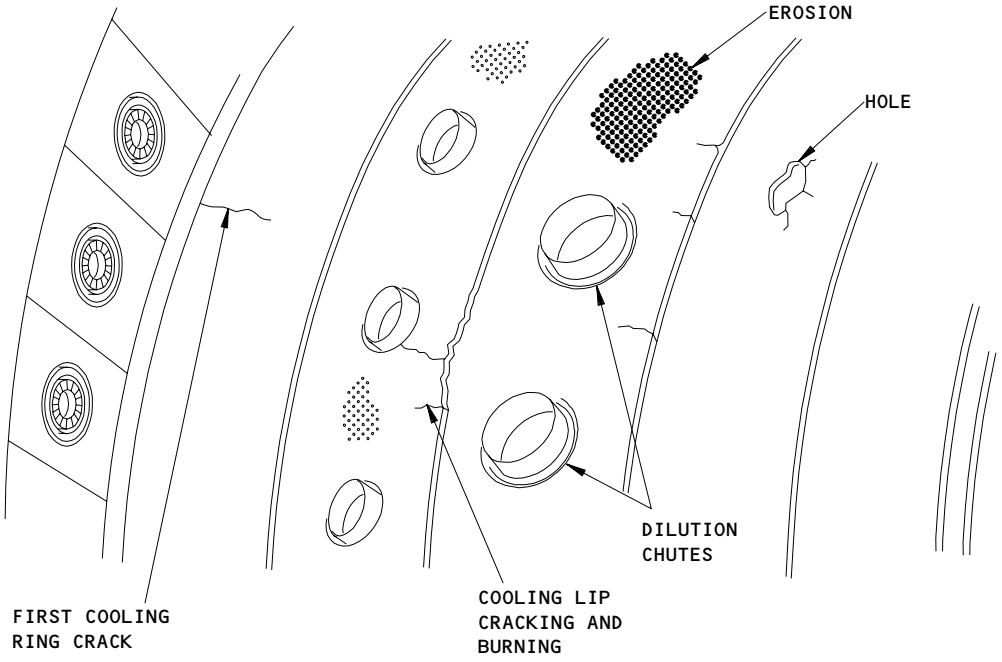


(VIEW ON OUTER WALL)

A

DEE0004809

Front Combustion Liner
Figure 606 (Sheet 4)



(VIEW ON INNER WALL)

B

DEE0004810

Front Combustion Liner
Figure 606 (Sheet 5)

Combustion Liners and HPNGV Inspection

d) For circumferential cracks: Accept if the cracks are more than 0.20 inches (5 mm) long but less than 0.79 inches (20 mm) long. You must do more inspections regularly, less than 300 flight cycles apart.
e) For circumferential cracks: Accept if the cracks are more than 0.79 inches (20 mm) long but less than 1.57 inches (40 mm) long. You must do more inspections regularly, less than 75 flight cycles apart.
f) For circumferential cracks: Reject if the cracks are more than 1.57 inches (40 mm) long. Remove the engine in less than 10 flight cycles.
g) For cracks in the first section of the liner inner wall: Reject if the end of the crack nearest to the meter panel cannot be clearly seen. Remove the engine in less than 10 flight cycles.
h) Reject if the cracks are not isolated. Remove the engine in less than 10 flight cycles.

4) Cracks in the dilution chutes.
a) Accept if the cracks do not go into the liner walls.

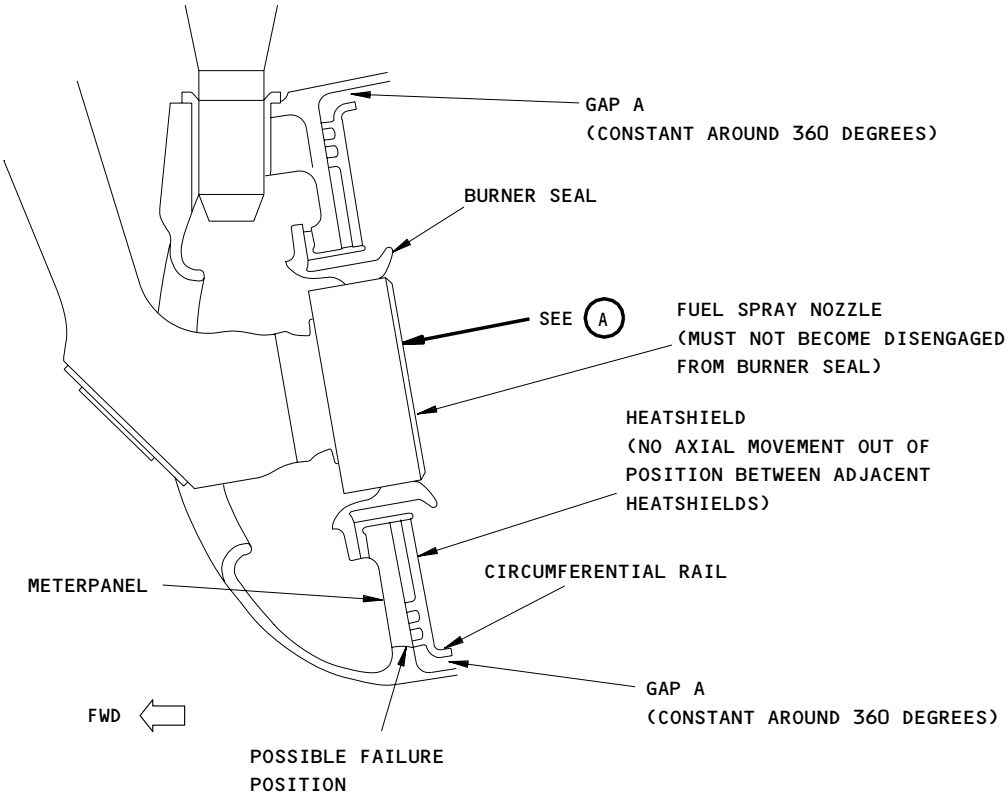
(b) Burns or erosion of the inner or outer walls of the front liner.
1) Accept burns or erosion, with related distortion or material decrease, of the cooling ring if you obey the limits that follow:
a) The axial length must not be more than 0.39 in. (10.00 mm).
b) If the damage is more than the above limits, make an inspection of the damage before 500 hours.
2) Burns or erosion of dilution chutes are permitted.

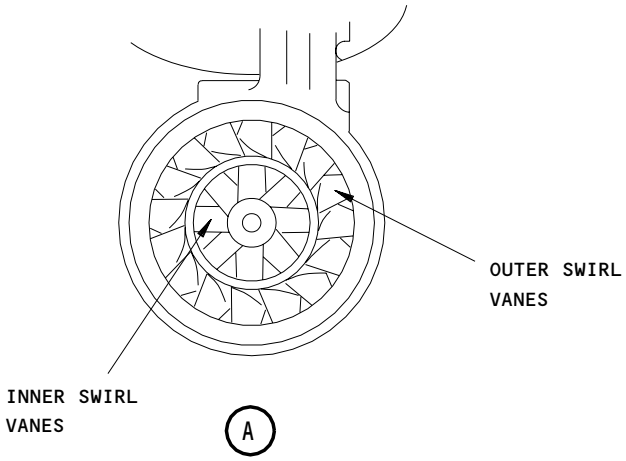
(c) Holes on the inner or outer walls of the front liner.
1) Accept a hole caused by burns and/or cracks at a maximum of 4 locations if the size of the hole is not more than 0.31 sq.in. (200.00 sq.mm).
2) If the hole is larger than the limit given above in 1), then you must do an inspection of the rear inner and outer discharge nozzles and the HPNGV at the time intervals given below:
a) If the hole is greater than 0.31 sq.in. (200.00 sq.mm) but less than 0.62 sq.in. (400.00 sq.mm), do the inspection again before 250 hours.
b) If the hole is greater than 0.62 sq.in. (200.00 sq.mm) but less than 1.24 sq.in. (800.00 sq.mm), do the inspection again before 130 hours.
c) If the hole is greater than 1.24 sq.in. (800.00 sq.mm) but less than 2.48 sq.in. (1600.00 sq.mm), do the inspection again before 65 hours.
d) If the hole is greater than 2.48 sq.in. (1600.00 sq.mm), remove the engine before 30 hours.

Combustion Liners and HPNGV Inspection

(d) Material decrease on the inner or outer walls of the front liner.
1) If a large amount of material is loose and will possibly break away, replace the engine.
(e) Thermal barrier layer decrease on the inner or outer walls of the front liner.
1) Accept a general decrease of the thermal barrier layer.

S 296-166-R01
(4) Do an inspection of the heatshield (Fig. 607) for the following:
(a) Cracks on the heatshield.
1) Accept cracks only if they are not more than 0.39 in. (10.00 mm) from the heatshield bore. They must also be more than 0.20 in. (5.00 mm) apart and have material with no cracks between them.
2) Accept cracks in the inner and outer circumferential rail provided they do not extend beyond the fillet radius.
3) Accept cracks that are longer than the limits only if you do the inspection again before 250 hours.
(b) Burns and erosion on the heatshield.
1) Accept burns and erosion only if there is no sign of holes.
(c) Holes in the heatshield.
1) Accept a hole or decrease of material only if the hole is not greater than 0.09 sq.in. (60.00 sq.mm).
2) Accept a hole or decrease of material greater than the limit only if the hole does not extend to more than 0.23 sq.in. (150.00 sq.mm) and you obey these conditions:
a) Do an inspection of the front liner inner and outer walls before 130 hours of operation.
b) Do an inspection of the rear inner and outer discharge nozzles before 130 hours of operation.
c) Do an inspection of the HPNGV before 130 hours of operation.
d) Do an inspection of the HP turbine before 130 hours of operation.
3) If a hole or decrease of material is greater than 0.23 sq.in. (150.00 sq.mm), you must replace the engine before 30 hours of operation.





DEE0002575A

Meterpanel and Heatshield
Figure 607

Combustion Liners and HPNGV Inspection

(d) Lifting of the heatshield (Fig. 607).
1) If the dimension of gap A is not constant around 360 degrees at 0.08 to 0.10 in. (2.00 to 2.50 mm), replace the engine.
(e) Axial movement of the heatshield.
1) If there is axial movement out of position between adjacent heatshields, replace the engine.

S 296-167-R01
(5) Do an inspection of the burner seals (Fig. 607) for the following:
(a) Cracks on the burner seal.
1) Accept radial cracks around the conical section only if they are not greater than 0.12 in. (3.00 mm).
2) Accept cracks that are longer than the limits only if you do this inspection again before 130 hours.
(b) Burns or erosion on the burner seal.
1) Accept burns or erosion around the edge of the conical tip section only if it is not greater than 0.12 in. (3.00 mm) from the tip.
2) Accept burns or erosion greater than the limits only if you do this inspection again before 130 hours.
(c) Distortion of the burner seal.
1) Accept distortion of the conical section.

S 296-168-R01
(6) Do an inspection of the rear inner and outer discharge nozzles (Fig. 606) for the following:
(a) Cracks of the rear inner and outer discharge nozzles.
1) Accept isolated cracks only if they are not greater than 0.79 in. (20.00 mm).
2) Accept cracks that are greater than the limit only if you do this inspection again before 130 hours.
(b) Burns or erosion on the rear inner and outer discharge nozzles.
1) Accept burns or erosion only if there are no holes.
(c) Thermal barrier layer decrease of the rear inner and outer discharge nozzles.
1) Accept a general decrease of the thermal barrier coating.

S 296-169-R01
(7) Do an inspection of the fuel spray nozzles (Fig. 607) for the following:
(a) Cracks in the fuel spray nozzle.
1) If there are cracks in a fuel spray nozzle, replace the fuel spray nozzle (AMM 73-11-05/401).
(b) Material decrease on the fuel spray nozzle.
1) If the inner or outer swirler vane has gone, do an inspection of the HP turbine blades and HP NGV.
a) If the HP turbine blades and HPNGV are serviceable, replace the fuel spray nozzle (AMM 73-11-05/401).

Combustion Liners and HPNGV Inspection

b) If the HP turbine blades and HPNGV are not serviceable, replace the engine.

(c) Incorrect location of the fuel spray nozzle.

1) If the center of the fuel spray nozzle is not at the center of the burner seal, do an inspection of the combustion liner.

a) If the combustion liner is serviceable, replace the fuel spray nozzle (AMM 73-11-05/401).

b) If the combustion liner is not serviceable, replace the engine.

S 296-170-R01

(8) Do an inspection of the HP nozzle guide vanes (Fig. 608) for the following:

(a) Cracks in the airfoil surface of the HPNGV.

1) Accept axial cracks in the concave surface only if:

a) Each axial crack is not longer than 1.00 in. (25.4 mm), and,

b) The material has not lifted more than 0.020 inches (0.508 mm).

2) Accept radial cracks in the concave surface only if:

a) Each radial crack is not longer than 1.00 in. (25.4 mm).

b) The material has not lifted more than 0.020 inches (0.508 mm).

3) Accept axial and/or radial cracks in the concave surface that are longer than 1.00 in. (25.4 mm) only if:

a) The material has not lifted more than 0.020 inches (0.508 mm); and,

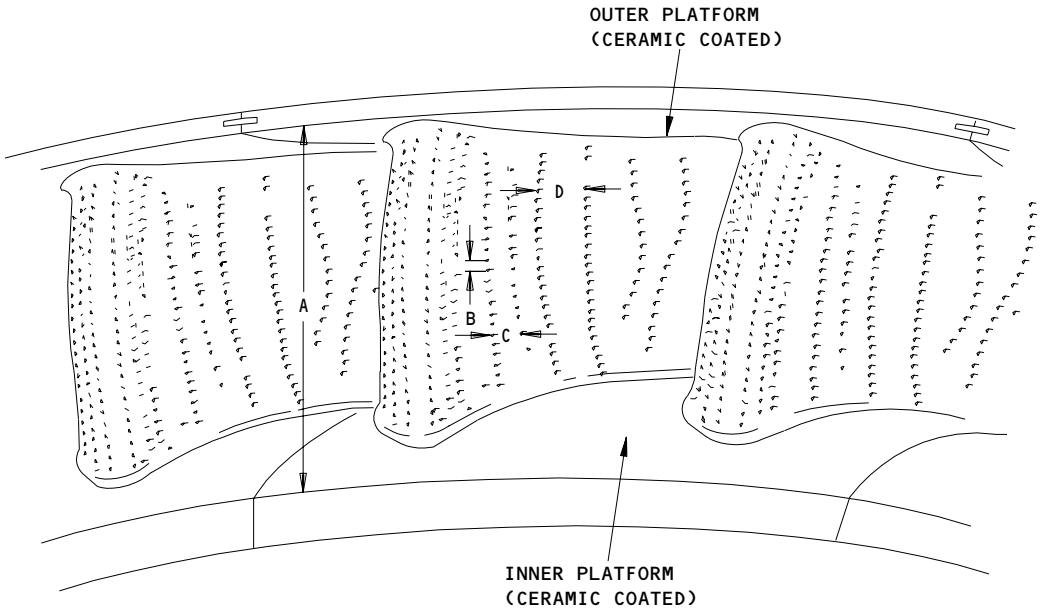
b) The cracks do not come together; and,

c) You must do the inspection again in less than 500 hours.

4) Axial cracks to convex surface:

a) Axial cracks up to 1.00 inch (25.4 mm) long, with no material lifted more than 0.020 inches (0.508 mm) or bulged. - Accept

b) Axial cracks more than 1.00 inch (25.4 mm) long but less than 2.00 inches (50.8 mm) with:
- No material lifted more than 0.020 inches (0.508 mm)
- Do an inspections at 500 hour intervals.



A = 2.952 INCHES (75.0 mm)
B = 0.078 INCH (2.0 mm)
C = 0.236 INCH (6.0 mm)
D = 0.500 INCH (12.7 mm)

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

HP Nozzle Guide Vanes
Figure 608

Combustion Liners and HPNGV Inspection

c) Axial cracks more than 2.00 inches (50.8 mm) long or:
- Material that is lifted more than 0.020 inches (0.508 mm), or
- Material that is bulged
- Replaced the engine in less than 50 hours.

5) Radial cracks to the airfoil convex surface.
a) Accept cracks less than 1.00 (25.4 mm) with:
- No material that has ifted more than 0.20 inch (0.508 mm) or
- No material that has bulges

b) Accept radial cracks more than 1 inch (25.4 mm) but less than 2 inches (50.8 mm) long with:
- No material that has lifted more than 0.020 inches (0.508 mm) or
- No material that has bulges
- Do an inspection at 500 hour intervals.

c) Radial cracks more than 2.00 inches (50.8 mm) long, or
- Material that has lifted more than 0.020 inches (0.508 mm) or
- Material that has bulges
- Reject the engine in less than 50 hours.

6) Axial cracks to the airfoil convex surface.
a) Axial cracks up to 1.00 inch (25.4 mm) long if there are no holes or signs of material that could be released. Examine again in less than 450 hours.
b) Axial cracks more than 1.00 inch (25.4 mm) long. Reject the engine in less than 100 hours.

7) Accept axial cracks in the vane leading edge only if:
a) Each axial crack is not longer than 1.00 in. (25.4 mm), and,
b) They do not extend into the convex surface film cooling holes; and
c) The material has not lifted more than 0.020 inches (0.508 mm).

8) Accept radial cracks in the vane leading edge only if:
a) Each radial crack is not longer than 1.00 in. (25.4 mm); and,
b) They do not extend into the convex surface film cooling holes; and,
c) The material has not lifted more than 0.020 inches (0.508 mm).

9) Accept axial and/or radial cracks in the vane leading edge that are longer than 1.00 in. (25.4 mm) only if:
a) The material has not lifted more than 0.020 inches (0.508 mm); and,
b) You do the inspection again in less than 500 hours.

Combustion Liners and HPNGV Inspection

10) Accept axial and/or radial cracks in the vane leading edge that extend into the convex surface film cooling holes, only if:
    a) The material has not lifted more than 0.020 inches (0.508 mm); and,
    b) You do the inspection again in less than 500 hours.
11) Replace the engine in less than 50 hours if material has lifted more than 0.020 inches (0.508 mm).
12) Replace the engine in less than 50 hours if cracks connect and material can break away from the airfoil surface.

(b) Cracks in the inner and outer platform of the HPNGV.
    1) Accept cracks in the ceramic layer.
    2) Accept cracks in the inner and outer platform only if material cannot break away.
    3) Replace the engine in less than 50 hours if material can break away.

(c) Material decrease on the HPNGV.
    1) Replace the engine in less than 50 hours if material has lifted more than 0.020 inches (0.508 mm), or can break away from the airfoil surface.

(d) Burns or erosion on the HPNGV.
    1) Accept burns, erosion and a decrease in the quantity of the ceramic layer only if they have not gone into the inner or outer platform.
        a) If you see burns to the inner or outer platform you must:

            Make sure that the fuel spray nozzles are in the correct location in the heatshield seals, and

            Do an inspection of the front combustion liner.
    2) Replace the engine in less than 50 hours if burns or erosion have gone into the inner or outer platform.
    3) Accept burns, erosion or holes that go into the vane leading edge only if:
        a) Less than 30 % of the leading edge has gone; and,
        b) No more of the leading edge material will go.
    4) Accept burns, erosion or holes that go into the vane leading edge only if:
        a) Less than 40% of the leading edge has gone; and,
        b) No more of the leading edge material will go; and,
        c) You do the inspection again in less than 500 hours.
    5) Replace the engine in less than 50 hours if more than 40% of the leading edge is gone.

(e) Foreign object damage to the HPNGV.
    1) Accept dents in the airfoil section only if you do an inspection of the turbine blades.

Combustion Liners and HPNGV Inspection

2) Accept nicks and tears in the vane trailing edge only if:
   a) They do not extend forward of the rear row of film cooling holes; and,
   b) You can see no burns; and,
   c) You do an inspection of the turbine blades.
3) Reject the engine in less than 50 hours if cracks, nicks or tears in the vane trailing edge extend forward of the rear row of film cooling holes.
4) You must do an inspection of the turbine blades.
5) Replace the engine if you see any blockage between the vanes.

High Pressure Turbine Inspection

TASK 72-00-00-206-085-R01

8. High Pressure (HP) Turbine Inspection

A. General

(1) The subsequent operations give the HP turbine inspection procedure and the standards (limits) you can accept.

(2) With this inspection, you will examine the HP turbine for the conditions that follow:
(a) Burns or oxidation.
(b) Cracks.
(c) Dents.
(d) Erosion.
(e) Foreign object damage.
(f) Interlock damage.

(3) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 609).

(4) Use an impact extractor if it is not easy to remove the access plugs for the borescope.

(5) Inspection through borescope access holes.

NOTE: Deterioration of the HP NGV support ring heatshield may allow axial and circumferential movement of the heatshield over the support ring, after removal of the borescope plug. This may partially obscure the HP turbine borescope hole 'G'. The heatshield may be repositioned by hand to allow ease of entry of borescope. Looseness of the heatshield will not affect engine integrity.

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location Zones
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure

S 846-172-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 846-173-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 426-174-R01

(3) Attach the tool to turn the HP system (AMM 72-00-00/201).

High Pressure Turbine Inspection

S 296-171-R01

(4) Do an inspection of the HP turbine (Fig. 609) for the conditions that follow:

(a) Cracks in the concave and convex airfoil surfaces (Area C) of the HP turbine.

1) Axial cracks.

a) Reject axial cracks.

2) Radial cracks.

a) Accept radial cracks that are not more than 0.250 in. (6.35 mm) in length.

b) Accept radial cracks that are between 0.250 in. (6.35 mm) and 0.500 in. (12.7 mm) in length with no signs of burns or holes, only if you examine them again before 100 hours.

c) If the radial cracks are longer than 0.500 in. (12.7 mm) and burns or holes are not seen, replace the engine before 50 hours of engine operation is completed.

(b) Dents in the airfoil surfaces of the HP turbine.

1) Accept one dent with a round bottom on one of the two surfaces if it has no related cracks or holes.

2) If the dent damage is larger than the limits given above, then you must replace the engine.

(c) Cracks in the HP turbine shroud (Fig. 609).

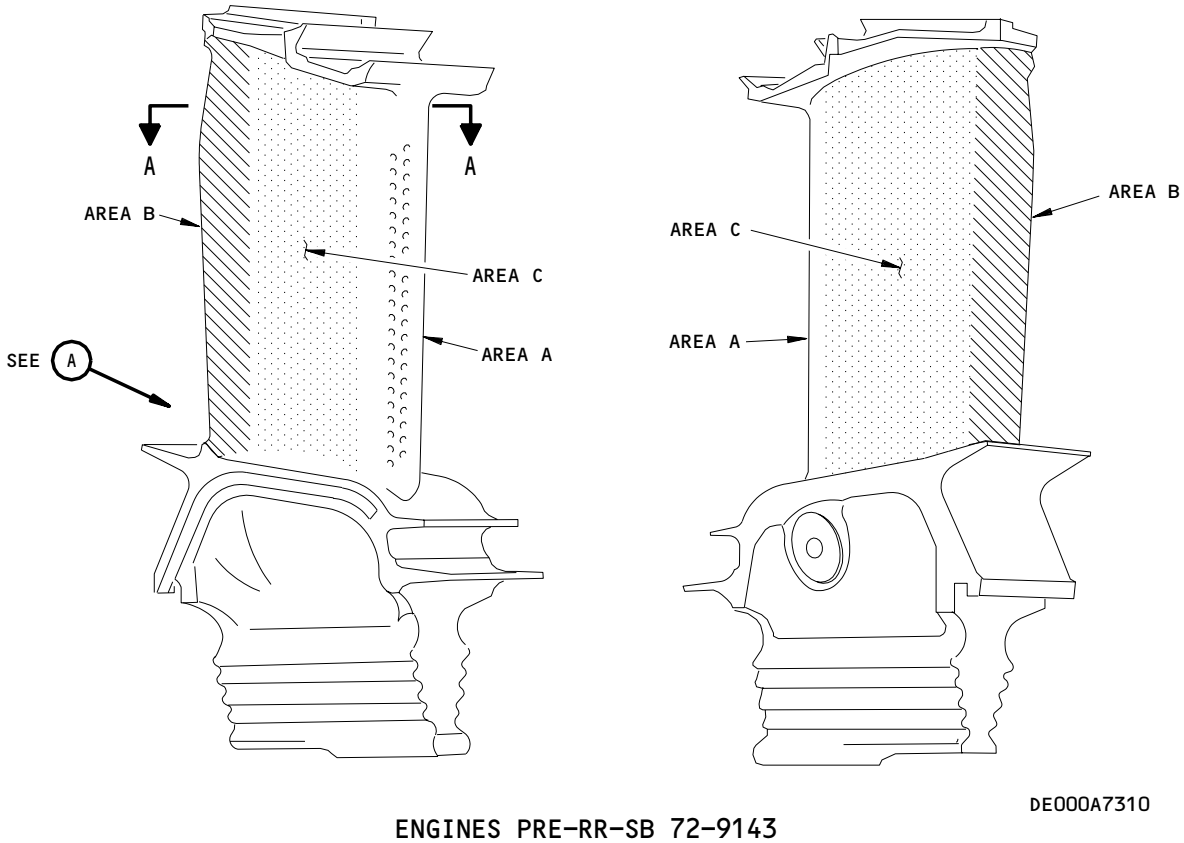
1) Accept radial cracks from the rear face if they are not more than 0.200 in. (5.08 mm) in length and they do not turn axial.

2) Accept radial cracks on the rear face that are between 0.200 in. (5.08 mm) and 0.250 in. (6.35 mm) only if:

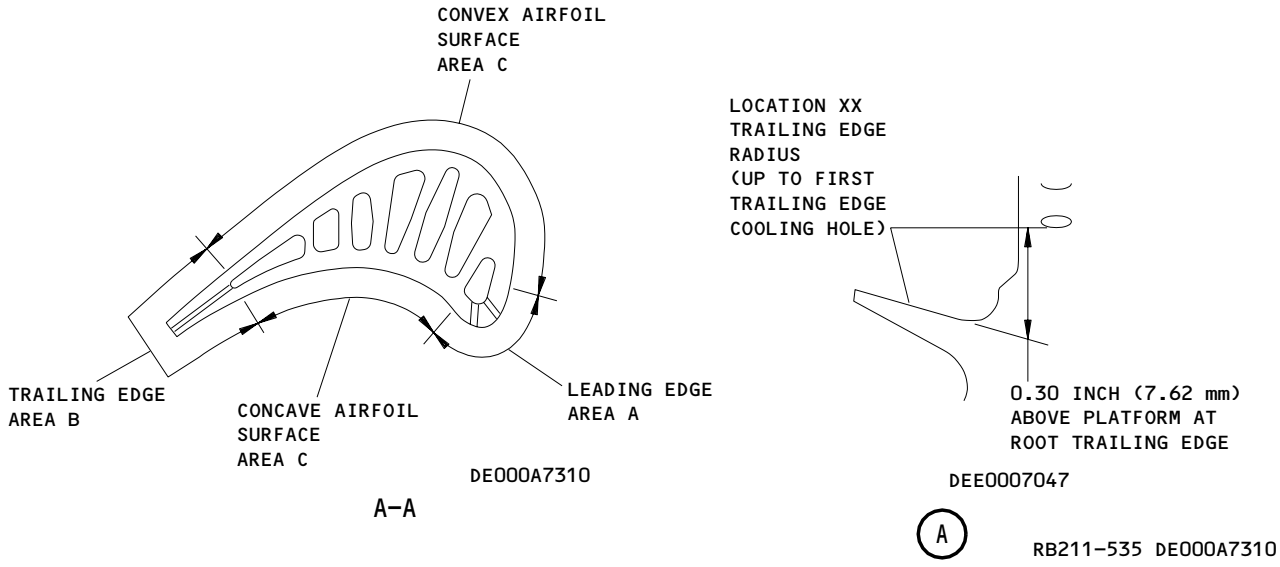
a) The radial cracks do not run in the axial direction, and,

b) You do an inspection again before 250 hours of engine operation is completed.

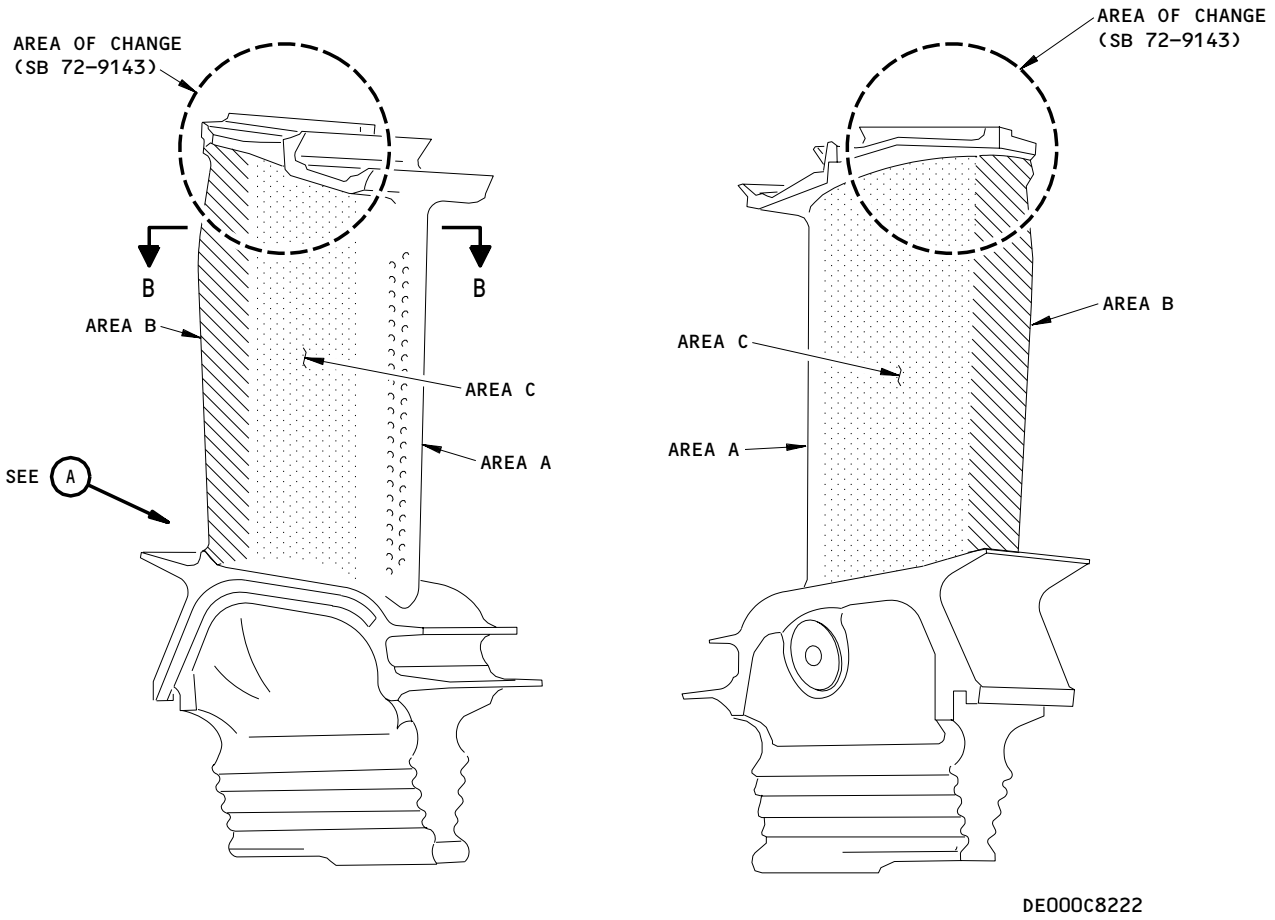
3) If you find cracks that are more than the limits above, you must replace the engine before 250 hours.



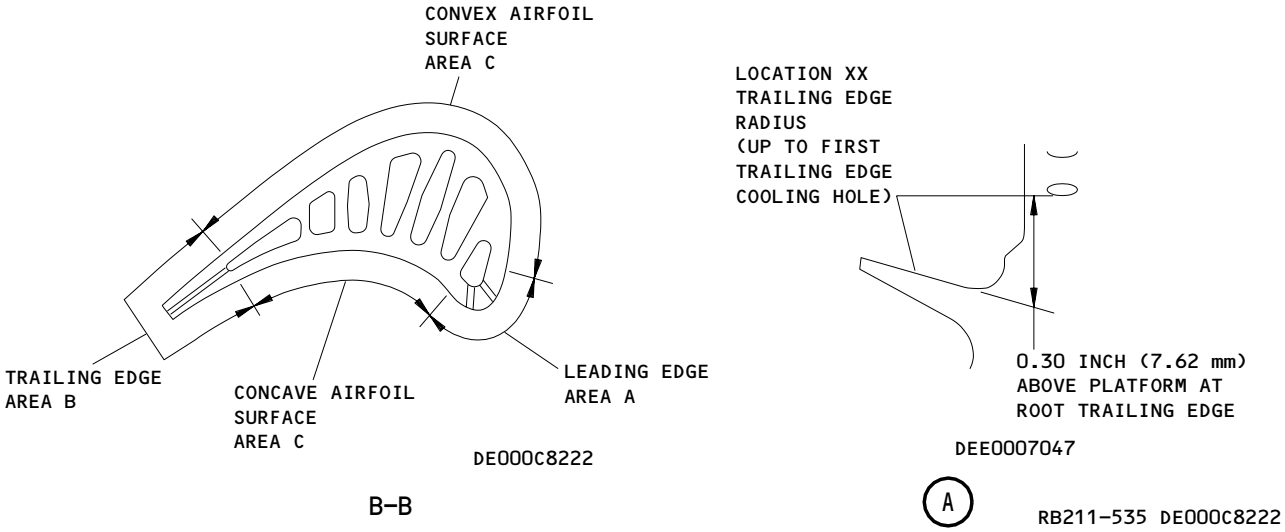
ENGINES PRE-RR-SB 72-9143



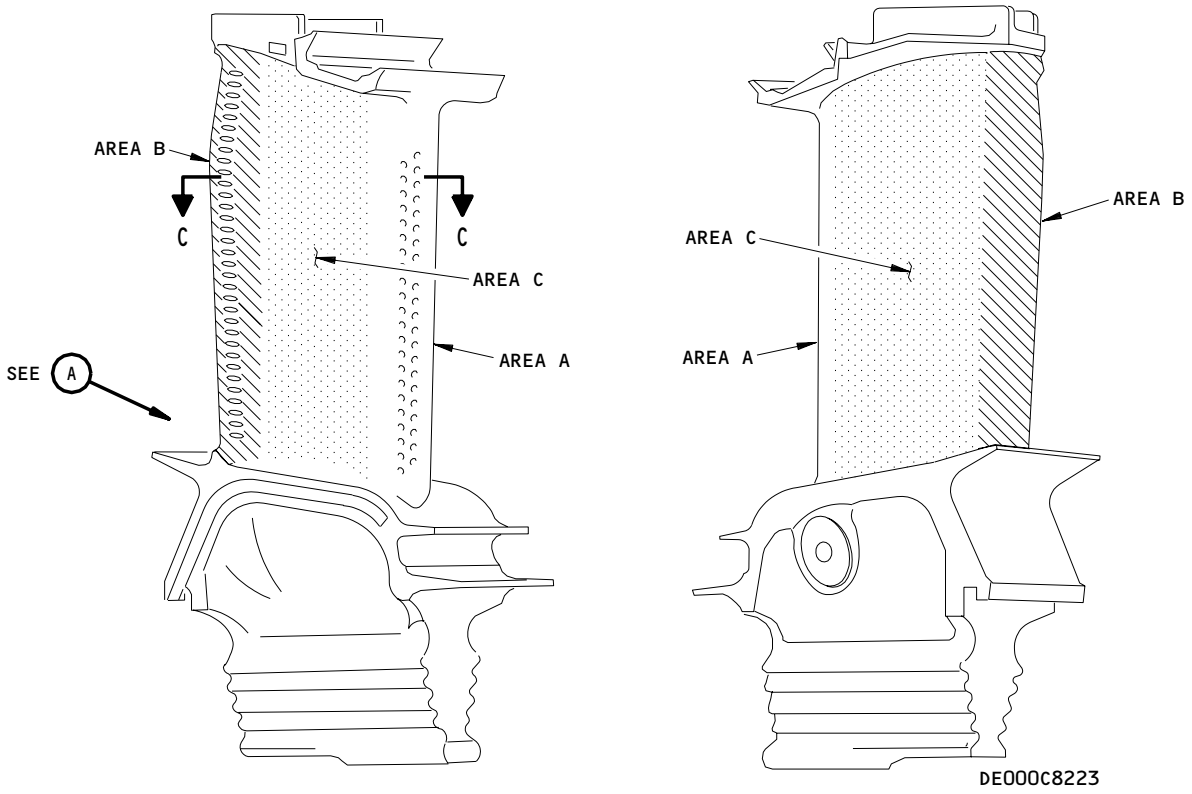
HP Turbine Blades
Figure 609 (Sheet 1)



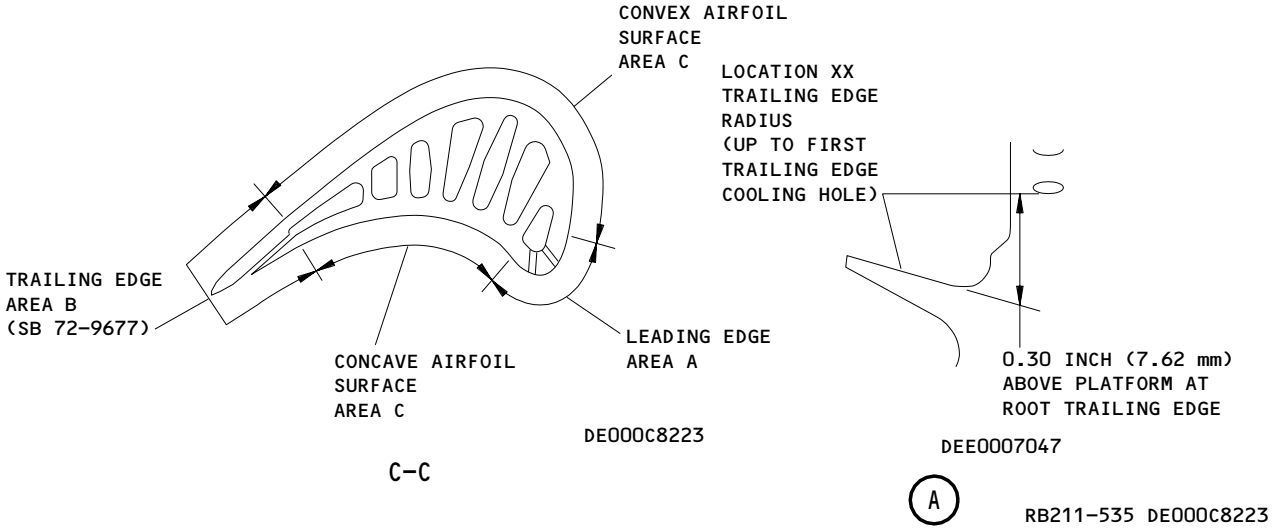
ENGINES POST-RR-SB 72-9143 AND PRE-RR-SB 72-9677



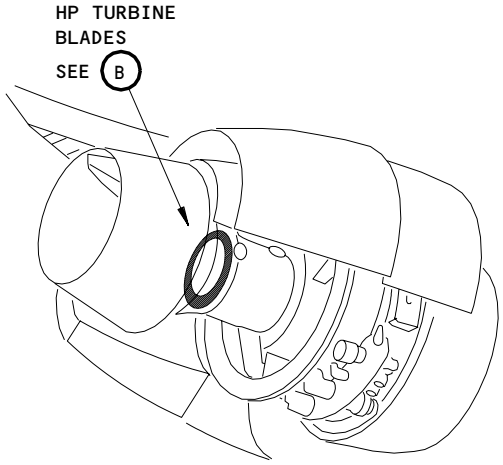
HP Turbine Blades
Figure 609 (Sheet 2)

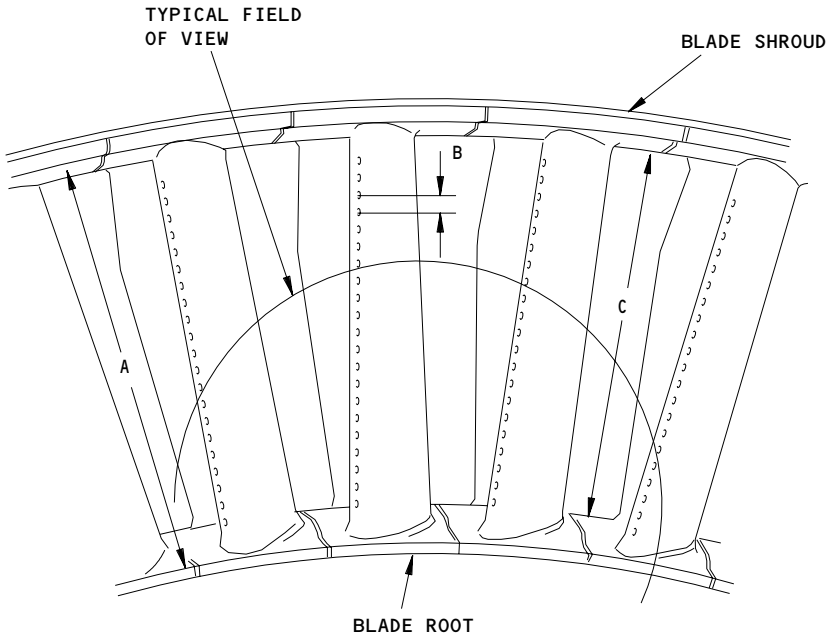


ENGINES POST-RR-SB 72-9677



HP Turbine Blades
Figure 609 (Sheet 3)





NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

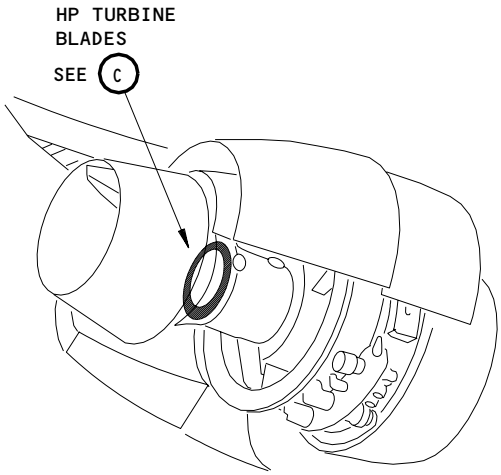
A = 2.401 INCHES (61.0 mm)
B = 0.078 INCH (2.0 mm) APPROXIMATELY BETWEEN FILM COOLING AIR HOLES
C = 2.519 INCHES (64.0 mm)

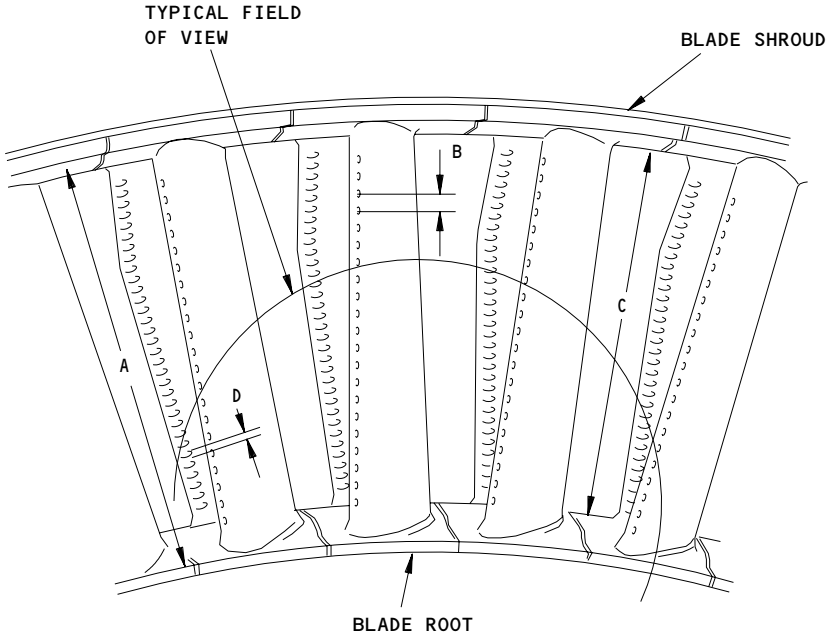
HP TURBINE BLADES
(VIEW IN THE AFT DIRECTION)
B

ENGINES PRE-RR-SB 72-9677

DE000C8224

HP Turbine Blades
Figure 609 (Sheet 4)





NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

A = 2.401 INCHES (61.0 mm)
B = 0.078 INCH (2.0 mm) APPROXIMATELY BETWEEN FILM COOLING AIR HOLES
C = 2.519 INCHES (64.0 mm)
D = 0.051 INCH (3.1 mm)BETWEEN TRAILING EDGE COOLING AIR HOLES

HP TURBINE BLADES
(VIEW IN THE AFT DIRECTION)

C

ENGINES POST-RR-SB 72-9677

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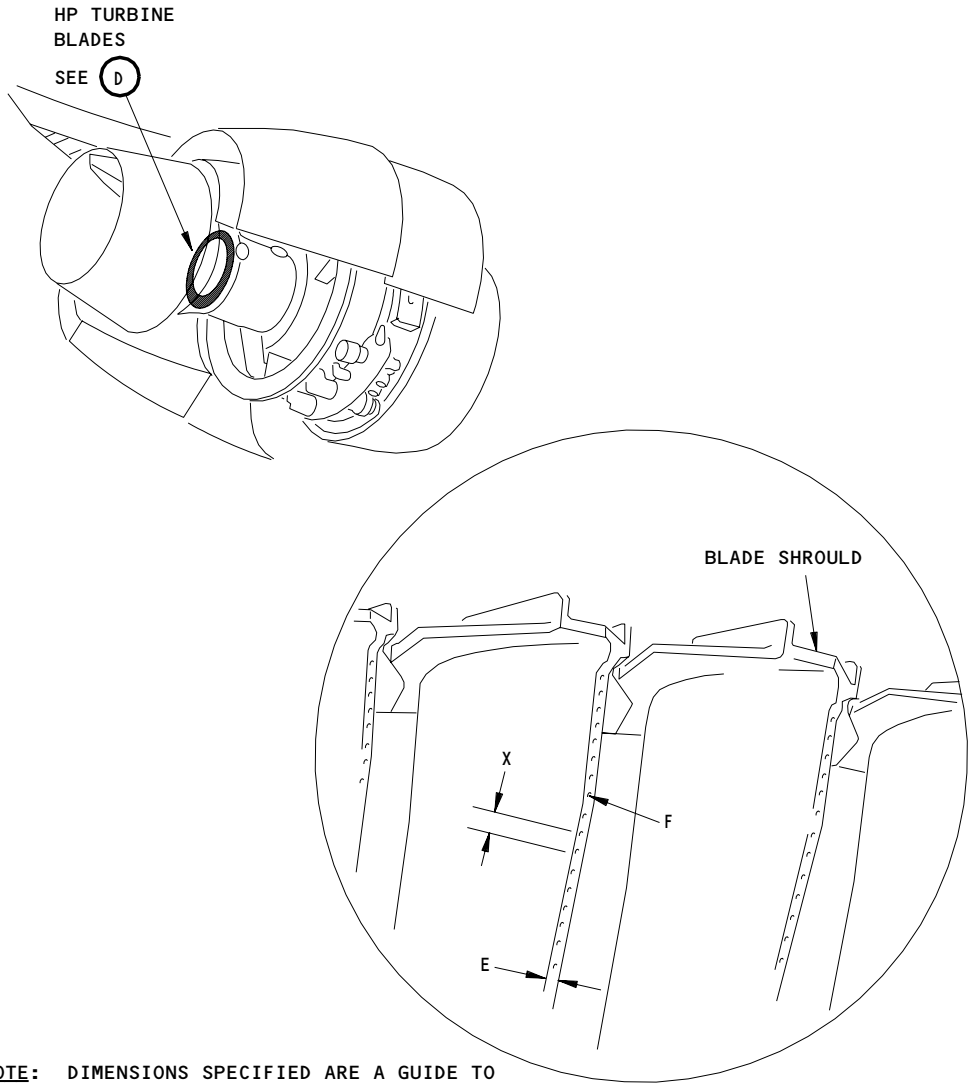
HP Turbine Blades
Figure 609 (Sheet 5)



NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

E = TRAILING EDGE THICKNESS 0.042 INCH (1.07 mm)
F = HOLE SIZE 0.018 INCH (0.46 mm) DIAMETER
X = 0.094 INCH (2.4 mm) BETWEEN CENTER OF TRAILING EDGE COOLING HOLES

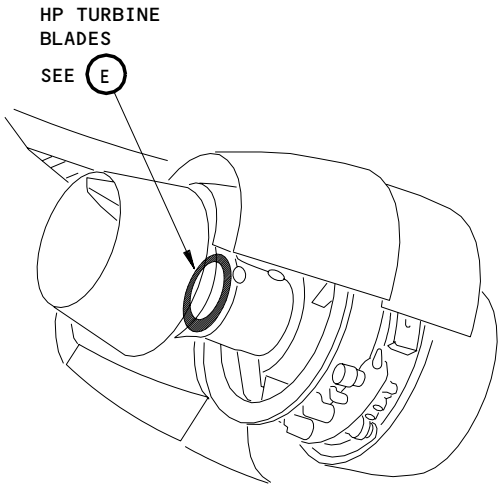
HP TURBINE BLADES
(VIEW IN THE FORWARD DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 14)
(ENDOPROBE)

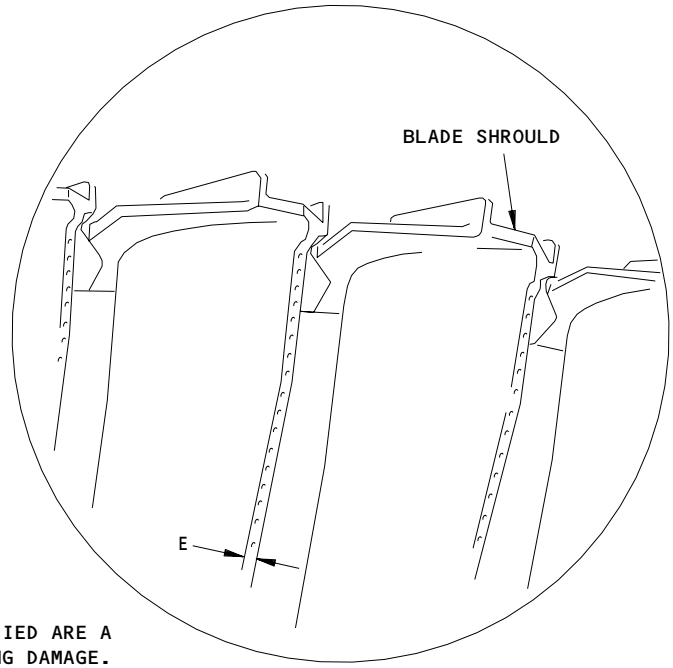
D

ENGINES PRE-RR-SB 72-9677

DE000C8226

HP Turbine Blades
Figure 609 (Sheet 6)





NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

E = TRAILING EDGE THICKNESS
0.025 INCH (0.64 mm)

HP TURBINE BLADES
(VIEW IN THE FORWARD DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 14)
(ENDOPROBE)

E

ENGINES POST-RR-SB 72-9677

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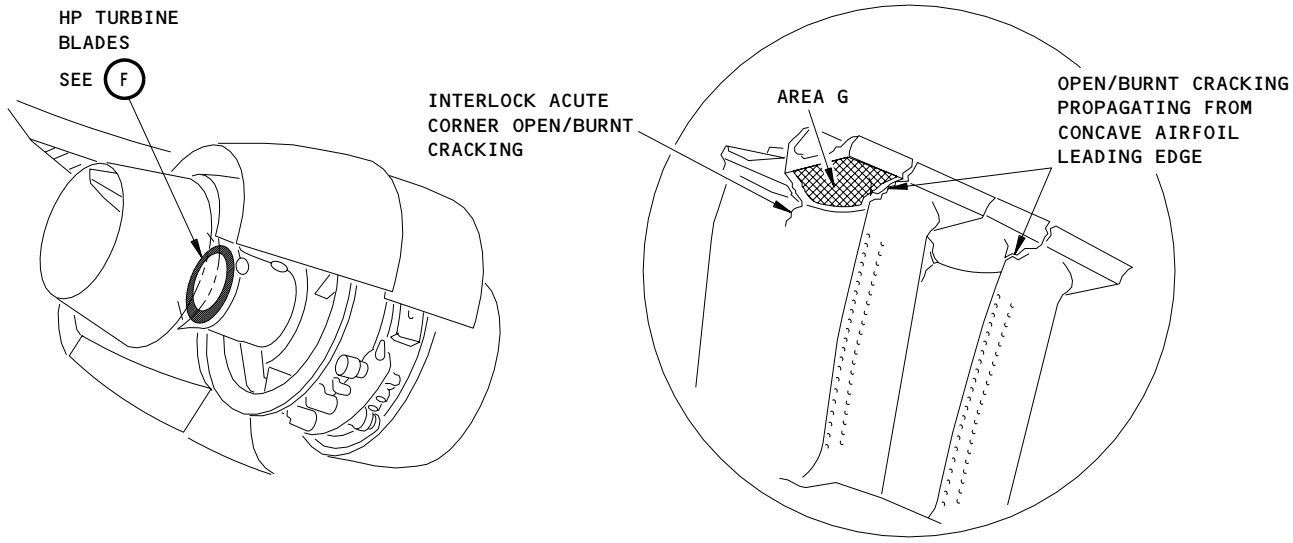
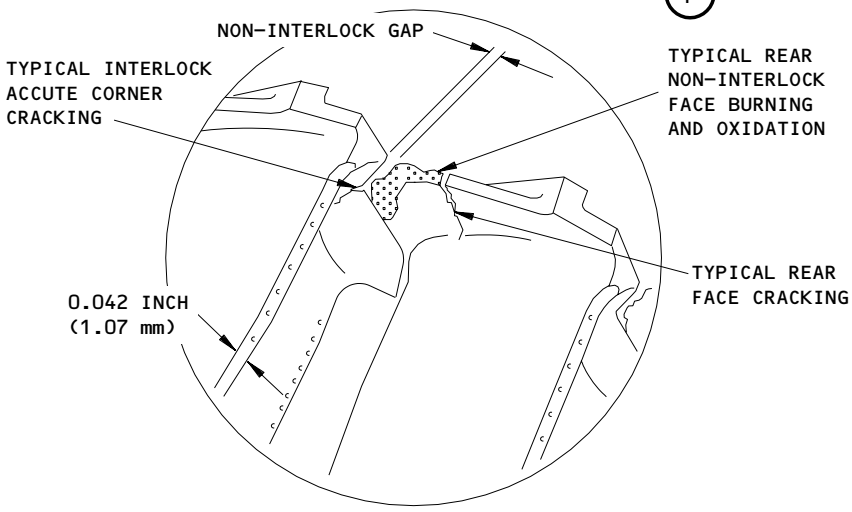
HP Turbine Blades
Figure 609 (Sheet 7)



HP TURBINE BLADES
(VIEW IN THE AFT DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 15)
(ENDOPROBE)

F



HP TURBINE BLADES
(VIEW IN THE FORWARD DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 15)
(ENDOPROBE)

F 1

DE000C8228

1 RR ENGINES PRE–SB 72–9677

HP Turbine Blades
Figure 609 (Sheet 8)

High Pressure Turbine Inspection

4) Accept cracks that run from the interlock acute corner, only if:
   a) Radial cracks do not increase into the airfoil, then become axial and,
   b) Axial cracks to the front shroud of the concave side of the blade do not extend to more than 0.200 in. (5.08 mm).
   c) Radial cracks do not extend more than 0.200 in. (5.08 mm).
   d) You do an inspection again before 100 hours of engine operation is completed
5) If the cracks are more than the limits given above, you must replace the engine.

(d) Burns or Oxidation.
1) Accept burns or oxidation on the bottom of the outer shroud near the rear non-interlock faces only if you find these conditions:
   a) The increased clearance between the adjacent rear non-interlock faces is not more than 0.035 in. (0.89 mm) around the rotor.
   b) The increased clearance is more than 0.035 in. (0.89 mm) around, but less than 50% around the rotor.

   NOTE: The decrease of material caused by burns and oxidation causes the increased clearance between the rear non-interlock faces.

2) If the damage from the burns or oxidation is more than the limits given above, you must replace the engine before 100 hours

(e) Missing material to the outer shroud of the concave side of the blade.
1) Accept if sections of the outer shroud are missing or damaged in Area G and you do an inspection again before 300 hours of engine operation are completed (Fig. 609).
2) If sections of the outer shroud are missing outside of Area G, replace the engine before 25 hours of engine operation are completed (Fig. 609).

(f) Interlock Damage.
1) If sections of the interlock or shroud are missing, replace the engine before 25 hours of engine operation is completed.

(g) Cracks and holes in the leading edge (Area A).
1) Accept cracks that are not open, and that extend from the leading edge of the concave airfoil to the shroud fillet radius (Fig. 609).

High Pressure Turbine Inspection

2) Accept open or burned cracks, or holes in the leading edge if you obey the limits that follow:
   a) The crack or holes extend from the leading edge of the concave airfoil, to the shroud fillet radius (Fig. 609).
   b) The total area of open cracks and holes, in the leading edge of the concave airfoil to the shroud fillet radius, for all the blades in the set, is not more than 0.229 square inches (148.00 square mm).
   c) The area of the open crack or holes on each blade is not more than 0.011 square inches (7.00 square mm).
   d) Do an inspection again before 700 hours.
3) Replace the engine before 50 hours of engine operation if the area of the holes is more than the above limit.
4) Reject axial cracks that are open.
5) Accept one radial crack only if you obey the limits that follow:
   a) The radial crack must not be more than 0.250 in. (6.35 mm) in length; and,
   b) The radial crack must not connect more than four cooling holes; and,
   c) The radial crack must not extend to the airfoil fillet radius.
6) Accept radial cracks only if you obey the limits that follow:
   a) The radial cracks must not be more than 0.50 in. (12.7 mm) in length; and,
   b) The radial cracks must not connect more than eight cooling holes; and,
   c) The radial cracks must not extend to the radius of the aft airfoil fillet; and,
   d) You do an inspection again before 100 hours of engine operation is completed.
7) Replace the engine before 50 hours of engine operation if you find the conditions that follow:
   a) Radial cracks that are more than 0.50 in. (12.7 mm).
   b) There are more than eight cooling holes that are connected.
8) Replace the engine before 50 hours of engine operation if you find radial cracks that are open or burned, or that extend to the airfoil fillet radius.

(h) Foreign object damage (Area A).
1) Accept foreign object damage only if you obey the limits that follow:
   a) There must not be holes or cracks caused by other damage; and,
   b) You must do an inspection again before 100 hours of engine operation is completed.

High Pressure Turbine Inspection

2) Replace the engine before 50 hours of engine operation if you find the conditions that follow:
   a) Holes or cracks caused by foreign object damage.
   b) Axial cracks.
3) Replace the engine if you find holes or cracks with related axial cracks caused by foreign object damage.

(i) Erosion (Area A).
1) Accept erosion if there are no signs of holes caused by erosion.
2) If you find holes caused by erosion, other than as specified in the limits for open or burned cracks, replace the engine before 50 hours of engine operation is completed.

(j) Cracks in the trailing Edge (Area B).
1) Accept more than one crack in the root radius of the trailing edge (location xx) only if it is not more than 0.10 inches (2.54 mm) in length.

   NOTE: Location XX is defined as the area of the trailing edge root radius up to the first trailing edge cooling hole.

2) Accept one axial crack in the root radius of the trailing edge (location xx) only if you obey the limits that follow:
   a) The crack is more than 0.10 inches (2.54 mm) but not more than 0.150 inches (3.81 mm) in length; and,
   b) You do an inspection again before 500 hours of engine operation is completed.
   c) If the crack is more than 0.150 inches (3.81 mm) the engine must be rejected in less than 50 hours.
3) Accept more than one crack that extends from the trailing edge shroud radius if you obey the limits that follow:
   a) The cracks are not more than 0.050 inches (1.27 mm).
   b) If the cracks are more than 0.050 inches (1.27 mm) but less than 0.100 inches (2.54 mm) you must do an inspection again in less than 100 hours.
   c) If the cracks are more than 0.100 inches (2.54 mm) the engine must be rejected in less than 50 hours.
4) Accept a single axial crack that is longer than 0.050 in. (1.27 mm) and that extends from the trailing edge outer shroud radius, only if you obey the limits that follow:
   a) The length of the axial crack must not be more than 0.100 in. (2.54 mm); and,
   b) You do another inspection before 900 hours of engine operation is completed.

High Pressure Turbine Inspection

5) Accept a single axial crack that is longer than 0.100 in. (2.54 mm) and that extends from the trailing edge outer shroud radius, only if you obey the limits that follow:
   a) The length of the axial crack must not be more than 0.150 in. (2.81 mm); and,
   b) You do another inspection before 450 hours of engine operation is completed.
6) Accept cracks from the trailing edge at positions other than the root radius or outer shroud radius, only if you obey the limits that follow:
   a) The crack's length must not be more than 0.050 in. (1.27 mm); and,
   b) You do another inspection before 100 hours of engine operation is completed.
7) If you find cracks in the trailing edge that are more than the above limits, you must replace the engine before 50 hours of engine operation is completed.
8) Accept burns or oxidation with no material decrease, at the trailing edge root or outer shroud, only if you obey the limits that follow:
   a) The radial length of the burn or oxidation must not be more than 0.400 in. (10.16 mm); and,
   b) The axial length from the trailing edge must not be more than 0.400 in. (10.16 mm); and,
   c) You must do another inspection before 450 hours of engine operation is completed.
9) Accept temporarily burns or oxidation with material decrease on the trailing edge, only if you obey the limits that follow:
   a) The axial length of the missing material from the trailing edge must not be more than 0.080 in. (2.03 mm).
   b) If you see this condition, then you must replace the engine before 50 hours of engine operation is completed.
10) Accept smooth, round bottomed dents only if there are no related holes or cracks.
11) If you see holes or cracks that are caused by the dents, and there is no related axial cracking, you must replace the engine before 50 hours of engine operation.
12) If you find axial cracks related to the dents, you must replace the engine.

High Pressure Turbine Inspection

(k) Burns or oxidation (Area B).

NOTE: Material decrease is defined as the amount of material that is completely missing. It does not apply to areas that are burned or have oxidation, or if the thickness of the material is reduced.

1) It is permitted to have burns or oxidation at the trailing edge only if you obey the limits that follow:
   a) It is not more than 0.40 in. (10.16 mm) axially from the trailing edge.
   b) The material decrease from the trailing edge must not be more than 0.020 in. (0.508 mm) axial length.
2) It is permitted to have burns and oxidation with the limits given in the step above, only if you obey the limits that follow:

   a) The material decrease from the trailing edge must not be more than 0.100 in. (2.54 mm) axial length and,
   b) Do the inspection again before 500 hours of engine operation are completed.
   c) The decrease in the material from the trailing edge of more than 0.100 in. (2.54 mm) axial length, but less than 0.120 in. (3.05 mm) axial length, inspect again at 100 hour intervals.

      NOTE: If no further deterioration is seen after three successive inspections at 100 hour intervals, you can increase the repeat inspection interval to twice the original value, up to a maximum of 500 hours. If further deterioration is subsequently seen, you must decrease the repeat inspection interval to 100 hours again.
   d) Burns or oxidation or decrease in material from the trailing edge more than 0.080 inch (2.03 mm) in axial length and less than 0.120 inch (3.05 mm) in axial length re-inspection every 100 hours.
   e) Decrease in material from the trialing edge of more than the limits above, reject the engine before 50 hours.
3) If you find burns and oxidation, or decrease in material than is more than the limits given above, replace the engine before 50 hours of engine operation is completed.

(l) Foreign object damage (Area B).
1) Accept dents with smooth, circular bottoms if you do not see other related holes or cracks.

High Pressure Turbine Inspection

2) Replace the engine before 50 hours is completed if you see the conditions that follow:
   a) Dents with related holes or cracks.
   b) No axial cracks.
3) Replace the engine if you find of axial cracks caused by dents.

Intermediate Pressure Turbine Inspection

TASK 72-00-00-206-102-R01

9. Intermediate Pressure (IP) Turbine Inspection

A. General

(1) The operations that follow give the procedure for the IP Turbine inspection and the standards (limits) you can accept.

(2) With this inspection, you will examine the IP turbine for the conditions that follow:

(a) Cracks.

(b) Damage near the blade root, or changes in the contour of the leading or trailing edges.

(c) Dents.

(d) Nicks or scratches.

(e) Spatter.

(3) Use an impact extractor if it is not easy to remove the access plugs for the borescope.

(4) The access location, view area, and number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
LP 1S	Trailing Edge - IP	112
LP 1S	Leading Edge - LP1	78

(5) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 609).

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

D. Procedure

S 846-183-R01

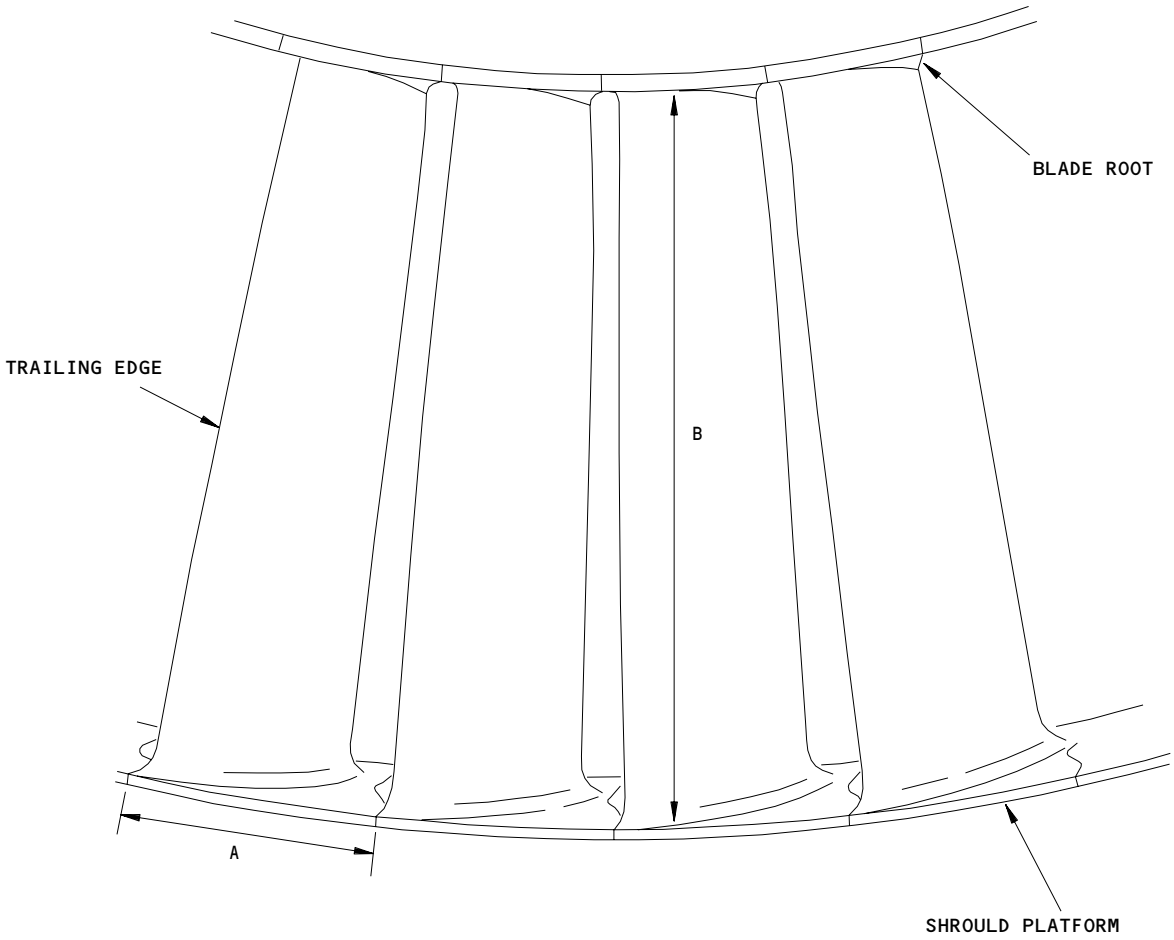
(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-184-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 296-175-R01

(3) Do an inspection of the IP turbine (Fig. 610) for the conditions that follow:



VIEWED FROM
THE REAR

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE
QUANTITY 112 BLADES
A = 1.149 INCHES (29.185 mm)
B = 4.493 INCHES (114.13 mm)

DE00067962

IP Turbine Blades
Figure 610

Intermediate Pressure Turbine Inspection

(a) Cracks.
    1) Reject cracks.
(b) Changes in the leading or trailing edge contours.
    1) Reject sharp or sudden changes in the leading or trailing edge contour.
(c) Damage to the blade root or blade shroud platform.
    1) Reject any damage within 0.500 in. (12.7 mm) of the blade root or 0.200 in. (5.08 mm) of the blade shroud platform.
(d) Dents
    1) Accept more than one smooth bottomed dent only if you obey the limits that follow:
        a) Leading edge dents must not be more than 0.050 in. (1.27 mm) in length and there must be a minimum of 0.100 in. (2.54 mm) between dents.
        b) Trailing edge dents must not be more than 0.020 in. (0.51 mm) in length and there must be a minimum of 1.500 in. (38.1 mm) between dents.
        c) Airfoil dents must not be more than 0.100 in. (2.54 mm) in diameter.
    2) Accept a single smooth bottomed dent to leading edge only if its length is not more than 0.125 in. (3.175 mm).
(e) Nicks or scratches on the airfoil surface.
    1) Accept nicks and/or scratches on the airfoil surface only if the individual widths are not more than 0.020 in. (0.51 mm) and the individual lengths are not more than 0.050 in. (1.27 mm).
(f) Spatter.
    1) Accept foreign object spatter.

Low Pressure Turbine Inspection

TASK 72-00-00-206-115-R01

10. Low Pressure (LP) Turbine Inspection

A. General

(1) The subsequent operations give the procedure for the LP turbine inspection and the standards (limits) you can accept.

(2) With this inspection, you will examine the LP turbine for the conditions that follow:

(a) Cracks.

(b) Damage near the blade root, or changes in the contour of the leading or trailing edges.

(c) Dents.

(d) Nicks or scratches.

(e) Spatter.

(3) Use an impact extractor if it is not easy to remove the access plugs for the borescope.

(4) The access location, view area, and number of blades for each compressor stage are as follows (Fig. 602):

NOTE: You can view the trailing edge of the stage 3 turbine blades through the tail bearing housing with the aid of an inspection lamp.

Access	View Area	Number of Blades
LP 2S	Trailing Edge - LP1	78
LP 2S	Leading Edge - LP2	64
LP 3S	Trailing Edge - LP2	64
LP 3S	Leading Edge - LP3	64

(5) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 610).

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

D. Procedure

S 846-181-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

Low Pressure Turbine Inspection

S 946-182-R01

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 296-176-R01

(3) Do an inspection of the LP turbine (Fig. 611) for the conditions that follow:

(a) Cracks.

1) Reject cracks.

(b) Damage near the blade root, or changes in the contour of the leading or trailing edges.

1) Reject any damage within 0.500 in. (12.7 mm) of the blade root, or causing sharp deformation to the leading or trailing edge contour.

(c) Dents.

1) Accept a single smooth bottomed dent to leading edge only if its length is not more than 0.250 in. (6.35 mm) and its depth is not more than 0.020 in. (0.51 mm).

2) Two dents in each trailing edge are permitted if the limits below are obeyed:

a) The dents is not more than 1.00 inch (25.4 mm) long and not more than 0.020 inch (0.51 mm) deep, with no sharp edges.

b) The maximum permitted height of the protrusion is 0.005 inches (0.13 mm).

c) The protrusion is no closer than 0.500 inches (12.7 mm) to the blade shroud or root radius.

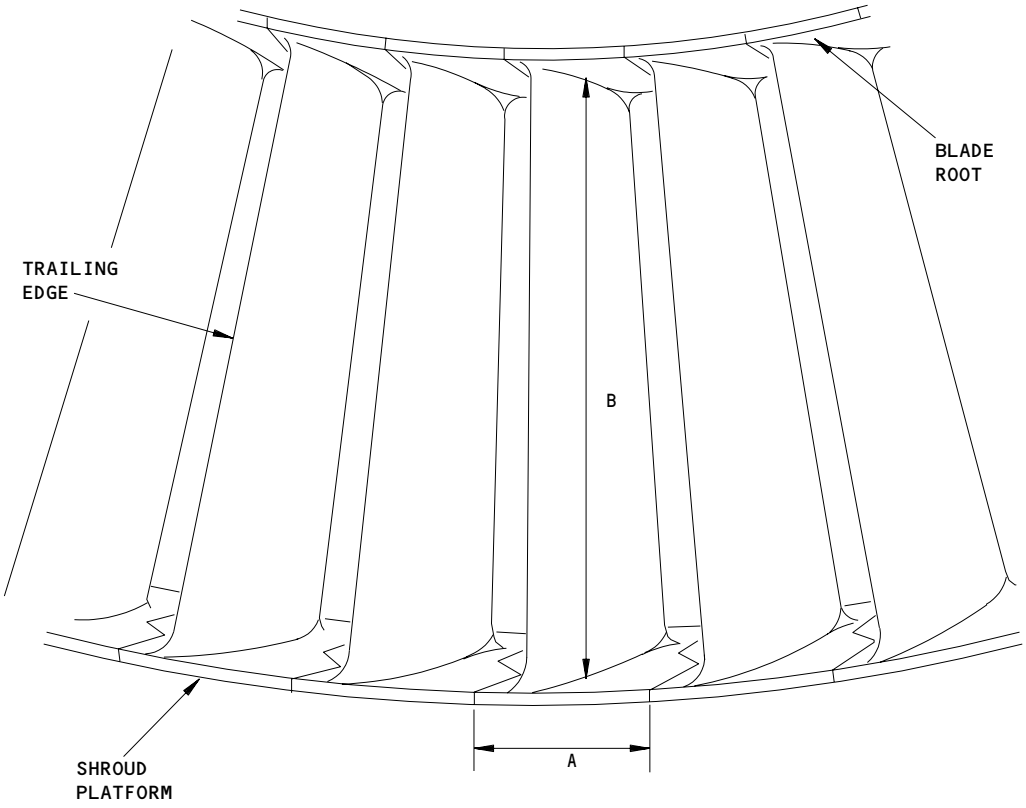
3) Reject all dents that are more than the limits.

(d) Nicks or scratches to the airfoil surfaces.

1) Accept nicks and/or scratches to airfoil surface only if the individual length is not more than 0.050 in. (1.27 mm) and depth is not more than 0.010 in. (0.25 mm).

(e) Spatter.

1) Accept foreign object spatter.



VIEWED FROM THE REAR

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

STAGE	QTY	DIMENSION A	DIMENSION B
1	78	2.268 INCHES (57.63 MM)	6.768 INCHES (171.92 mm)
2	64	2.265 INCHES (57.54 mm)	9.200 INCHES (233.69 mm)
3	64	1.795 INCHES (45.60 mm)	11.143 INCHES (283.05 mm)

DE00059369

LP Turbine Blades
Figure 611

Low Pressure Turbine Inspection

(f) Pin and Gas Holes.

1) A maximum of two holes are permitted on each of the concave and convex airfoil surfaces. You must obey the limits that follow:

a) The holes are not on the leading or trailing edge, or the fillet radii.

b) Only one hole is in the lower 1/3 of the airfoil.

LPT Stage 3 Nozzle Guide Vane Inspection

TASK 72-00-00-206-126-R01

11. Low Pressure Turbine (LPT) Stage 3 Nozzle Guide Vane (NGV) Inspection

A. General

(1) The operations that follow give the procedure for the LPT Stage 3 NGV inspection and the standard (limits) you can accept.

(2) With this inspection you will examine the LPT Stage 3 NGV for the conditions that follow:

(a) Cracks.
(b) Tears.
(c) Nicks.
(d) Dents.

(3) The access location, view area, and number of blades for the LPT Stage 3 are as follows (Fig. 602):

NOTE: You can view the trailing edge of the stage 3 turbine blades through the tail bearing housing with the aid of an inspection lamp.

Access	View Area	Number of Blades
LP 3S	Rear - Stage 3	64

(4) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 610).

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

(2) Access panels

415AL Thrust Reverser
416AR Thrust Reverser
425AL Thrust Reverser
426AR Thrust Reverser

D. Procedure

S 846-178-R01

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-179-R01

(2) If not already done, do the procedure to prepare the boreescope equipment for the inspection.

LPT Stage 3 Nozzle Guide Vane Inspection

S 426-180-R01

(3) Attach the tool to turn the IP system (AMM 72-00-00/201).

S 296-177-R01

(4) Do an inspection of the LPT Stage 3 NGV for the conditions that follow:

(a) Cracks.

1) Accept axial cracks not more than 0.75 in. (19.05 mm) in length only if the cracks are not closer than 0.050 in. (12.0 mm) from the leading or the trailing edge.

2) Reject engine within 50 hours provided radial cracks do not exceed 1.000 in. (25.4 mm), there is a minimum of 1.000 in. (25.4 mm) between cracks, they are non-convergent and are not within 0.500 in. (12.7 mm) of trailing edge.

(b) Nicks or dents.

1) Accept dents or nicks only if they do not penetrate the vane and are not within 0.500 in. (12.7 mm) of the trailing edge.

Put the Airplane Back to Its Usual Condition

TASK 72-00-00-846-143-R01

12. Put the Airplane Back to Its Usual Condition

A. References

(1) AMM 70-42-12/201, Local Surface Protection
(2) AMM 70-51-00/201, Torque Tightening Technique
(3) AMM 72-00-00/201, Engine
(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 73-11-05/401, Fuel Spray Nozzles
(6) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

210 Control Cabin
411 No. 1 Engine
421 No. 2 Engine

C. Procedure

S 296-035-R01

CAUTION: MAKE SURE YOU CORRECTLY INSTALL THE BLANKING PLUG AFTER YOU DO A BORESCOPE INSPECTION. IF YOU DO NOT DO THIS, ENGINE DAMAGE CAN OCCUR.

(1) Install the fuel spray nozzle (AMM 73-11-05/401).

S 296-022-R01

(2) Clean the borescope access details (Fig. 602).

WARNING: WHEN YOU USE DEGREASING FLUID, MAKE SURE YOU HAVE GOOD VENTILATION IN THE WORK AREA. DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID.

KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAME, AND HEAT. DEGREASING FLUID IS A FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Clean the borescope access details.
1) Make a lint free cloth moist with degreasing fluid.
2) Clean the surfaces of the borescope access details that will touch the outer faces of the engine case when assembled. Let the surfaces dry.

Put the Airplane Back to Its Usual Condition

3) Clean the surfaces of the engine case that will touch the borescope access details when they are assembled. Let the surfaces dry.

NOTE: Make sure you remove all the used jointing compound or anti-seize compound from the engine case and borescope access details.

S 296-023-R01

(3) Install the borescope access details (Fig. 602).

(a) Install the access details at location B (Fig. 602).

CAUTION: BOLTS THAT HOLD THE BLANKING PLUGS MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

1) Apply the jointing compound to the mating faces of the plug and spacers.
2) Make sure no jointing compound goes into the central passageway of the plug or spacers.
3) Put the spacers and the plug in the correct position on the LP compressor inner case.
4) Make sure the blanking plugs are in the correct position at their inner end.
5) Make sure the blanking plug mating flanges fully touch the compressor case.
6) Apply clean approved engine oil to the threads of the bolts.
7) Install the washers and the bolts. Tighten the bolts to the standard torque limits (AMM 70-51-00/201).

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS AT LOCATIONS G AND F (FIG. 602) MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

8) Apply the jointing compound to the mating faces of the access details.
9) Put the access details in their correct positions on the engine.
10) Make sure the blanking plugs at locations G and F (Fig. 602) are in the correct position at their inner end.
11) Make sure the blanking plug mating flanges at locations G and F (Fig. 602) fully touch the compressor case.
12) Apply clean approved engine oil to the threads of the bolts.

Put the Airplane Back to Its Usual Condition

13) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

(b) Install the access details at locations G, D, E and F (Fig. 602).

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS AT LOCATIONS G, AND F (FIG. 602) MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

1) Apply jointing compound to the mating faces of the access details.
2) Put the access details in their correct positions on the engine.
3) Make sure the blanking plugs at locations G and F (Fig. 602) are in the correct position at their inner end.
4) Make sure the blanking plug mating flanges at locations G and F (Fig. 602) fully touch the compressor case.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

(c) Install the access details at location K (Fig. 602).

CAUTION: YOU MUST NOT GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN. THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND IS HARMFUL. USE APPLICABLE GLOVES. IF YOU GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN REMOVE IT WITH SOAP AND WATER. IF THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND GOES THROUGH YOUR SKIN THERE CAN BE A HEALTH RISK.

1) Apply anti-seize compound to the threads and the mating faces of the HP NGV blanking plug.
2) Install the blanking plug and torque tighten to 370 pound-inches (41.81 Newton-meters).
3) Apply anti-seize compound to the mating faces of the HP NGV blanking cover.
4) Put the blanking cover into the correct position on the engine.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

Put the Airplane Back to Its Usual Condition

(d) Install the access details at locations J, L, C, A and H (Fig. 602).

NOTE: At location J make sure the C-ring seals are visually satisfactory and installed correctly to the blanking plugs.

WARNING: YOU MUST NOT GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN. THE HIGH TEMPERAUTE ANTI-SEIZ SEIZE COMPOUND IS HARMFUL. USE APPLICABLE GLOVES. IF YOU GET THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND ON YOUR SKIN REMOVE IT WITH SOAP AND WATER. IF THE HIGH TEMPERATURE ANTI-SEIZE COMPOUND GOES THROUGH YOUR SKIN THERE CAN BE A HEALTH RISK.

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS MUST NOT BE USED TO PULL THE PLUG INTO POSITION IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND CAN DAMAGE THE ENGINE.

1) Use a brush to apply a thin layer of anti-seize compound to the mating faces of the access details.
2) Put the access details into their correct position on the engine.
3) Make sure the blanking plugs are in the correct position at their inner end.
4) Make sure the blanking plug mating flanges fully touch the combustion case.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts and tighten to the standard torque limits (AMM 70-51-00/201).

S 296-024-R01

(4) Remove the IP and HP system turning tools (AMM 72-00-00/201).

S 296-025-R01

(5) Install the right-hand lower compressor fairing panel (AMM 72-03-01/401).

S 296-036-R01

(6) Close the right-hand and left-hand thrust reverser 'C' ducts (AMM 78-31-00/201).

Put the Airplane Back to Its Usual Condition

S 866-144-R01

(7) For the left engine, remove the DO-NOT-CLOSE tags and close the following circuit breakers:
   (a) P11 Overhead Circuit Breaker Panel
      1) 11D7, ENGINES STBY IGN LEFT 1
      2) 11D8, ENGINES STBY IGN LEFT 2
      3) 11L1, LEFT ENGINE IGN 1
      4) 11D12, LEFT T/R CONT
      5) 11D17, LEFT ENG SYNC LOCK CONT
      6) 11K5, LEFT ENG T/R IND
      7) 11K6, LEFT ENG T/R DCV SEC

S 866-145-R01

(8) For the right engine, remove the DO-NOT-CLOSE tags and close the following circuit breakers:
   (a) P11 Overhead Circuit Breaker Panel
      1) 11D9, ENGINES STBY IGN RIGHT 1
      2) 11D10, ENGINES STBY IGN RIGHT 2
      3) 11L28, RIGHT ENGINE IGN 1
      4) 11B30, RIGHT ENG T/R CONT ALTN
      5) 11K31, RIGHT ENG T/R IND
      6) 11K32, RIGHT ENG SYNC LOCK
      7) 11K33, RIGHT ENG T/R CONT
      8) 11K34, RIGHT ENG T/R DCV SEC
   (b) On the P6 power distribution panel:
      1) 6D12, R ENG SYNC LOCK ALTN (BAT BUS)

ENGINE - INSPECTION/CHECK

1. General
   A. The first procedure gives the equipment and their use for the borescope inspection.
   B. The second procedure prepares the airplane for the borescope inspections.
   C. This borescope inspection has these procedures:
      (1) Inspection of the Intermediate Pressure (IP) Compressor
      (2) Inspection of the High Pressure (HP) Compressor
      (3) Inspection of the Combustion Liners and High-Pressure Nozzle-Guide-Vane (HPNGV)
      (4) Inspection of the High Pressure (HP) Turbine Blades
      (5) Inspection of the Intermediate Pressure (IP) Turbine Blades
      (6) Inspection of the Low Pressure (LP) Turbine Blades
      (7) Inspection of the Stage 3 Nozzle-Guide-Vanes of the Low Pressure (LP) Turbine
   D. The subsequent procedure gives the steps to remove the borescope equipment.
   E. The last procedure gives the steps to put the airplane back to its usual condition.
   F. It is possible to visually examine the gas generator at different positions with the use of the borescope equipment.
   G. The inspection equipment is a 110v/240v AC light box.
      (1) You use this to transmit light along a flexible fiber light cable to the probe viewing instrument.
      (2) You can use all of the different probe types.
      (3) This will let you examine the different areas of the gas generator correctly.
      (4) It is possible for you to get a photograph through the probe eyepiece.
   H. You can examine the compressor and turbine rotor blades, the internal walls of the combustion liner and the HP nozzle-guide-vanes.
   I. For the inspections of engine areas not contained in this section, refer to the Inspection/Check page blocks at these locations:

- LP compressor rotor blades and root dampers	72-31-11
- LP compressor case	72-34-10
- LP compressor intake rotating fairing	72-35-01
- Exhaust plug	72-51-01

TASK 72-00-00-726-210-R02

2. Borescope Equipment Preparation and Use

A. General

(1) This task lists the inspection equipment, the light-source test and the installation of the borescope equipment used in the engine inspection.

B. Equipment

(1) Borescope Inspection Equipment (Fig. 601)

(a) 1702322 Light Source Box and Case, Rolls-Royce

(b) 1702227 Cable - Light Guide, Rolls-Royce

(c) 1702375 Endoprobe (Green), Rolls-Royce

(d) 1702379 Endoprobe (Blue), Rolls-Royce

(e) 1702374 Endoprobe, Rolls-Royce

(f) 1702376 Endoprobe (Yellow), Rolls-Royce

(g) 1702377 Endoprobe (Red), Rolls-Royce

(h) 1702378 Endoprobe (Red), Rolls-Royce

(i) 1702368 Location Stop, Rolls-Royce (use with 1702378)

(j) 1702422 Endoprobe, Rolls-Royce

(k) 1702394 Eye Piece (EF/12), Rolls-Royce

(l) 1702371 Portable Light Source Box, Rolls-Royce

NOTE: Use with all borescopes, but not 1702319.

(m) 1702393 Right Angle Viewer, Rolls-Royce

(n) 1702380 Right Angle Viewer, Rolls-Royce

(o) 1702381 Carrying Case, Rolls-Royce

(p) Cable (Use with 1702371 Portable Light Source Box)

Borescope Equipment Preparation and Use

(q) 1702319 Flexible Borescope (Use with 1702322 Light Source Box), Rolls-Royce
(2) HU19036/1 Impact extractor, Rolls-Royce
(3) 289200 Protective Workmat, Rolls-Royce
(4) Inspection Lamp
(5) Clean, Stiff-Bristled Brush

C. Consumable Materials
(1) Degreasing Fluid, Acetone
British Spec/Ref - B.S. 509, 1964
American Spec/Ref - MIL-D-6998
OMat No. 150
(2) Isopropyl Alcohol
OMat 1/40
(3) Cleaning Solvent
Desoclean 45
P-D-680TY1
OMat 1/257
(4) Jointing Compound
British Spec/Ref - DTD.900/4586, PL.32 (light)
OMat No. 4/46
(5) High Temperature Anti-Seize Compound
British Spec/Ref - Rocol ASC251T
OMat No. 4/62
(6) Lockwire
British Spec/Ref - DTD.189A, 22 S.W.G.
American Spec/Ref - 21 A.W.G.
OMat No. 238
(7) Oil - Clean, Approved Engine

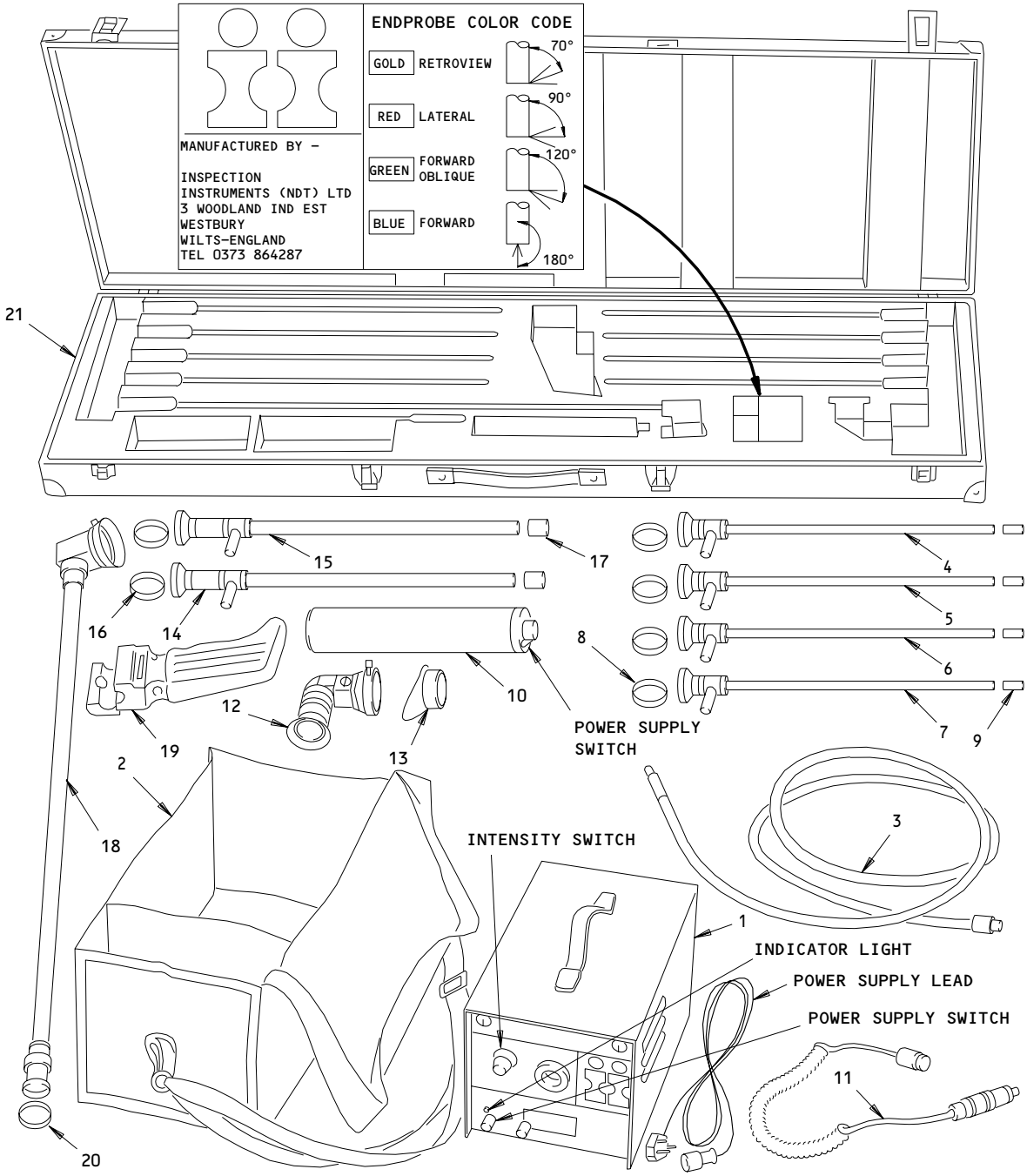
D. References
(1) AMM 72-00-00/201, Engine

E. Procedure

S 846-201-R02
(1) Prepare the equipment for the inspection (Fig. 601)

1.	Light source box	
2.	Carrying case for item 1	
3.	Cable-light guide	
4.	Endoprobe (Green)	Diameter 0.315 inch (8.0 mm) Length 10.6 inches (270.0 mm) View fore oblique 120 degrees
5.	Endoprobe (Blue)	Diameter 0.315 inch (8.0 mm) Length 10.6 inches (270.0 mm) View forward 180 degrees
6.	Endoprobe (Red)	Diameter 0.315 inch (8.0 mm) Length 10.6 inches (270.0 mm.) View lateral 90 degreees
7.	Endoprobe (Gold)	Diameter 0.315 inch (8.0 mm) Length 10.6 inches (270.0 mm) View retro 70 degrees
8.	Eyepiece cover for items 4,5,6 and 7	
9.	Tip cover for items 4,5,6 and 7	
10.	Portable light source box (battery operated)	
11.	Cable - for use with item 10	
12.	Right angle viewer	
13.	Eyepiece adapter	
14.	Endoprobe (Red)	Diameter 0.433 inch (11.0 mm) Length 10.4 inches (265.0 mm) View lateral 90 degrees
15.	Endoprobe (Red)	Diameter 0.433 inch (11.0 mm) Length 10.4 inches (265.0 mm) View lateral 90 degrees
16.	Eyepiece cover for items 14 and 15	
17.	Tip cover for items 14 and 15	
18.	Right angle viewer	
19.	Steady handle for item 18	
20.	Eyepiece cover for item 18	
21.	Carrying case	

Borescope Inspection Equipment
Figure 601 (Sheet 1)



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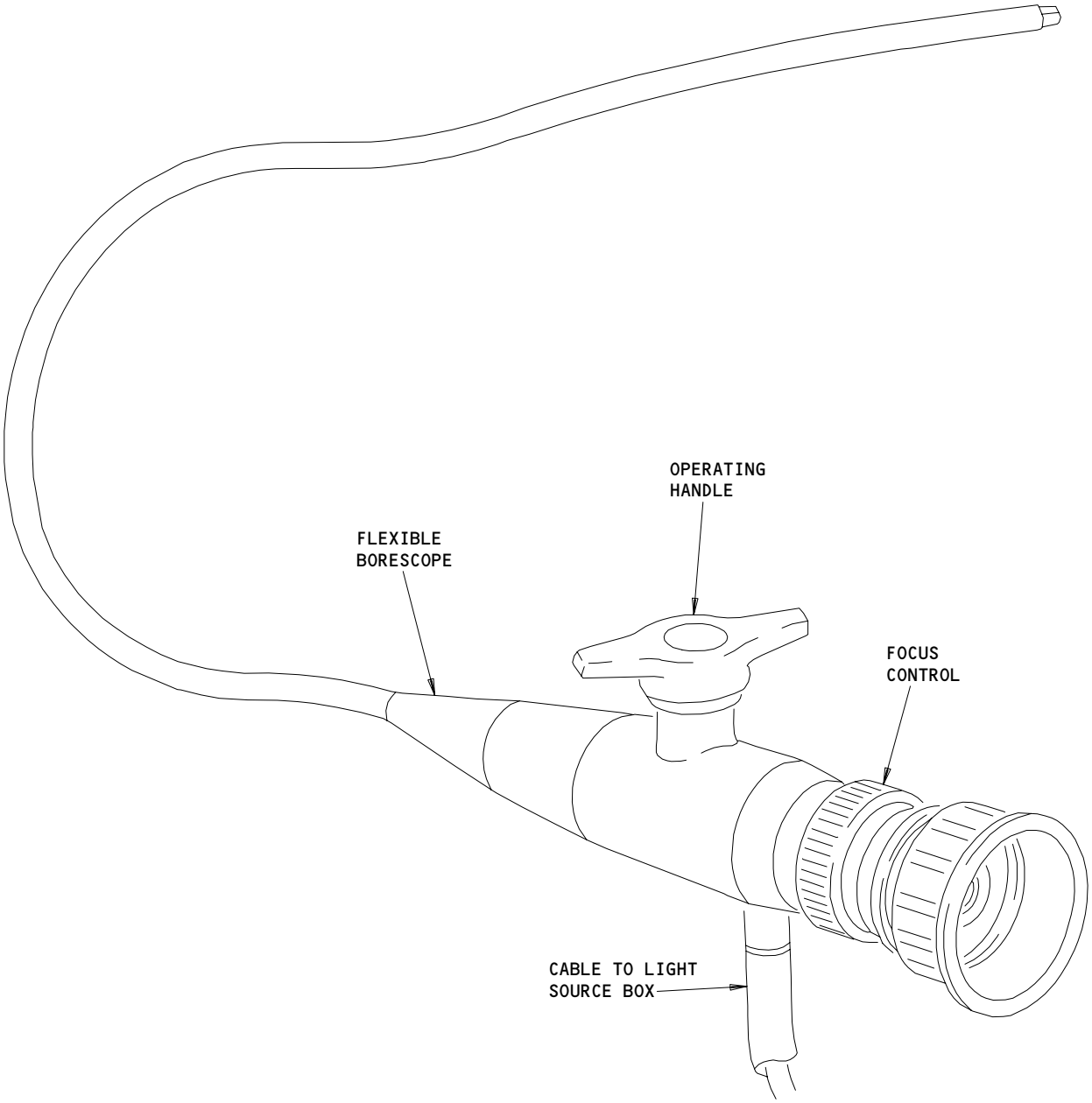
Borescope Inspection Equipment
Figure 601 (Sheet 2)

EFFECTIVITY
RB211–535E4 AND RB211–535E4–B ENGINES
PRE RR SB 72–C230 (PHASE II COMBUSTOR)

277189



Borescope Inspection Equipment
Figure 601 (Sheet 3)

Borescope Equipment Preparation and Use

(a) Make sure the switch at the rear of the light source box (1) is at the correct voltage.
(b) Connect the power supply to the light source box.
(c) Set the intensity switch to the lowest light position.
(d) Do a function check of the light source box.
1) Set the power supply to ON and make sure that the red indication light comes on.
2) Put the power supply switch back to the OFF position.
(e) Attach the light cable (3) to the light source box.

NOTE: The flexible borescope has an integral light cable and it is not necessary to attach the light cable (3).

(f) If you use the portable light source, attach the cable (11) to the portable light source box (10).

NOTE: The portable light source is used with all borescopes, but not 1702319.

(g) Attach the applicable borescope to the light cable, or attach the flexible borescope to the light source box.
(h) Set the power supply to the ON position.

S 846-202-R02
(2) Do these steps to use the borescope inspection equipment:

NOTE: After the removal of the borescope plug, it is possible for the HPNGV support ring heat shield to move on the support ring. There can be axial or circumferential movement and the two are caused by deterioration of the heat shield. This movement can close part of the borescope port 'G' on the HP turbine. You can position the heat shield correctly with your hands to permit the borescope to be put into the port. The engine is satisfactory with a heat shield that is loose.

(a) Put the borescope through the applicable opening for the inspection to be done.
(b) Turn the IP or the HP system for the compressor or turbine inspection (AMM 72-00-00/201).
(c) Refer to the applicable inspection.
(d) Remove the borescope from the engine.

S 216-203-R02
(3) Do an inspection through the opening in the fuel spray nozzle as follows:
(a) Remove the stop adapter from the flexible borescope if attached.

Borescope Equipment Preparation and Use

CAUTION: DO NOT LET THE BORESCOPE EXTEND FORWARD THROUGH THE HP OUTLET GUIDE VANES. IF THE BORESCOPE TOUCHES THE STAGE 6 ROTOR BLADES OF THE HP COMPRESSOR, DAMAGE TO THE BORESCOPE AND THE ENGINE CAN OCCUR.

MAKE SURE THE FLEXIBLE BORESCOPE DOES NOT RUB THE INTERNAL PARTS OR DAMAGE TO THE BORESCOPE AND THE ENGINE CAN OCCUR.

(b) Put the flexible borescope through the opening made when you removed the fuel spray nozzle.
(c) Carefully put it through the outer liner of the combustion liner head section and then between the inner platform of the HP outer guide vanes.
(d) Turn the HP system (AMM 72-00-00/201).
(e) Refer to the HP compressor inspection.

CAUTION: MAKE SURE THE FLEXIBLE BORESCOPE DOES NOT RUB ALL INTERNAL PARTS OR DAMAGE TO THE BORESCOPE AND THE ENGINE CAN OCCUR.

(f) Remove the flexible borescope from the engine.

Prepare the Airplane for the Inspection

TASK 72-00-00-866-142-R02

3. Prepare the Airplane for the Inspection

A. References

(1) AMM 72-03-01/401, Compressor Fairings

(2) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

210 Control Cabin

411 No. 1 Engine

421 No. 2 Engine

C. Procedure

S 866-143-R02

(1) For the left engine, open these circuit breakers and install a DO-NOT-CLOSE tag:

(a) P11 Overhead Circuit Breaker Panel

1) 11D7, ENGINES STBY IGN LEFT 1

2) 11D8, ENGINES STBY IGN LEFT 2

3) 11L1, LEFT ENGINE IGN 1

4) 11D19, ENGINE START CONT LEFT

S 866-144-R02

(2) For the right engine, open these circuit breakers and install a DO-NOT-CLOSE tag:

(a) P11 Overhead Circuit Breaker Panel

1) 11D9, ENGINES STBY IGN RIGHT 1

2) 11D10, ENGINES STBY IGN RIGHT 2

3) 11L28, RIGHT ENGINE IGN 1

4) 11D20, ENGINE START CONT RIGHT

S 016-145-R02

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Open the thrust reversers (AMM 78-31-00/201).

S 016-146-R02

(4) Remove the lower-right compressor fairing panel (AMM 72-03-01/401).

Prepare the Airplane for the Inspection

S 016-208-R02

(5) Remove the applicable borescope access plug for the inspection (Fig. 602).

Inspection of the Intermediate Pressure (IP) Compressor

TASK 72-00-00-206-147-R02

4. Inspection of the Intermediate Pressure (IP) Compressor

A. General

(1) Examine the IP Compressor Blades for the conditions that follow:
  (a) Missing annulus filler
  (b) Airfoil cracks, nicks, and tears
  (c) Airfoil dents and bends
  (d) Material missing from the airfoil leading and trailing edges
  (e) Airfoil tip damage.

(2) Examine the 1st-stage compressor blades through the front of the engine.

(3) Examine the 2nd thru 6th-stage compressor blades with the borescope equipment (Fig. 602).

(4) Use an impact extractor if it is not easy to remove the plugs.

(5) It is not possible to examine these areas of the IP compressor:

The rear of the 1st-stage rotor blades.
The front of the 2nd-stage rotor blades.
The rear of the 3rd-stage rotor blades.
The front of the 4th-stage rotor blades.
The rear of the 5th-stage rotor blades.
The front of the 6th-stage rotor blades.

(6) Access location, the view area and the number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
Engine Front	Front - 1st-Stage	50
IP 2S	Rear - 2nd-Stage	57
	Front - 3rd-Stage	48
IP 4S	Rear - 4th-Stage	53
	Front - 5th-Stage	49
IP 6S	Rear - 6th-Stage	46

NOTE: Borescope access bosses IP 2S, IP 4S, and IP 6S will not look in the center position of the adjacent thickened section of the case. This is acceptable.

(7) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 603).

B. References

(1) AMM 72-00-00/201, Engine

Inspection of the Intermediate Pressure (IP) Compressor

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure (Fig. 602, 602A, 603 and 603A)

S 846-148-R02

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 496-149-R02

(2) Attach the tool with which you turn the IP system (AMM 72-00-00/201).

S 946-200-R02

(3) If not already done, do the procedure to prepare the equipment for the inspection.

S 216-152-R02

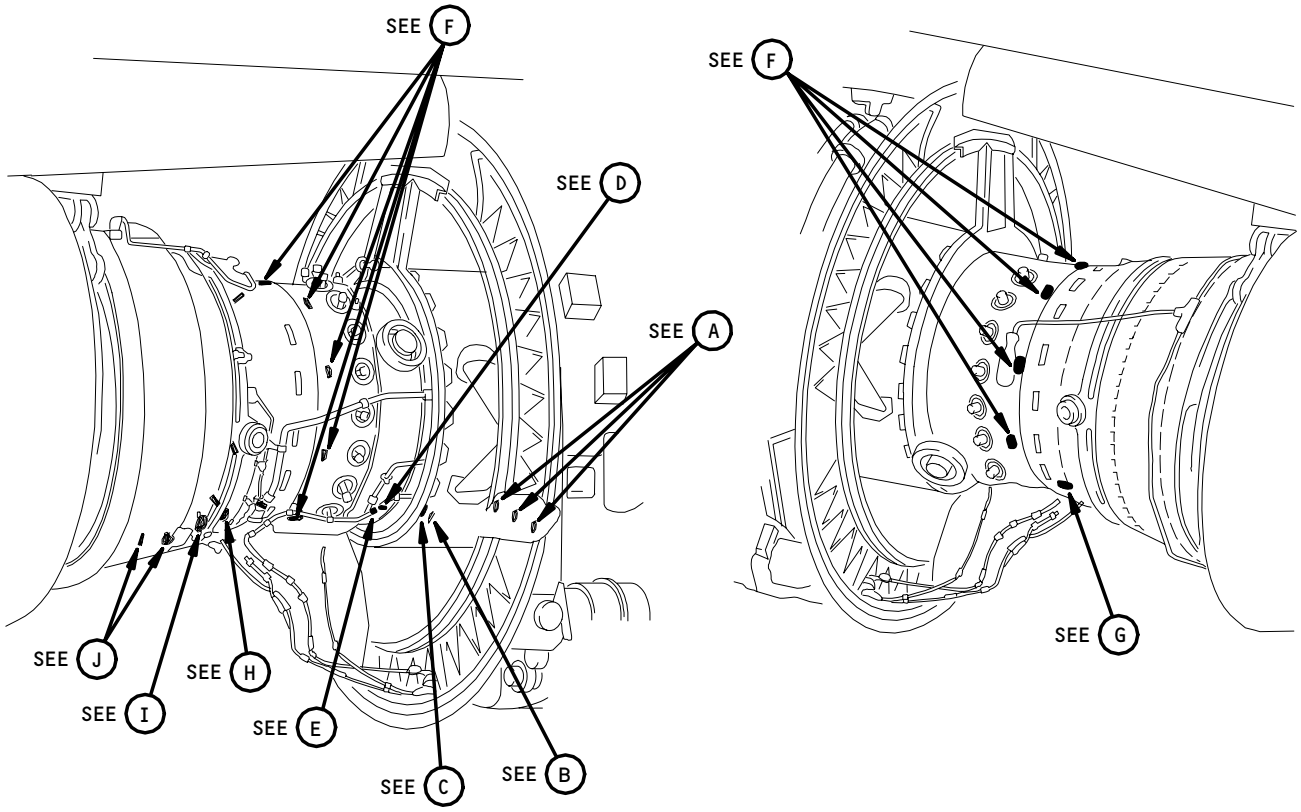
(4) Examine the IP compressor blades.

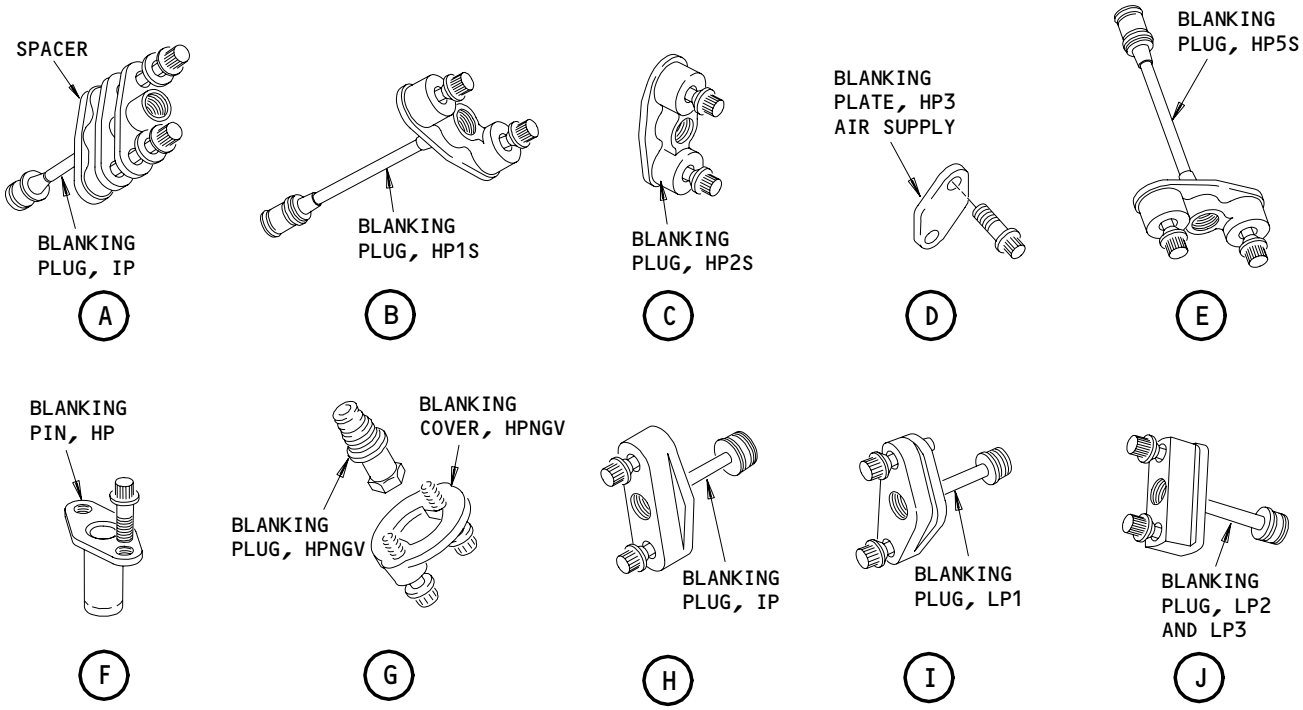
NOTE: To examine the 1st-stage IP compressor blades, use a light source through the LP and IP compressor inlet guide vanes. Damaged or missing annulus filler is permitted.

NOTE: If you find damage which extends between different zones, compare the chordal width of the damage in each zone to the limits for that zone.

(a) Damage is permitted to the limits that follow:

1) Material missing up to a depth of 0.15 in. (0.38 mm) with no related cracks.

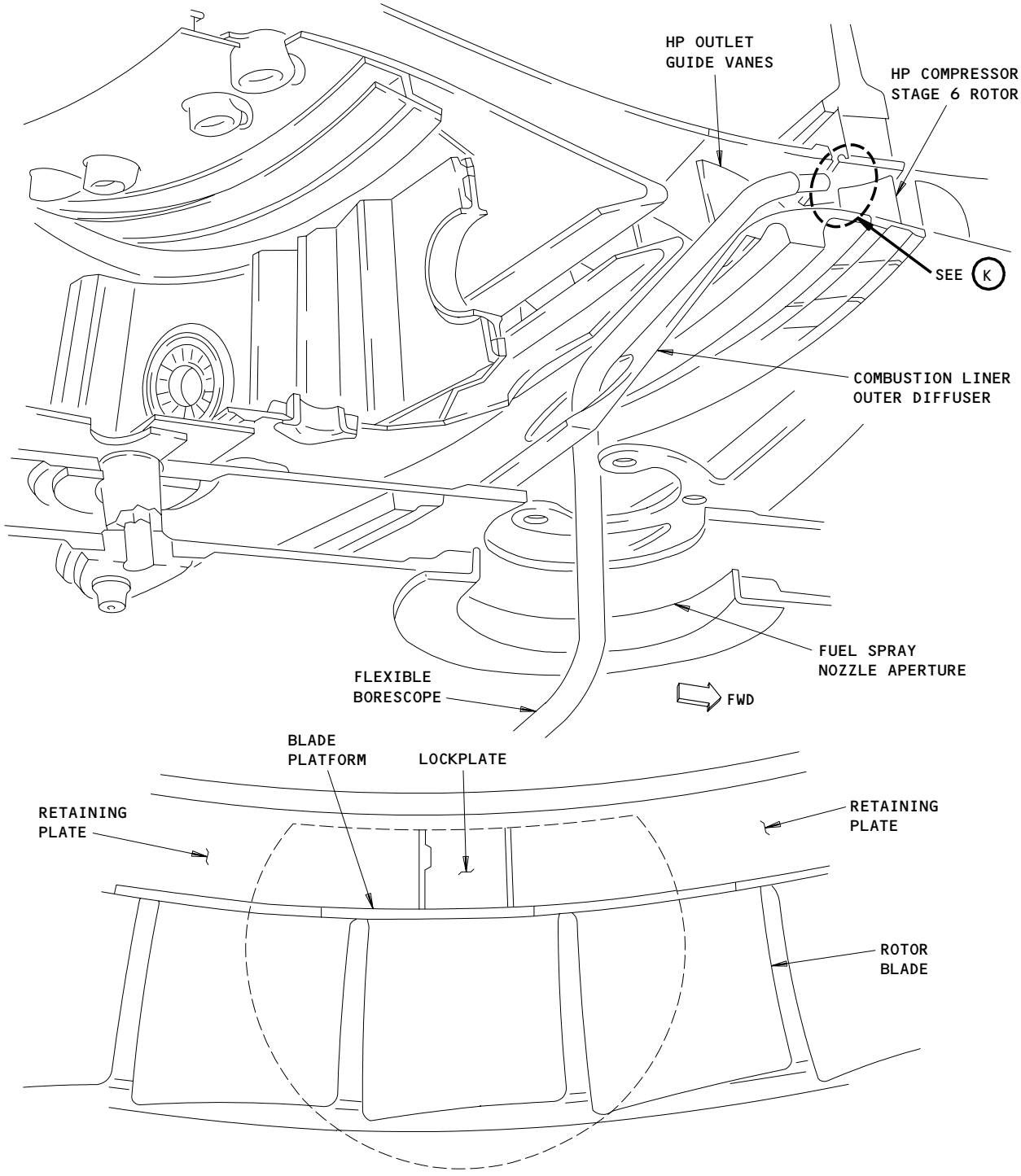




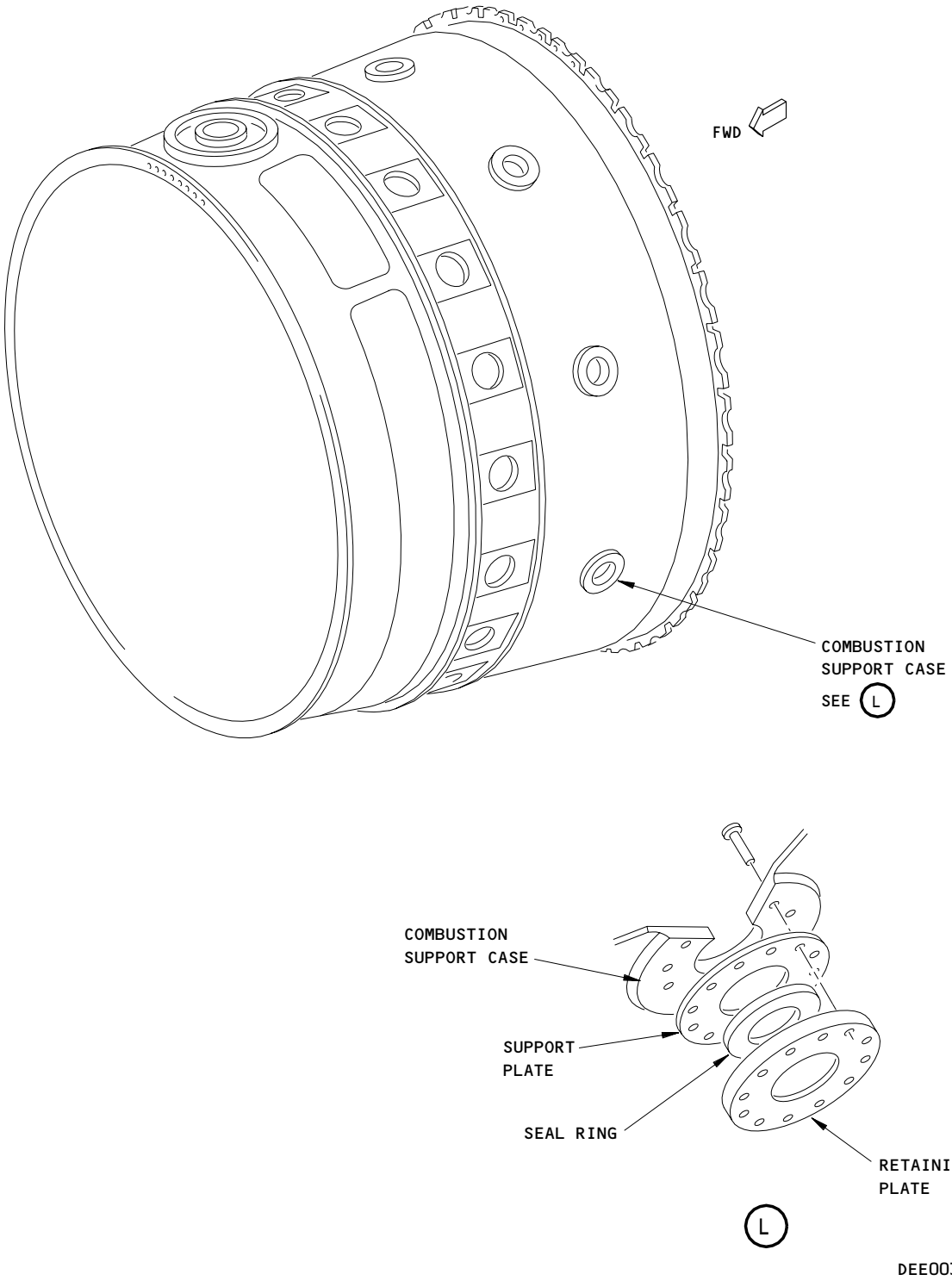
Borescope Access Details
Figure 602 (Sheet 1)

EFFECTIVITY
RB211-535E4 AND RB211-535E4-B ENGINES
PRE RR SB 72-C230 (PHASE II COMBUSTOR)

277190



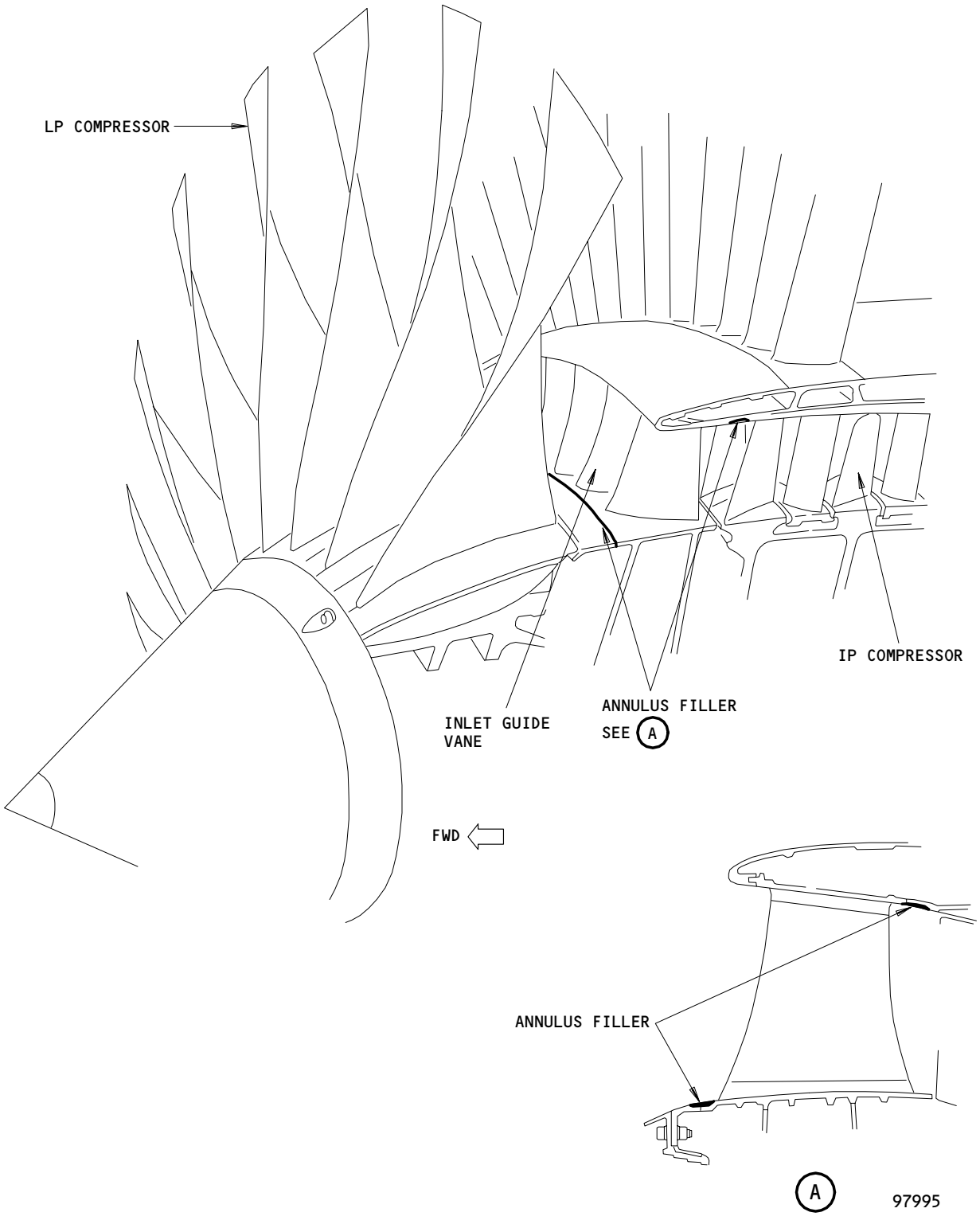
Borescope Access Details
Figure 602 (Sheet 2)



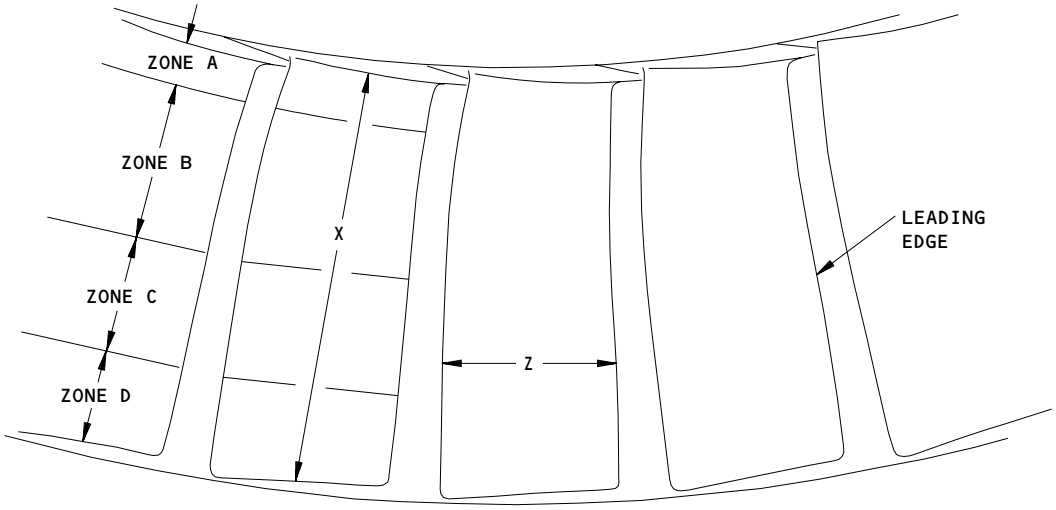
Borescope Access Details
Figure 602 (Sheet 3)

EFFECTIVITY
RB211-535E4 AND RB211-535E4-B ENGINES
PRE RR SB 72-C230 (PHASE II COMBUSTOR)

K31184



IP Compressor Inlet Guide Vanes and Front Bearing Housing Support
Figure 602A



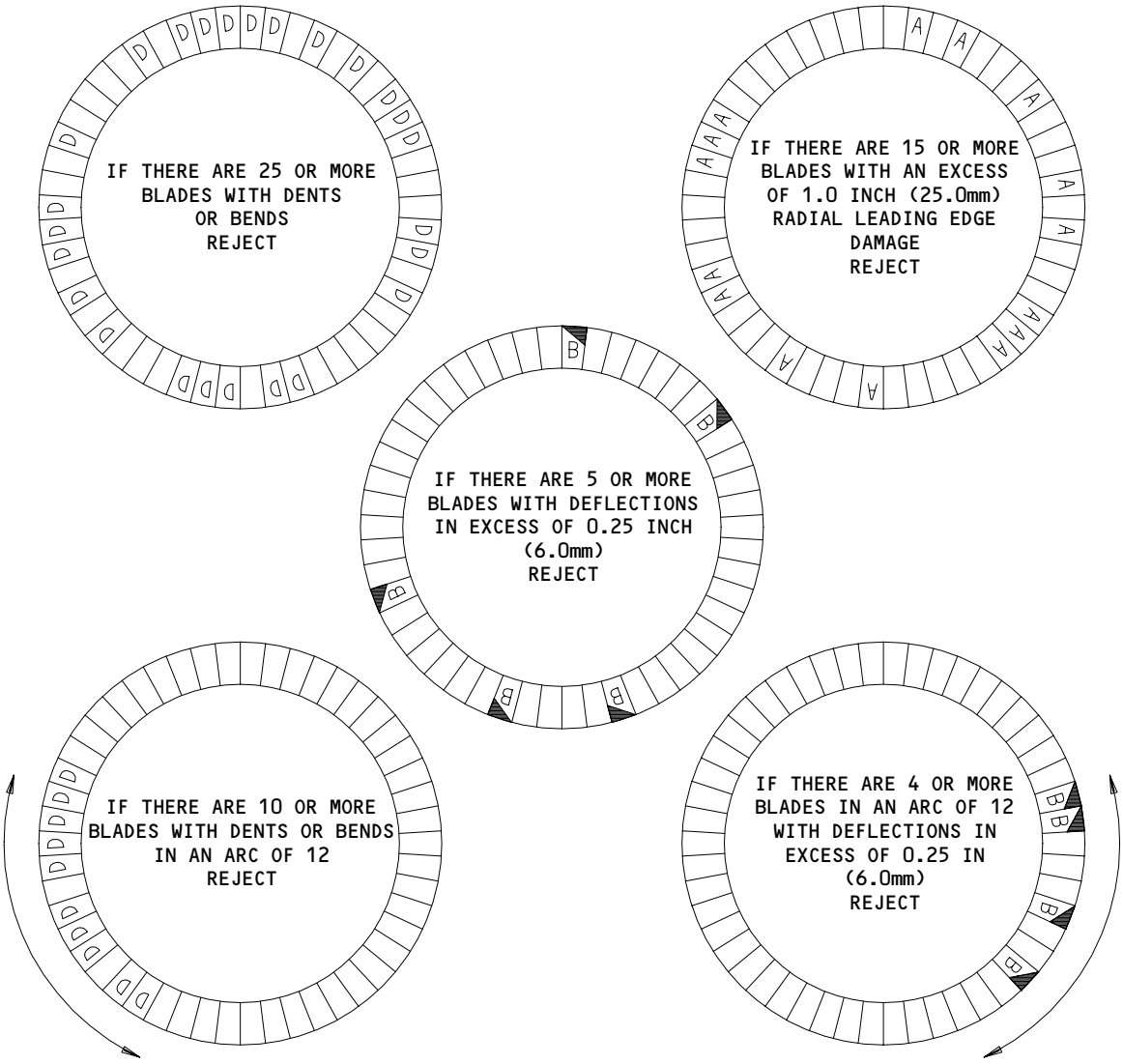
STAGE 2
(VIEW IN THE FORWARD DIRECTION)

STAGE	QTY	DIMENSION X	DIMENSION Z (TRUE CHORD)
1ST	50	5.100 INCHES (129.54 mm)	2.97 INCHES (75.38 mm)
2ND	57	4.700 INCHES (119.38 mm)	2.52 INCHES (64.08 mm)
3RD	48	4.300 INCHES (109.22 mm)	2.36 INCHES (60.00 mm)
4TH	53	3.900 INCHES (99.06 mm)	2.19 INCHES (55.59 mm)
5TH	49	3.700 INCHES (93.98 mm)	2.21 INCHES (56.06 mm)
6TH	46	3.500 INCHES (88.9 mm)	2.31 INCHES (58.79 mm)

NOTE: ZONE A = 10% OF BLADE AIRFOIL
ZONE B = 40% OF BLADE AIRFOIL
ZONE C = 25% OF BLADE AIRFOIL
ZONE D = 25% OF BLADE AIRFOIL

DE00067934A

IP Compressor Blades
Figure 603



DAMAGED BLADE IDENTIFICATION

BLADE WITH NO DAMAGE

A — BLADE WITH RADIAL LEADING EDGE DAMAGE OF MORE THAN 1.0 INCH (25.0mm) IN LENGTH

B — BLADE WITH DEFLECTIONS OF MORE THAN 0.25 INCH (6.0mm)

D — BLADE WITH ANY DENTS OR BENDS THAT INCLUDE DEFLECTIONS

IP Compressor Blades, Stage 1 – Examples of Damage
Figure 603A

EFFECTIVITY
RB211-535E4 AND RB211-535E4-B ENGINES
PRE RR SB 72-C230 (PHASE II COMBUSTOR)

862923

Inspection of the Intermediate Pressure (IP) Compressor

2) Nicks and tears from the leading and trailing edges up to 0.15 in. (0.38 mm) in depth with no related cracks.

   NOTE: If you use digital optical measuring equipment, this limit is increased to 0.025 in. (0.64 mm).

3) The material missing is from a previous repair.

   NOTE: Missing material from a previous repair will have a smooth contour appearance.

4) Dents or bends on the 1st stage compressor blades are permitted to the limits that follow:
   a) No related cracks, nicks, or tears.
   b) No more than 25 blades with dents or bends along the leading edge that are more than 1.0 in. (25.4 mm).
   c) No more than 5 blades with dents or bends that change the shape of the blade more than 0.25 in. (6.35 mm) away from the correct airfoil position.
   d) No more than 10 blades with dents or bends in an arc of 12 blades.
   e) No more han 4 blades, in an arc of 12 blades, with dents that change the shape of the blade more than 0.25 in. (6.35 mm) away from the correct airfoil position.
   f) Reject any blade that touches a different blade.
5) Dents or bends on the 2nd stage to the 6th stage compressor blades are permitted to the limits that follow:
   a) No related cracks, nicks, or tears
   b) No large bends if the blade touched a different blade.
   c) Heat discoloration because of blade tip rub is permitted.
   d) Burrs on the training edge tip due to blade tip rub is permitted if they are on 25 percent or less of the blade chord width.
   e) Bends or curls are permitted if there is no other damage.
   f) Tip missing up to the limits below (30 percent tru chord width) is permitted only if you examine the subsequent stages for damage:

      Stage 1: 0.89 inch (22.6 mm)
      Stage 2: 0.76 inch (19.3 mm)
      Stage 3: 0.71 inch (18.0 mm)
      Stage 4: 0.66 inch (16.7 mm)
      Stage 5: 0.66 inch (16.7 mm)
      Stage 6: 0.69 inch (17.5 mm)

Inspection of the Intermediate Pressure (IP) Compressor

(b) Damage is permitted to the limits that follow if you do the inspection procedure:

1) Blade cracks, bends, or swirls are permitted up to the limits that follow:

a) One radial crack for each blade tip is permitted if it is not more than 10% of the true chord width:

Stage 1: 0.30 inch (7.6 mm)
Stage 2: 0.25 inch (6.4 mm)
Stage 3: 0.24 inch (6.1 mm)
Stage 4: 0.22 inch (5.6 mm)
Stage 5: 0.22 inch (5.6 mm)
Stage 6: 0.23 inch (5.8 mm)

b) The crack must not be related to other damage on the blade.

c) Axial cracks, nicks or tears on one edge in zone A, B, and C are permitted if the length is not more than 5% of the true chord width:

Stage 1: 0.15 inch (3.8 mm)
Stage 2: 0.13 inch (3.3 mm)
Stage 3: 0.12 inch (3.0 mm)
Stage 4: 0.11 inch (2.8 mm)
Stage 5: 0.11 inch (2.8 mm)
Stage 6: 0.09 inch (2.3 mm)

d) Axial cracks, nicks or tears on the two edges in zone A, B, and c are permitted if the length is not more than 2.5% of the true chord width:

Stage 1: 0.07 inch (1.8 mm)
Stage 2: 0.06 inch (1.5 mm)
Stage 3: 0.06 inch (1.5 mm)
Stage 4: 0.06 inch (1.5 mm)
Stage 5: 0.06 inch (1.5 mm)
Stage 6: 0.06 inch (1.5 mm)

Inspection of the Intermediate Pressure (IP) Compressor

e) Axial cracks, nicks or tears on one edge in Zone D are permitted if the length is not more than 15% of the true chord width:

Stage 1: 0.45 inch (11.4 mm)
Stage 2: 0.38 inch (9.6 mm)
Stage 3: 0.35 inch (8.8 mm)
Stage 4: 0.33 inch (8.3 mm)
Stage 5: 0.34 inch (8.6 mm)
Stage 6: 0.35 inch (8.8 mm)

f) Axial cracks, nicks or tears on the two edges in Zone D are permitted if the length is not more than 7.5% of the true chord width:

Stage 1: 0.23 inch (5.8 mm)
Stage 2: 0.19 inch (4.8 mm)
Stage 3: 0.18 inch (4.5 mm)
Stage 4: 0.17 inch (4.3 mm)
Stage 5: 0.17 inch (4.3 mm)
Stage 6: 0.17 inch (4.3 mm)

g) Bends or curls together with cracks or tears are permitted if each individual crack or tear is not longer than 20% of the true chord width:

Stage 1: 0.60 inch (15.2 mm)
Stage 2: 0.50 inch (12.7 mm)
Stage 3: 0.47 inch (11.9 mm)
Stage 4: 0.44 inch (11.1 mm)
Stage 5: 0.44 inch (11.1 mm)
Stage 6: 0.46 inch (11.7 mm)

Inspection of the Intermediate Pressure (IP) Compressor

2) Do three inspections at intervals of between 250 and 350 flight hours and one inspection at between 800 and 1,000 flight hours.
   a) If there is no increase in deterioration or damage, the next inspection is subject ot airlines decision.

(c) Dress the blade by borescope blending - refer to FRS 7161 (AMM 72-00-00/801).

1) It is not necessary to do the inpection procedure if you repair all nicks, cracks, and tears.

NOTE: It is permitted to do this repair once only on each blade.

NOTE: Make sure that the total number of repaired blades in both the IP and HP Compressor blades is not more than 10.

2) All axial cracks, nicks, or tears can be blended if they are in the limits that follow:
   a) Edges that can be blended are listed below:

	IP Compressor Access:	
Compressor Stage	Leading Edge	Trailing Edge
1	No	No
2	No	Yes
3	Yes	No
4	No	Yes
5	Yes	No
6	Yes	Yes

3) Axial cracks, nicks, or tears with length that is not more than 5 percent of the true chord width on one edge in zone B can be blended:

Stage 1: 0.15 inch (3.8 mm)
Stage 2: 0.13 inch (3.2 mm)
Stage 3: 0.13 inch (3.2 mm)
Stage 4: 0.11 inch (2.8 mm)
Stage 5: 0.11 inch (2.8 mm)
Stage 6: 0.11 inch (2.8 mm)

Inspection of the Intermediate Pressure (IP) Compressor

4) Axial cracks, nicks, or tears with length that is not longer than ten percent of the true chord width on one edge in zones C and D can be blended:

Stage 1	0.30 inch (7.6 mm)
Stage 2	0.25 inch (6.4 mm)
Stage 3	0.24 inch (6.1 mm)
Stage 4	0.22 inch (5.6 mm)
Stage 5	0.22 inch (5.6 mm)
Stage 6	0.23 inch (5.8 mm)

(d) If necessary, the acceptance limits for cracks in zone D can be increased if you do the steps that follow:
1) Damage limits to blades in zone D can be increased by 50 percent of the inspection limits for that zone.
a) Repair before 5 cycles or 24 flight hours. Use the limit that occurs first.
(e) Damage more than the limits in this procedure must be repaired immediately.

S 846-153-R02

(5) Do the procedure to put the airplane back to its usual condition.

Inspection of the High Pressure (HP) Compressor

TASK 72-00-00-206-154-R02

5. Inspection of the High Pressure (HP) Compressor

A. General

(1) This inspection gives the procedure to examine the H.P. compressor blades for the conditions that follow:
   (a) Airfoil cracks, nicks, and tears.
   (b) Airfoil dents and bends.
   (c) Material loss on the airfoil leading and trailing edges.
   (d) Airfoil tip damage and discoloration.

(2) It is not possible to examine these areas of the H.P. compressor:
   (a) The rear of the 4th-stage rotor blades.
   (b) The front of the 5th-stage rotor blades.
   (c) The rear of the 6th-stage rotor blades.

(3) The access location, the area that can be viewed and the number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
HP 1S	Rear - Stage 1	57
	Front - Stage 2	82
HP 2S	Rear - Stage 2	82
	Front - Stage 3	94
-----	Rear - Stage 3	94
	Front - Stage 4	97
HP 5S	Rear - Stage 5	76
	Front - Stage 6	74

NOTE: Borescope access bosses HP 1S and HP 2S will not look in the center position of the adjacent thickened section of the case. This is accptable.

Inspection of the High Pressure (HP) Compressor

(4) To help you make an estimate of the damage, refer to the acceptance zones in Fig. 604.

B. References
(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings

C. Access
(1) Location Zones
410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Procedure (Fig. 602 and 604)

S 846-155-R02
(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 496-156-R02
(2) Attach the tool with which you turn the HP system (AMM 72-00-00/201).

S 946-199-R02
(3) If not already done, do the procedure to prepare the borescope equipment for the inspection.

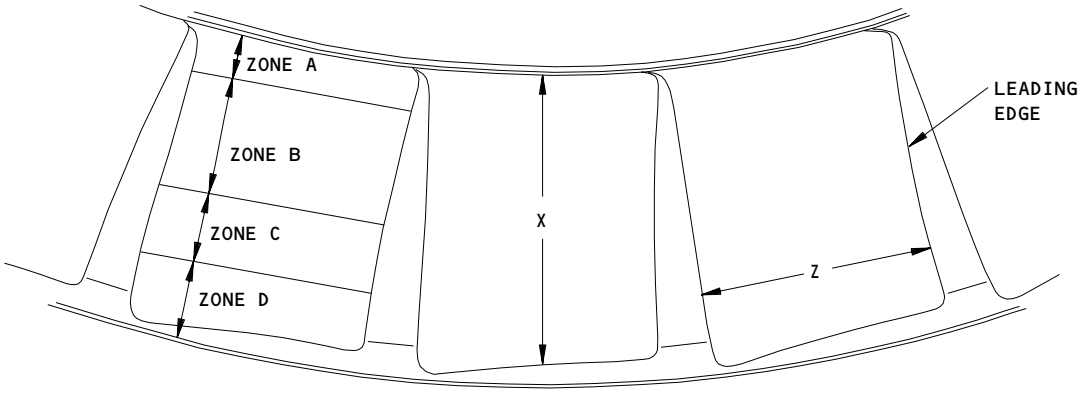
S 296-158-R02
(4) Examine the HP Compressor blades for damage. Use the limits that follow (Fig. 604):

NOTE: If you find damage that extends from one zone into another, compare the chord width of the damage in each zone with the limit for that zone. All stages of the HP compressor rotor blades are made with local bends at the tip and the root. These bends are different to the bends or curls caused by impact damage.

(a) Damage is permitted to the limits that follow:
1) Accept missing material up to a depth of 0.015 inch (0.38 mm) with no related cracks.
2) The material missing is from a related repair.

NOTE: Material missing from a previous repair will have a smooth contour appearance. Check the module log book.

3) Accept nicks or tears that start on the leading or trailing edges, only if:
a) There are no cracks.



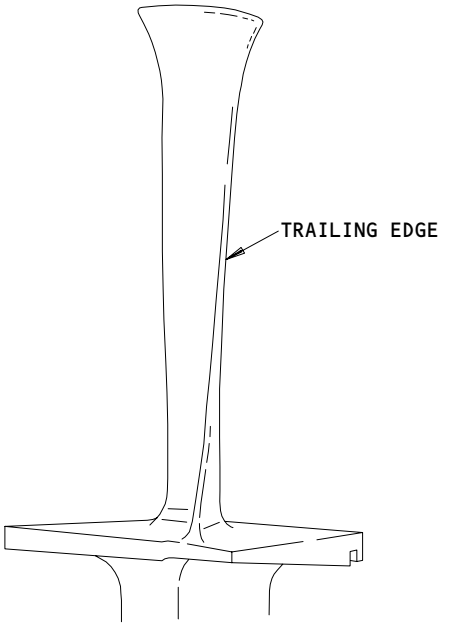
EXAMPLE OF STAGES 4, 5 AND 6
(VIEW IN THE FORWARD DIRECTION)

STAGE	QTY	DIMENSION X	DIMENSION Z (TRUE CHORD)
1ST	57	2.30 INCHES (58.3 mm)	1.65 INCHES (41.91 mm)
2ND	82	1.91 INCHES (48.4 mm)	1.39 INCHES (35.31 mm)
3RD	94	1.57 INCHES (39.9 mm)	1.21 INCHES (30.83 mm)
4TH	97	1.34 INCHES (34.1 mm)	1.35 INCHES (34.29 mm)
5TH	76	1.20 INCHES (30.4 mm)	1.34 INCHES (34.00 mm)
6TH	74	1.06 INCHES (27.0 mm)	1.26 INCHES (32.13 mm)

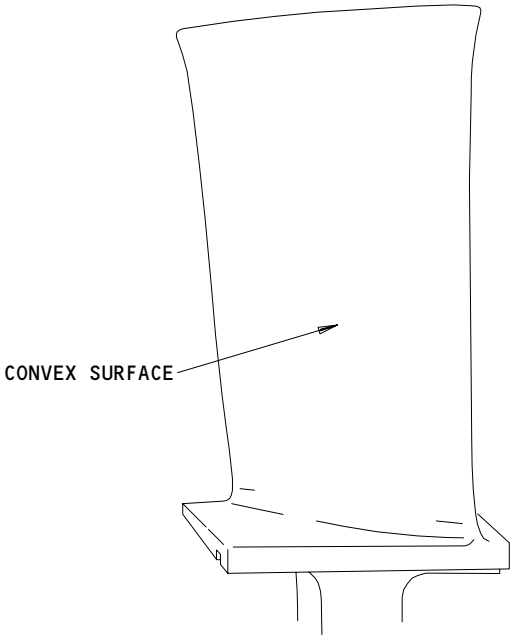
NOTE: ZONE A = 10% OF BLADE AIRFOIL
ZONE B = 40% OF BLADE AIRFOIL
ZONE C = 25% OF BLADE AIRFOIL
ZONE D = 25% OF BLADE AIRFOIL

DE00067440B

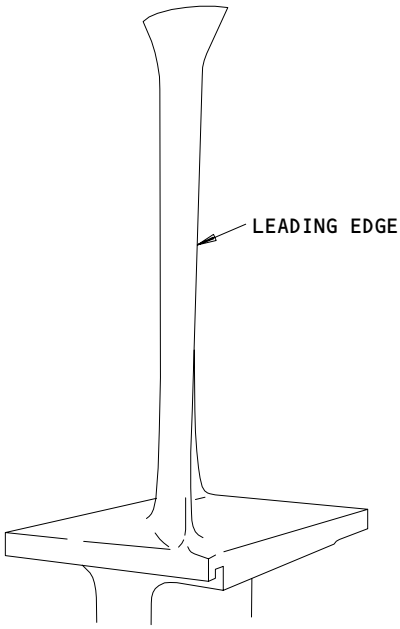
HP Compressor Blades
Figure 604 (Sheet 1)



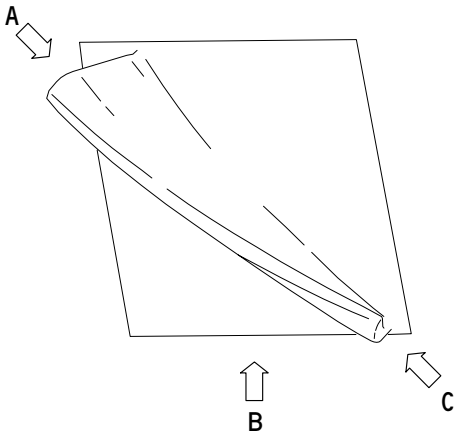
VIEW ON ARROW A



VIEW ON ARROW B



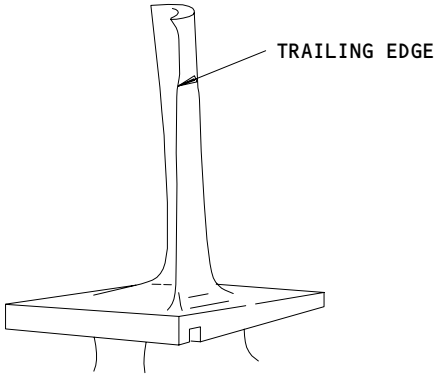
VIEW ON ARROW C



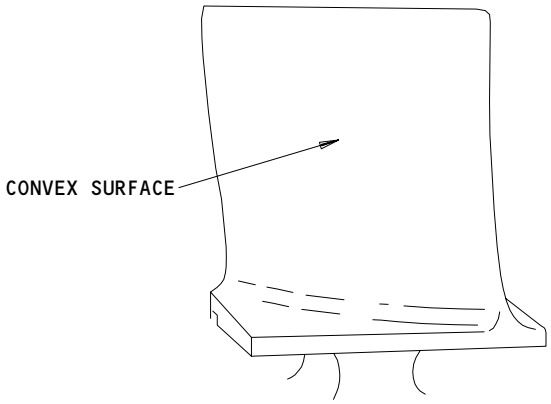
PRODUCTION TIP BENDS
STAGE 1

69088

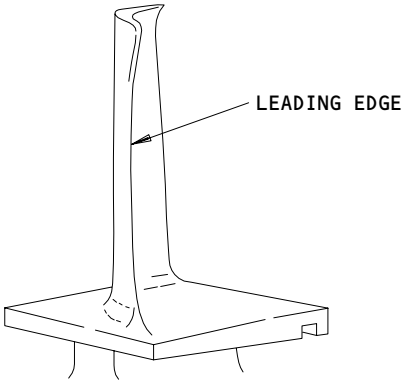
HP Compressor Blades
Figure 604 (Sheet 2)



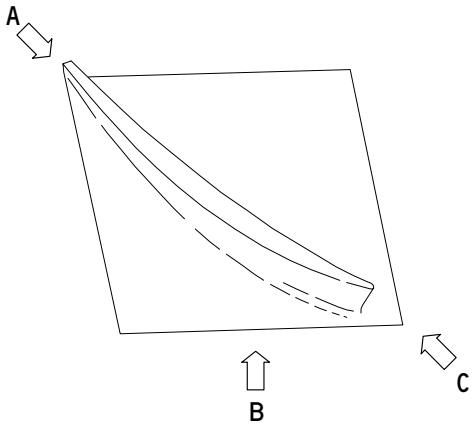
VIEW ON ARROW A



VIEW ON ARROW B



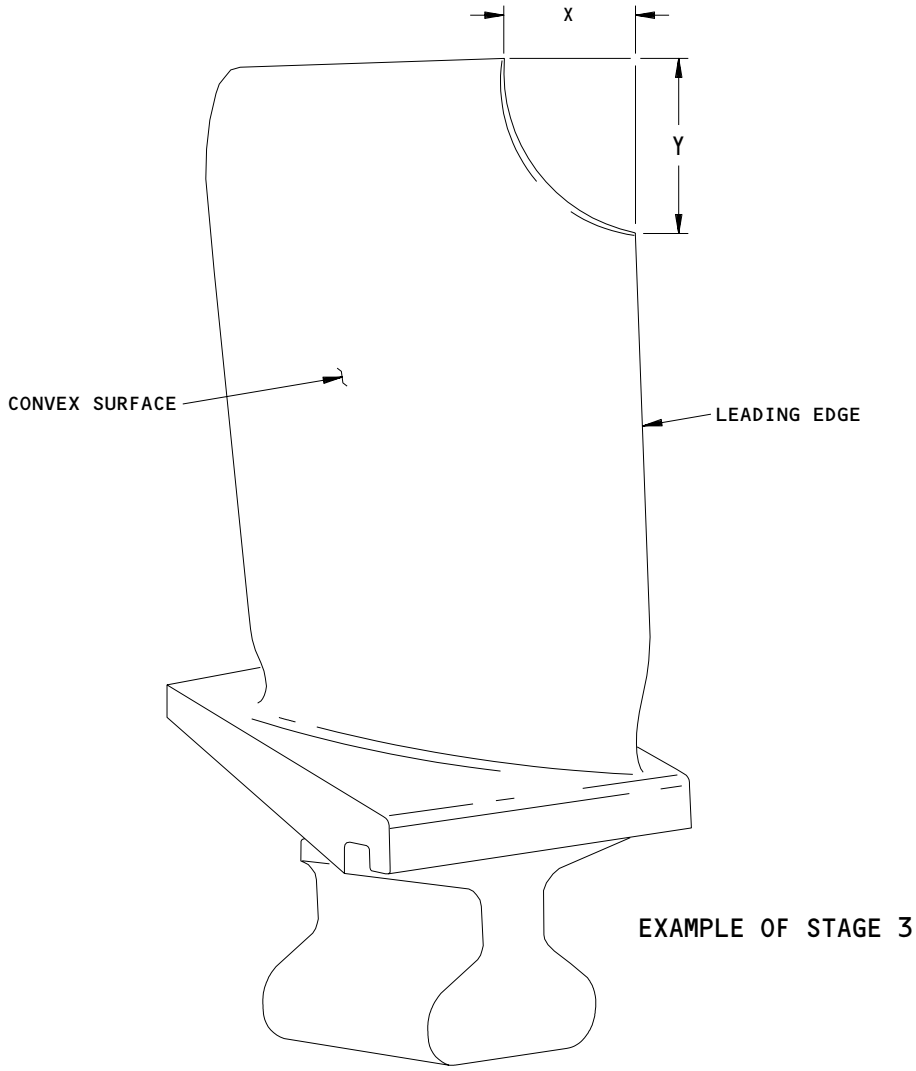
VIEW ON ARROW C



PRODUCTION TIP BENDS
STAGES 2 THRU 6

69298

HP Compressor Blades
Figure 604 (Sheet 3)



EXAMPLE OF STAGE 3

X = 0.250 INCH (6.35 mm)

Y = 0.40 INCH (10.16 mm)

EXAMPLE OF TIP RELEASE

A2962A

HP Compressor Blades
Figure 604 (Sheet 4)

Inspection of the High Pressure (HP) Compressor

b) The maximum depth of the nick or tear is 0.015 inches (0.38 mm).

NOTE: If a digital optical measurement equipment is used, the limit is increased to 0.025 inches (0.64 mm).

4) Dents or bends are permitted if:
   a) There are no related cracks, nicks, or tears.
   b) The blade does not touch a different blade.
5) Blade tip damage and discoloration in zone D.
   a) Accept blade tip discoloration caused by blade tip rub.
   b) Accept material that is bonded to the blade tip or leading edge.
   c) Accept bends or curls that do not have related cracks or tears.
   d) Tip missing up to the limits below (33 percent true chord width) is permitted only if you examine the subsequent stages for damage.

      Stage 1: 0.55 inch (13.9 mm)
      Stage 2: 0.46 inch (11.7 mm)
      Stage 3: 0.40 inch (10.1 mm)
      Stage 4: 0.45 inch (11.4 mm)
      Stage 5: 0.44 inch (11.2 mm)
      Stage 6: 0.42 inch (10.6 mm)

   e) The radial length from the tip of the missing piece has no limit. The missing tip can go from Zone D into Zone C (Fig. 604).
      1 Cracks from the tip, which are initially radial and then become axial, are permitted.

         NOTE: This condition can cause tip corner loss.

Inspection of the High Pressure (HP) Compressor

2 Cracks which start at the leading or trailing edges and then extent radially towards the tip are also permitted.

NOTE: This condition can cause tip corner loss.

3 Cracks, which start at the leading or trailing edges and then extend radially towards the fillet radius are not permitted. For limits on the corner material lose, see the limits above.

(b) Damage is permitted to the limits that follow if you do the inspection procedure.

1) Blade cracks, bends, or curls are permitted up to the limits that follow:

a) Axial cracks, nicks, tears and material loss on one edge in zone A, B, and C are permitted if each length is not more than 10 percent of the true chord width:

Stage 1: 0.17 inch (4.3 mm)
Stage 2: 0.14 inch (3.5 mm)
Stage 3: 0.12 inch (3.0 mm)
Stage 4: 0.14 inch (3.5 mm)
Stage 5: 0.13 inch (3.3 mm)
Stage 6: 0.13 inch (3.3 mm)

b) Axial cracks, nicks, tears and material loss on the two edges in zone A, B, and C are permitted if each length is not more than 5% of the true chord width:

Stage 1: 0.08 inch (2.0 mm)
Stage 2: 0.07 inch (1.7 mm)
Stage 3: 0.06 inch (1.5 mm)
Stage 4: 0.07 inch (1.7 mm)
Stage 5: 0.07 inch (1.7 mm)
Stage 6: 0.06 inch (1.5 mm)

c) Axial cracks, nicks, tears and material loss on one edge in zone D are permitted if each length is not more than 20% of the true chord width:

Stage 1: 0.33 inch (8.4 mm)
Stage 2: 0.28 inch (7.1 mm)
Stage 3: 0.24 inch (6.1 mm)
Stage 4: 0.27 inch (6.8 mm)
Stage 5: 0.27 inch (6.8 mm)
Stage 6: 0.25 inch (6.4 mm)

Inspection of the High Pressure (HP) Compressor

d) Axial cracks, nicks, tears and material loss on the two edges in zone D are permitted if each is not more than 10% of the true chord width:

Stage 1: 0.17 inch (4.3 mm)
Stage 2: 0.14 inch (3.5 mm)
Stage 3: 0.12 inch (3.0 mm)
Stage 4: 0.14 inch (3.5 mm)
Stage 5: 0.13 inch (3.3 mm)
Stage 6: 0.13 inch (3.3 mm)

2) Do three inspections at intervals of between 250 and 350 flight hours and one inspection at between 800 and 1,000 flight hours.
a) If there is no increase in deterioration or damage, the next inspection is subject to airlines decision.

(c) Dress the blade by borescope blending - Refer to FRS7161 (AMM 72-00-00/801).
1) It is not necessary to do the inspection procedure if you repair all cracks, nicks, and tears.

NOTE: It is permitted to do this repair once only on each blade.

NOTE: Make sure that the total number of repaired blades in both the IP and HP Compressor is not more than 10.

NOTE: Make sure that the number of repaired blades in HP Compressor stage 1 is not more than 10.

2) All axial cracks, nicks, or tears can be blended if they are in the limits that follow:
a) Edges that can be blended are listed below:

	HP Compressor Access	
Compressor Stage	Leading Edge	Trailing Edge
1	No	Yes
2	Yes	Yes
3	Yes	Yes
4	Yes	No
5	No	Yes
6	Yes	No

3) HP Compressor stage 1 blades only:
a) Axial cracks, nicks, or tears with length that is not more than 0.09 inch (2.5 mm) of the true chord width on one edge in zones B and C can be blended.

Inspection of the High Pressure (HP) Compressor

4) HP Compressor stage 2 to 6 blades only:
   a) Axial cracks, nicks, or tears with length that is not more than 5 percent of the true chord width on one edge in zone B can be blended:

      Stage 2: 0.07 inch (1.8 mm)
      Stage 3: 0.06 inch (1.5 mm)
      Stage 4: 0.07 inch (1.8 mm)
      Stage 5: 0.07 inch (1.8 mm)
      Stage 6: 0.06 inch (1.5 mm)

   b) Axial cracks, nicks, or tears with length that is not longer than 10 percent of the true chord width on one edge in zone C can be blended.

      Stage 2: 0.14 inch (3.6 mm)
      Stage 3: 0.12 inch (3.0 mm)
      Stage 4: 0.14 inch (3.6 mm)
      Stage 5: 0.13 inch (3.3 mm)
      Stage 6: 0.13 inch (3.3 mm)

5) All HP Compressor stages:
   a) Axial cracks, nicks, or tears with lentgh that is not longer than 10 percent of the true chord width on one edge in zone D can be blended.

      Stage 1: 0.34 inch (8.6 mm)
      Stage 2: 0.28 inch (7.1 mm)
      Stage 3: 0.24 inch (6.1 mm)
      Stage 4: 0.28 inch (7.1 mm)
      Stage 5: 0.26 inch (6.6 mm)
      Stage 6: 0.25 inch (6.4 mm)

(d) If necessary, the acceptance limits to blades in zone D can be increased if you do the steps that follow:
   1) Damage limits to blades in zone D can be increased by 50 percent of the inspection limits for that zone.
      a) Repair before 5 cycles or 25 flight hours. Use the limit that occurs first.

(e) All damage that is more than the limits given - Do not operate the engine until the engine is repaired.

S 846-159-R02

(5) Do the procedure to put the airplane back to its usual condition.

Inspection of HP Compressor Rotor Path Liners Stages 1 to 4

TASK 72-00-00-726-234-R02

6. Inspection of HP Compressor Rotor Path Liners Stages 1 to 4

A. General

(1) Do an inspection of the HP compressor rotor path liners stages 1 to 4 if the engine has had a high power surge.

NOTE: "High power surge" is defined as a surge at cruise power and above.

(2) Access locations are as follows:

Access	Location	View Area
HP1S	B	Stage 1
HP2S	C	Stages 2 and 3
Blanking Plate, HP3 Air Supply	D	Stage 4

B. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

C. Procedure

S 946-235-R02

(1) If not already done, do the procedure to prepare the engine for the inspection.

S 946-236-R02

(2) If not already done, do the procedure to prepare the borescope equipment for the inspection.

S 026-241-R02

(3) Remove the engine from service if:

(a) It was not possible to examine a minimum of 90% of all stages of the HP compressor rotor path liners.

Inspection of HP Compressor Rotor Path Liners Stages 1 to 4

(b) On one individual stage, the liner material has a total missing area greater than 6.20 sq. inches (4000 sq. mm).
(c) One individual area of material loss is greater than 2.325 sq. inches (1500 sq. mm).

NOTE: It is not necessary to measure individual areas of lining loss less than 0.078 sq. inches (50 sq. mm).

(d) The nominal width and area between the blades of the rotor path liner are given below. This will help to calculate the damage to the rotor path liner.

		Width of Rotor Path Liner		Area Between Blades	
Stage	No. of blades	Inch	mm	sq. inches	sq. mm
1	57	1.81	46.0	71.65	1820.0
2	82	1.42	36.0	38.58	980.0
3	94	1.06	27.0	25.20	640.0
4	97	1.06	27.0	24.41	620.0

S 296-242-R02

(4) Do an inspection of the stage 1 HP compressor rotor path liner. Use a 6 mm Flexible borescope.
(a) Put the borescope through the access HP1S (Location B).
1) Move the borescope forward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
(b) Slowly pull the borescope back and examine the surface of the rotor path liner.
1) Make sure that the full width is examined and record the dimensions of all missing rotor path liner.
(c) Remove the borescope from the engine.

S 296-243-R02

(5) Do an inspection of the Stage 2 HP compressor rotor path liner. Use a 6 mm flexible borescope.
(a) Put the borescope through the access HP2S (Location C).
1) Move the borescope forward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
(b) Slowly pull the borescope back and examine the surface of the rotor path liner.
1) Make sure that the full width is examined and record the dimensions of all missing rotor path liner.
(c) Remove the borescope from the engine.

Inspection of HP Compressor Rotor Path Liners Stages 1 to 4

S 296-239-R02

(6) Do an inspection of the Stage 3 HP composer rotor path liner. Use a 6 mm flexible borescope.
  (a) Put the borescope through the access HP2S (Location C).
    1) Move the borescope rearward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
  (b) Slowly pull the borescope back and examine the surface of the rotor path liner.
    1) Make sure that the full width is examined and record the dimensions of all missing rotor path liner.
  (c) Remove the borescope from the engine.

S 296-244-R02

(7) Do an inspection of the Stage 4 HP compressor rotor path liner. Use a 6 mm flexible borescope.
  (a) Put the borescope through the access HP3 air supply blanking plate (Location D).
    1) Move the borescope rearward through the vane and feed 360 degrees in a clockwise direction, as viewed from the rear.
  (b) Slowly pull the borescope back and examine the surface of the rotor path liner.
    1) Make sure that the full width is examined and record the dimensions of all missing rotor path lining.
  (c) Remove the borescope from the engine.

    NOTE: Do not let the borescope fall through the cooling air passages on the outer vane ring. If this happens carefully twist the scope while it is slowly withdrawn from the passage back into the annulus between the compressor blades and the vanes.

S 946-233-R02

(8) Do the procedure to put the airplane back to its usual condition.

Inspection of the Combustion Liners and HPNGV

TASK 72-00-00-206-160-R02

7. Inspection of the Combustion Liners and HPNGV

A. General

(1) After 5 inspections at the intervals given in the limits that follow, you can multiply the inspection interval by two if:
(a) There is no more deterioration and no new defects are found.

(2) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 605, 606 and 607).

(3) It is not necessary to examine the convex surface of the HPNGV airfoil. You can see some of the NGV convex surfaces when you do an inspection of the HP turbine blades. If damage is seen, use the acceptance limits that are given.

B. References

(1) AMM 72-00-00/201, Engine
(2) AMM 72-03-01/401, Compressor Fairings
(3) AMM 73-11-05/401, Fuel Spray Nozzles

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Do the Combustion Liners and HPNGV Inspections (Fig. 605)

S 846-161-R02

(1) If not already done, do the procedure to prepare the airplane for the inspection.

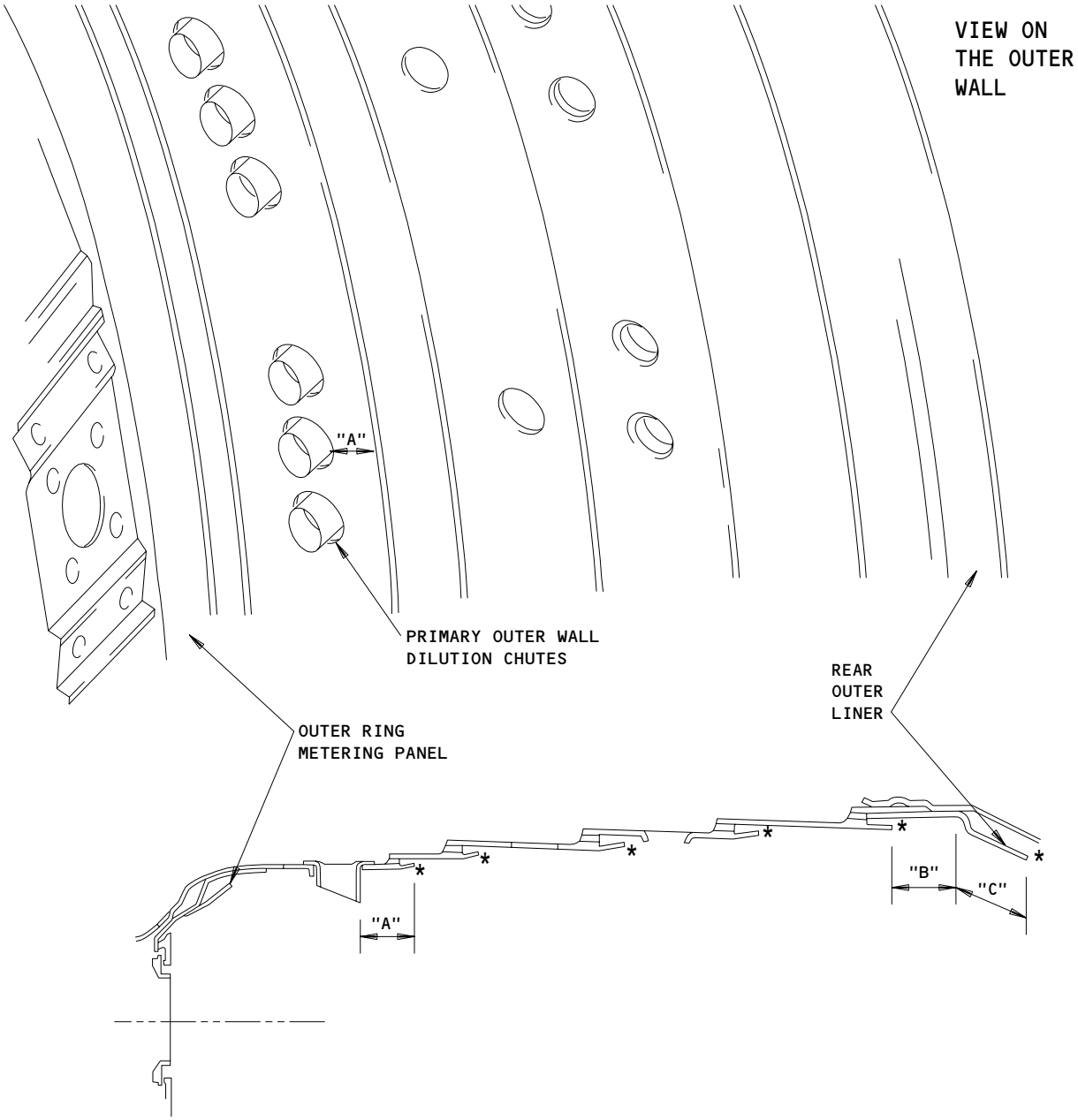
NOTE: If you use the flexible borescope to inspect the combustion liner, you must use no less than four borescope access ports (Fig. 602, Location 'F') that are not adjacent. At the next scheduled borescope inspection of the combustion liner, you must use a different set of four borescope access ports. If this is not possible, you must remove the nine borescope access blanks.

S 496-162-R02

(2) Attach the tool with which you turn the HP system (AMM 72-00-00/201).

S 946-163-R02

(3) If not already done, do the procedure to prepare the equipment for the inspection.



USE THE DIMENSIONS SPECIFIED AS A GUIDE WHEN YOU ASSESS THE DAMAGE

ENGINES WITHOUT RR SB 72-8239;
"A" = 0.700 INCH (17.78 mm)

ENGINES WITH RR SB 72-8239;
"A" = 0.600 INCH (15.24 mm)

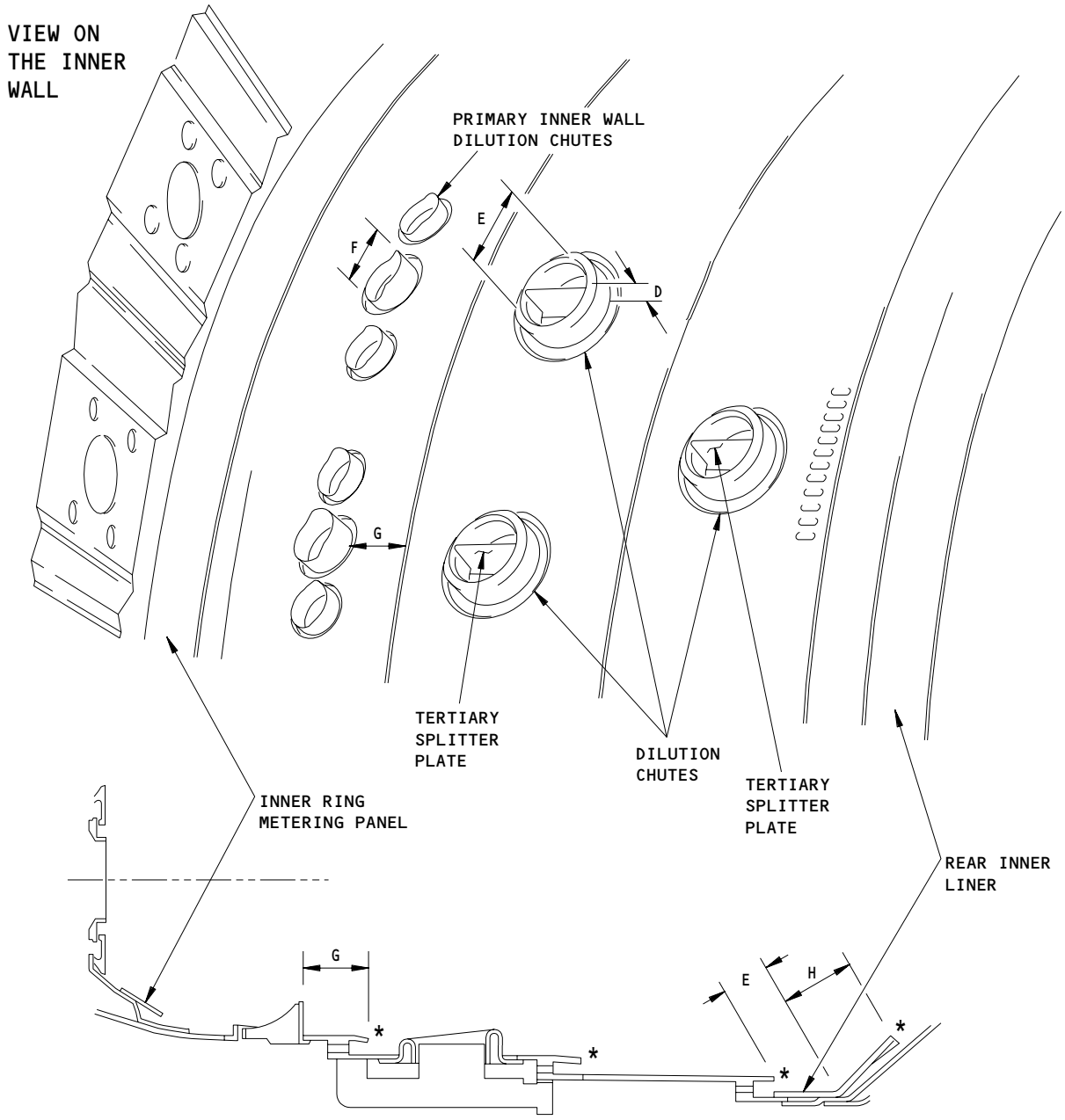
"B" = 1.000 INCH (25.40 mm)

"C" = 0.800 INCH (20.32 mm)

* COOLING LIPS

59364C

Front Combustion Liner Inner and Outer Walls
Figure 605 (Sheet 1)



NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

D = 0.375 INCH (9.53 mm)
E = 1.000 INCH DIA (25.4 mm)
F = 0.700 INCH DIA (17.78 mm)
G = 0.900 INCH (22.86 mm)
H = 1.00 INCH (25.4 mm)
* COOLING LIPS

59536B

Front Combustion Liner Inner and Outer Walls
Figure 605 (Sheet 2)

Inspection of the Combustion Liners and HPNGV

S 296-164-R02

(4) The combustion liner and HPNGV task makes an inspection of these items:

- Front liner inner and outer walls
- Inner and outer ring metering panels and rear inner and outer liners
- Front combustion liner heatshields
- Fuel spray nozzles
- HP Nozzle-Guide-Vane (HPNGV)

S 296-223-R02

(5) Do an inspection of the borescope access holes (Fig. 602, Location 'F') for signs of damage to the sliding rings and the retaining plates.

(a) If you use a rigid borescope for the inspection of the combustion liner, do the steps that follow:

1) Remove the nine borescope access port blanks (Fig. 602, Location 'F').
2) Use the borescope to examine the access port sliding seal ring assembly for the following damage:
   a) Sliding seal rings that are damaged or missing.
   b) Loss of material, deformation or cracking of the retaining plate.

(b) If you use a flexible borescope for the inspection of the combustion liner, do the steps that follow:

1) Remove no less than four borescope access port blanks that are not adjacent (Fig. 602, Location 'F').
2) Make a record of the access ports used.

NOTE: For subsequent inspections you must use four different access ports. If you do not know which access ports were used, you must remove the nine access port blanks.

3) Use the borescope to examine the access port sliding seal ring assembly for the damage that follows:
   a) Sliding seal rings that are damaged or missing.
   b) Loss of material, deformation or cracking of the retaining plate.

NOTE: If you find a sliding seal ring that is damaged or missing, you must do the inspections at all nine positions.

Inspection of the Combustion Liners and HPNGV

S 296-165-R02

(6) After a known or possible birdstrike in the gas generator system, do the inspection of the heat shields on the front combustion liner.

E. Inspection Standards

S 296-224-R02

(1) Do an inspection of these components:

(a) Front liner inner and outer walls as follows:

1) Cracks

a) It is permitted to have axial cracks in the walls or cracks which extend from the cooling lips up to a maximum length of 1.00 inch (25.4 mm).

b) If an axial crack is longer than 1.00 inch (25.4 mm) but less than 1.25 inches (31.75 mm), do the inspection of the crack(s) again at intervals of not more than 250 hours.

c) If an axial crack is longer than 1.25 inches (31.75 mm), reject the engine in less than 100 hours.

d) If a circumferential crack is longer than 1.00 inch (25.4 mm), do the inspection again at intervals of not more than 250 hours.

e) If a circumferential crack is longer than 1.25 inches (31.75 mm), reject the engine in less than 100 hours.

f) It is permitted to have axial cracks connected to circumferential cracks. You must obey the limits that follow:

1. The axial cracks are not longer than 1 inch (25.4 mm). If axial cracks are longer than 1 inch (25.4 mm) but less than 1.25 inches (31.75 mm), do the inspection again at intervals of not more than 250 hours.

2. The circumferential cracks are not longer than 1.00 inch (25.4 mm). If the circumferential cracks are longer than 1.00 inch (25.4 mm), do the inspection again at intervals of not more than 250 hours.

3. Material that has extended into the gas stream must not extend more than 0.50 inch (12.7 mm). If material has extended into the gas stream more than 0.50 inch (12.7 mm), reject the engine in less than 100 hours.

Inspection of the Combustion Liners and HPNGV

4. Each area of lifted material is not more than 0.25 sq inch (161.3 sq mm). If the lifted material has released, use the limit for holes.

   - If the area of lifted material is more than 0.25 sq inch (161.3 sq mm) but less than 0.50 sq inch (322.6 sq mm), do the inspection again at intervals of not more than 250 hours.

   - If the area of lifted material is more than 0.50 sq inch (322.6 sq mm) but less than 1.00 sq inch (645.2 sq mm), do the inspection again at intervals of not more than 130 hours.

   - If the area of lifted material is more than 1.00 sq inch (645.2 sq mm) but less than 2.00 sq inch (1290.3 sq mm), you must remove the engine in less than 15 hours.

5. If a crack length is more than 1.25 inches (31.75 mm), reject the engine in less than 100 hours.

g) It is permitted to have circumferential cracks together with axial cracks between the two adjacent dilution chutes, if you obey the limits that follow:

NOTE: Dilution chutes in each group of three are adjacent.

1. The cracks are examined in less than 250 hours.
2. Material that has extended into the gas stream must not extend more than 0.50 inch (12.7 mm).
3. If more than the above limits, reject the engine in less than 100 hours.

h) Cracks must not extend forward more than 0.50 inch (12.7 mm) from the leading edge of the first row of dilution chutes on the inner or outer wall.

i) It is permitted to have cracks in the dilution chute material.

j) If a large quantity of material could be released from the location, reject the engine in less than 50 hours.

2) Burns, erosion and distortion

a) It is permitted to have burns or erosion, with distortion or missing material, at more than one position around the cooling ring lips if you obey the limits that follow:

1. The axial length of missing material is not more than 0.50 inch (12.7 mm).
2. If the axial length of the missing material is more than 0.50 inch (12.7 mm) but less than 0.75 inch (19.05 mm), examine in less than 500 hours.

Inspection of the Combustion Liners and HPNGV

3. If the axial length of the missing material is more than 0.75 inch (19.05 mm), reject the engine in less than 50 hours.

b) It is permitted to have burns or erosion of the dilution chutes.

c) It is permitted to have general distortion if there are no signs of holes.

3) Holes

a) It is permitted to have a hole caused by burns and/or cracks at a maximum of 4 locations if the size of the hole is not more than 0.250 square inches (161.29 sq. mm).

b) If the hole is larger than the above limit, you must make an inspection of the rear inner and outer combustion liners and the HPNGV at the time intervals given below.

1. If a hole is larger than 0.250 square inches (161.29 sq. mm) but less than 0.50 square inches (322.58 sq. mm), do the inspection again before 250 hours.

2. If a hole is larger than 0.50 square inches (322.58 sq. mm) but less than 1.00 square inches (645.16 sq. mm), do the inspection again before 130 hours.

3. If a hole is larger than 1.00 square inches (645.16 sq. mm) but less than 2.00 square inches (1290.32 sq. mm), do the inspection again before 65 hours.

4. If a hole is larger than 2.00 square inches (1290.29 sq. mm), you must remove the engine before 15 hours.

4) Loss of thermal barrier coating:

a) It is permitted to have loss of the thermal barrier coating.

5) Tertiary splitter plates that are loose or gone

a) It is permitted to have this damage if you obey the limits that follow:

1. Examine the rear inner combustion liner and make sure the damage is not more than the limits given for that inspection.

2. Examine the HP nozzle-guide-vanes and make sure the damage is not more than the limits given for that inspection.

3. Examine the HP turbine blades and make sure the damage is not more than the limits given for that inspection.

4. Examine the rear inner combustion liner, the HP nozzle-guide-vanes and the HP turbine blades again before 130 hours.

Inspection of the Combustion Liners and HPNGV

(b) Dilution Chutes
1) Material Loss
a) It is permitted to have up to a total of 4 inner or outer wall primary dilution chutes missing with a maximum of 1 missing in any fuel spray nozzle group under the following conditions:

NOTE: A fuel spray nozzle group of the primary dilution chutes is made up of 3 inner and 3 outer wall primary dilution chutes. The middle one of each group is axially in line with the fuel spray nozzle when looking forward.

1. The condition of the HP Nozzle Guide Vanes are acceptable (AMM 72-00-00/601), and they do not show signs of unusual deterioration axially aft of the dilution chute loss position.
2. A repeat inspection of the combustion liner and HP NGV is made at 500 hour intervals. Make sure the rear liners and HP NGV's axially aft of the chute loss position are carefully inspected.
3. If no unusual deterioration is seen after the first two 500 hour inspections, you may continue to borescope the engine at the regular intervals.

(c) Front liner inner and outer ring (flare) of the metering panel
1) Cracks
a) It is permitted to have axial cracks if the ring metering panel has not lifted more than 0.20 inch (5.08 mm).
b) Circumferential cracks are permitted, not more than 1.00 inch (25.4 mm) in length, with or without adjacent axial cracks, at a maximum of 10 locations if you obey the limits that follow:
1. The ring metering panel has not lifted more than 0.20 inch (5.08 mm).

c) It is permitted to have cracks that are more than the above steps if you obey the limits that follow:
1. Examine the front liner, inner and outer walls and you find it serviceable.
2. You must make the inspection of the inner and outer walls again before 500 hours of engine operation.
3. You must make the inspection of the metering panel again before 500 hours of engine operation.
4. The dimension of material that could be released is not more than 1.00 inch (25.4 mm) circumferentially and 0.75 inch (19.05 mm) axially.

Inspection of the Combustion Liners and HPNGV

5. If the dimension of material that could be released is more than 1.00 inch (25.4 mm) circumferentially and 0.75 inch (19.05 mm) axially, reject the engine in less than 50 hours.

2) Burns and erosion
   a) It is permitted to have burns and erosion that are not more than 3.00 inches (76.2 mm) in length circumferentially, and are less than 0.50 inch (12.7 mm) from the rearward lip.
   b) It is permitted to have burns and erosion that are more than the above step if you obey the limits that follow:
      1. Examine the inner and outer walls and make sure the damage is less than the limits given for that inspection.
      2. You must make the inspection of the inner and outer walls again before 500 hours of engine operation.

3) Distortion

   a) It is permitted to have ring metering panels that have moved up from their correct position or are bent not more than 0.20 inch (5.08 mm) if you follow these steps:

      1. Examine the inner and outer walls and obey the inspection limits.
      2. You must make an inspection again after 500 hours of engine operation.

4) Missing material
   a) It is permitted to have missing material (holing) if you obey the limits that follow:
      1. Not more than 1.50 square inches (967.74 sq. mm) is gone at no more than 10 positions.
      2. Examine the inner and outer walls and make sure the damage is less than the limits given for that inspection.
      3. Examine the HP nozzle-guide-vanes and make sure the damage is less than the limits given for that inspection.
   b) It is permitted to have a loss of the thermal barrier layer.

(d) Rear inner and outer liners (Fig. 605)

1) Cracks
   a) It is permitted to have axial cracks if you obey the limits that follow:
      1. The crack length is less than 1.00 inch (25.4 mm) and the crack is closed.
      2. There is a minimum of 1.00 inch (25.4 mm) of good material between adjacent cracks.

Inspection of the Combustion Liners and HPNGV

b) It is permitted to have more than one crack in the cooling lip if a crack is not more than 0.80 inch (20.3 mm) in length.
c) It is permitted to have circumferential cracks if you obey the limits that follow:
1. The cracks are not less than 1.00 inch (25.4 mm) from the cooling lip and not longer than 1.00 inch (25.4 mm) in length.
d) It is permitted to have cracks more than the limits above if:
1. You must examine the crack in less than 250 hours.
2. If the material that could be released is more than 1.00 inch (25.4 mm) circumferentially and 0.75 inch (19.05 mm) axially, reject the engine in less than 50 hours.

2) Burns, erosion and distortion
a) It is permitted to have burns and erosion of the cooling lip.
b) It is permitted to have distortion in one area around the cooling lip if it is not closed fully.

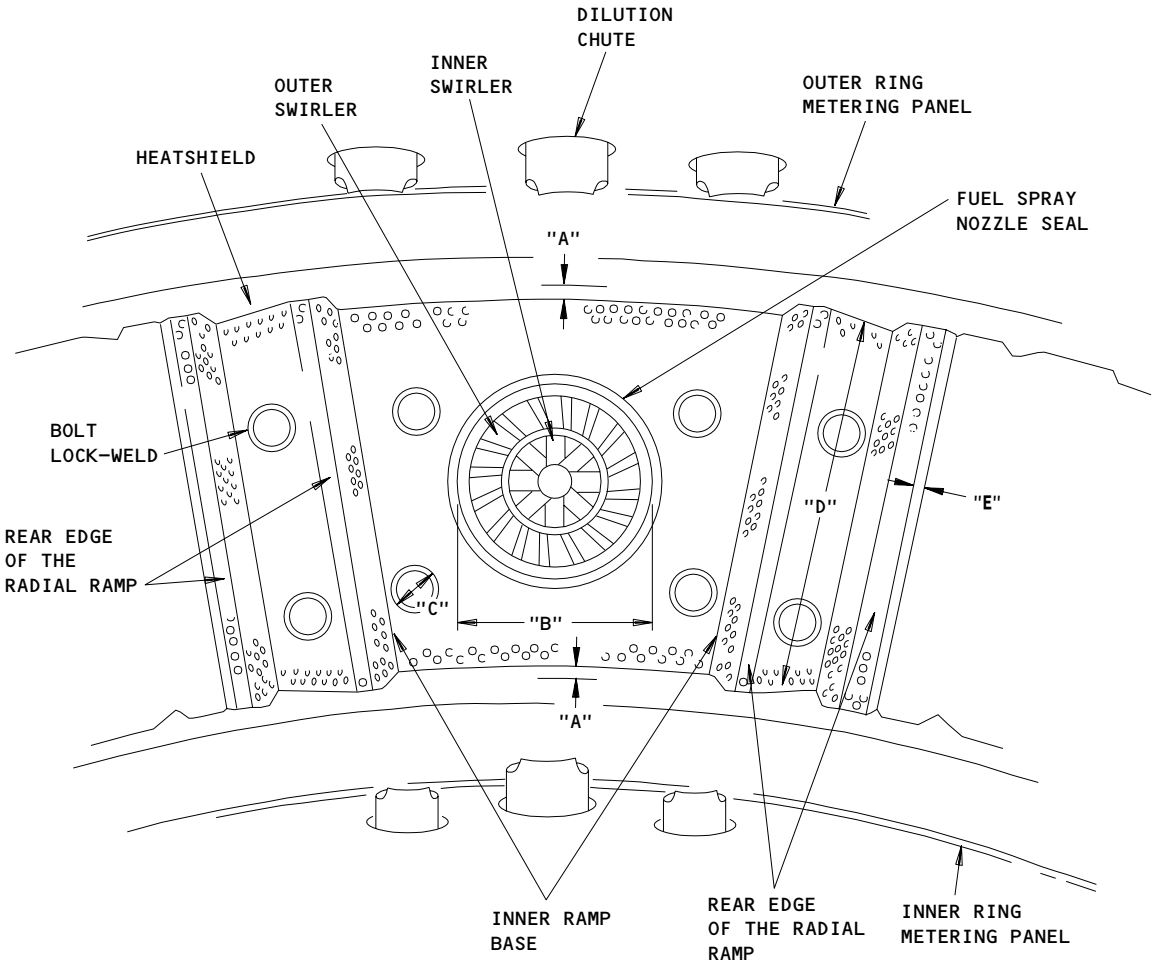
3) Holes (Fig. 605)
a) It is permitted to have holes in areas 'C' or 'H' in the corrugated flares.
b) It is permitted to have holes in areas 'B' or 'E' if you obey the limits that follow:
1. The damaged area is less than or equal to 1.000 square inches (645 sq. mm).
2. The damaged area is more than 1.000 square inches (645 sq. mm), but less than 2.000 square inches (1290 sq. mm), you must make an inspection again before 500 hours of engine operation.

4) Loss of thermal barrier coating:
a) It is permitted to have loss of the thermal barrier coating.

(e) Front combustion liner heatshields .

NOTE: The limits that follow are for one heatshield. Limits for loss of material and holes are for the total amount of such damage in one heatshield.

1) Cracks (Fig. 606)
a) One crack which comes from the burner aperture at the 6 and 12 o'clock positions and which extends across the full section of the heatshield at these positions is permitted if:
1. The cracks are closed.
2. The heatshield adjacent to the crack has not lifted.



USE THE DIMENSIONS SPECIFIED AS A GUIDE WHEN YOU ASSESS THE DAMAGE

"A" = 0.030 INCH (0.76 mm)

"B" = 1.500 INCH (38.1 mm)

"C" = 0.250 INCH (6.35 mm)

"D" = 2.650 INCH (67.36 mm)

"E" = MUST BE CONSISTENT AT EACH POSITION AROUND THE COMBUSTION CHAMBER RELATIVE TO THE ADJACENT SHIELD.

66853C

Front Combustion Liner Heatshield
Figure 606

Inspection of the Combustion Liners and HPNGV

b) It is permitted to have one crack from fuel spray nozzle opening if you obey the limits that follow:
   1. At the 3 and 9 o'clock positions that extend circumferentially.
c) Cracks more than the above two limits can be accepted if you obey the limits that follow:
   1. For cracks that connect, material must not extend more than 0.30 inch (7.62 mm) into the gas stream.
   2. Material release must not be possible in a short time.
   3. All retaining bolts must be in place with no sign that the bolt will come out.

(f) If cracks are more than the above limits, reject the engine in less than 100 hours.

1) Radial cracks along the rear edges of the radial ramps or cracks along the inner ramp base are permitted if you obey these limits:
   a. The cracks are not more than 1.50 inch (38.1 mm) in length.
   b. If the cracks are more than the limits, you must do an inspection again before 130 hours.
2) Circumferential cracks that are less than 0.50 inch (12.7 mm) in length are permitted.
   a. If the cracks are more than the limits, you must do an inspection again before 130 hours.
3) Missing retaining bolts

CAUTION: IF YOU REMOVE A FUEL SPRAY NOZZLE FOR ACCESS TO A MISSING RETAINING BOLT, YOU MUST OBEY THE PROCEDURE IN AMM 73-11-05/401. IF YOU INSTALL THE FUEL SPRAY NOZZLE INCORRECTLY, A SERIOUS ENGINE FIRE CAN OCCUR. YOU WILL ALSO CAUSE DISTORTION OF THE FUEL MANIFOLD TO BURNER FUEL TUBE.

a) It is permitted to have one missing retaining bolt if you do these steps:
   1. You must do the HPNGV inspection procedure.
   2. You must do the HP turbine blade inspection procedure.
   3. Remove the loose bolt from the engine. If you cannot remove the loose bolt, replace the engine before 250 hours or do these steps:
      a. Make sure the retaining bolt is not in the cavity behind the heatshield.
      b. Make sure there is no damage to the fuel spray nozzle adjacent to the missing bolt.

Inspection of the Combustion Liners and HPNGV

c. Make sure there is no deterioration of the heatshield that can cause release of the heatshield material.
d. Do an inspection of the combustor at intervals of 500 hours.

4. If more than one bolt is missing, replace the engine before 250 hours.

4) Cracks in the lockweld for the heatshield retaining bolt:
a) It is permitted to have cracks in the heatshield retaining bolt lockwelds if you obey the limits that follow:
1. There are no signs that the bolt has or will come out.
2. If a bolt has started to come out but not released, examine the bolt in less than 500 hours.

3. If the the bolt has released, use the limit for bolt loss.

NOTE: Be careful when you examine this area around the retaining bolt lockwelds because it can often be mistaken for cracks.

5) Loss of material (holing)
a) Holes that are not more than 0.16 square inches (103.23 sq. mm) are permitted.

NOTE: It is possible that soot collected on the heatshield ramps can look like holes. A continuous line of cooling holes through the dark area is a sign that the area is not a hole.

b) It is permitted to have holes that are more than 0.16 square inches (103.23 sq. mm) but less than 0.250 square inches (161.29 sq. mm) if you do these inspections before the next 130 hours:
1. Inner and outer walls of the front liner
2. Inner and outer liners of the rear liners
3. HP nozzle-guide-vanes
4. HP turbine blades

c) If there is more than 0.25 square inches (161.29 sq. mm) of missing material (holes), you must remove the engine before 30 hours.

6) Corrosion or oxidation (burning)
a) Burning or oxidation is permitted if you obey the limits that follow:
1. When a hole is visible, use the limits for holing.

Inspection of the Combustion Liners and HPNGV

b) It is permitted to have holes that are more than 0.16 square inches (103.23 sq. mm) but less than 0.250 square inches (161.29 sq. mm) if you do these inspections before the next 130 hours:
1. Inner and outer walls of the front liner
2. Inner and outer liners of the rear liners
3. HP nozzle-guide-vanes
4. HP turbine blades

c) If there is more than 0.25 square inches (161.29 sq. mm) of missing material (holes), you must remove the engine before 30 hours.

7) Lifting (Fig. 606).
a) If the dimension of gap A or gap E increases relative to the adjacent shield (heatshield lifting) - reject the engine.

(g) Fuel spray nozzle (Fig. 606)
1) Missing inner and outer swirler vane
a) If the inner or outer swirler vane is gone, then examine the HP turbine blades and the H.P.N.G.V.'s.
1. If the HP turbine blades and the H.P.N.G.V.'s are serviceable, replace the fuel spray nozzle (AMM 73-11-05/401).
2. If the HP turbine blades and the H.P.N.G.V.'s are not serviceable, replace the engine.

2) Missing shroud ring
a) If the shroud ring installed in the heatshield seal is gone, do an inspection of the HP turbine blades and the H.P.N.G.V.'s.
1. If the HP turbine blades and the H.P.N.G.V.'s are serviceable, replace the fuel spray nozzle (AMM 73-11-05/401).
2. If the HP turbine blades and the H.P.N.G.V.'s are not serviceable, replace the engine.

Inspection of the Combustion Liners and HPNGV

3) Make sure that the fuel spray nozzles are located correctly in the fuel spray nozzle seals.
   a) To show if the fuel spray nozzles that are not aligned with the borescope access holes, are correctly located in the fuel spray nozzle seals (Ref. Fig. 611, Fig. 612 and Fig. 613).
      1. If the fuel spray nozzle is not located correctly (Ref. Fig. 611 and Fig. 612) and the fuel spray nozzle has been correctly installed and fastened to the engine case, reject the engine.
   b) The fuel spray nozzles aligned with the borescope ports must be concentric with the fuel spray nozzle seals (Ref. Fig. 606). If the fuel spray nozzles are not concentric, and the fuel spray nozzles have been correctly installed and fastened to the engine case, reject the engine.

(h) Combustion Support Case
   1) It is permitted to have sliding seal rings missing from the borescope access port (Fig. 602, Location 'F'). Refer to the limits below and these conditions:
      a) There is no deterioration of the combustion liner, support case or the H.P.N.G.V.'s which is different from the deterioration at the remaining locations.
      b) You must do a test of the bleed valves (AMM 71-00-00/501).

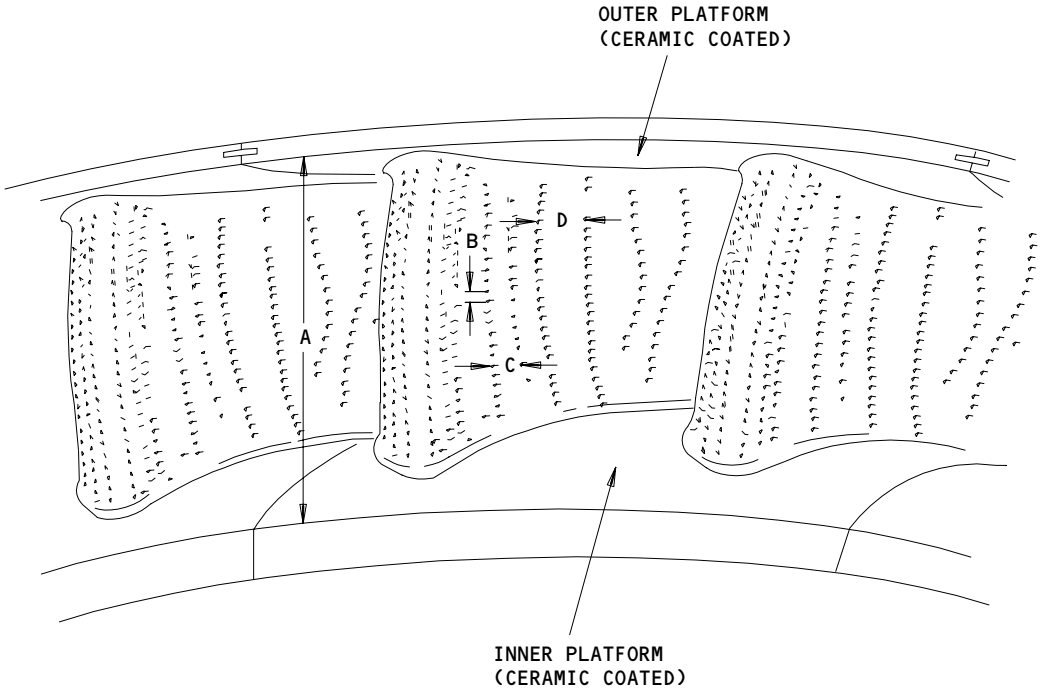
         NOTE: If the bleed valve test is not done immediately you must do the inspections in the intervals listed under 'Bleed Valves Not Tested'. If the bleed valve test has been completed, you may use the 'Bleed Valves Serviceable' inspection interval.

Inspection of the Combustion Liners and HPNGV

COMBUSTION SUPPORT CASE INSPECTION CRITERIA		
Number of Missing Sliding Seal Rings	Inspection Intervals	
	Bleed Valves Serviceable	Bleed Valves Not Tested
1	Usual borescope interval	Maximum 250 cycles
2	Usual borescope interval	Maximum 100 cycles
3	Maximum 250 cycles	Reject the engine
4	Maximum 100 cycles	
More than 4	Reject the engine	

2) Cracks, deformation or material loss from the sliding seal ring retaining plate.
   a) Frettage of a seal through a retaining plate can cause cracks, deformation or material loss. You can see the damage on the outer surface of the retaining plate. Use the limits for a missing sliding seal ring given above.

(i) High Pressure Nozzle-Guide-Vanes (HPNGV) (Fig. 607)
1) Cracks (Airfoil surface)
   a) It is permitted to have axial cracks in the concave surface if each is not longer than 1.00 inch (25.4 mm).
      1. Make sure the material does not lift more than 0.020 inch (0.508 mm) into the gas stream.
   b) It is permitted to have radial cracks in the concave surface if each is not longer than 1.00 inch (25.4 mm).
      1. Make sure the material does not lift more than 0.020 inch (0.508 mm) into the gas stream.



A = 2.952 INCHES (75.0 mm)

B = 0.078 INCH (2.0 mm)

C = 0.236 INCH (6.0 mm)

D = 0.500 INCH (12.7 mm)

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

66855

HP Nozzle Guide Vane
Figure 607

Inspection of the Combustion Liners and HPNGV

c) Accept axial or radial cracks in the concave surface which are longer than 1.00 inch (25.4 mm) with these conditions.
   1. Make sure the material does not lift more than 0.020 inch (0.508 mm) into the gas stream.
   2. The cracks do not come together.
   3. You must do an inspection again in less than 500 hours.
   4. If material has lifted into the gas stream more than 0.020 inch (0.508 mm), reject the engine in less than 50 hours.

d) Radial cracks in the airfoil convex surface.
   1. Accept radial cracks less than 1.00 inch (25.4 mm) long if:
      - All material that has lifted into the gas stream does not lift more than 0.020 inch (0.508 mm).
      - The surface has no bulges.
   2. Accept radial cracks more than 1.00 inch (25.4 mm) long, but less than 2.00 inches (50.8 mm) long if:
      - All material that has lifted into the gas stream does not lift more than 0.020 inch (0.508 mm), or
      - The surface does not have bulges
      - Do an inspection at 500-hour intervals.
   3. Radial cracks more than 2.00 inches (50.8 mm) long, or:
      - Material has lifted into the gas stream more than 0.020 inch (0.508 mm), or
      - Surfaces that have bulges
      - Reject the engine in less than 50 hours.

e) Axial cracks in the vane leading edge are permitted with these conditions:
   1. Each crack is not longer than 1.00 inch (25.4 mm).
   2. The cracks do not extend into the film cooling holes of the convex surface.
   3. The material has not lifted into the gas stream more than 0.020 inch (0.508 mm).
   4. If material has lifted into the gas stream more than 0.020 inch (0.508 mm), reject the engine in less than 50 hours.

f) Radial cracks in the vane leading edge are permitted with these conditions:
   1. Each crack is not longer than 1.00 inch (25.4 mm).
   2. The cracks do not extend into the film cooling holes of the convex surface.
   3. The material has not lifted into the gas stream more than 0.020 inch (0.508 mm).
   4. If material has lifted into the gas stream more than 0.020 inch (0.508 mm), reject the engine in less than 50 hours.

Inspection of the Combustion Liners and HPNGV

g) Axial or radial cracks in the vane leading edge longer than 1.00 inch (25.4 mm) are permitted with these conditions:
   1. The material has not lifted into the gas stream more than 0.020 inch (0.508 mm).
   2. If material has lifted into the gas stream more than 0.020 inch (0.508 mm), reject the engine in less than 50 hours.
   3. You must do an inspection again in less than 500 hours.

h) Axial or radial cracks in the vane leading edge that extend into the film cooling holes of the convex surface are permitted with these conditions:
   1. The material has not lifted into the gas stream more than 0.020 inch (0.508 mm).
   2. You must do an inspection again in less than 500 hours.
   3. If material has lifted into the gas stream more than 0.020 inch (0.508 mm), reject the engine in less than 50 hours.

2) Axial cracks to convex surface:
   a) Accept axial cracks up to 1.00 inch (50.8 mm) long, if:
      - Material that has lifted into the gas stream does not lift more than 0.020 inch (0.508 mm), or
      - The surface does not have bulges.
   b) Accept axial cracks more than 1.00 inch (25.4 mm) long, but less than 2.00 inches (50.8 mm) long, if:
      - All material that has lifted into the gas stream does not lift more than 0.020 inch (0.508 mm), or
      - The surface does not have bulges
      - Do the inspection again at 500 hour intervals.
   c) Axial cracks more than 2.00 inches (50.8 mm) long, or:
      - Material that has lifted more than 0.020 inch (0.508 mm), or
      - The surface has bulges
      - Reject the engine in less than 50 hours.
   d) Replace the engine in less than 50 hours if the material has lifted more than 0.020 inch (0.508 mm).
   e) Replace the engine in less than 50 hours if the cracks connect and the material can break away from the airfoil surface.
3) Cracks in the inner and outer platform
   a) It is permitted to have cracks in the ceramic layer.
   b) It is permitted to have cracks in the inner and outer platform if the material cannot break away.
   c) Replace the engine in less than 50 hours if the material can break away.

Inspection of the Combustion Liners and HPNGV

4) Material decrease
   a) Replace the engine in less than 50 hours if the material has lifted into the gas stream more than 0.020 inch (0.508 mm) or can break away from the airfoil surface.
5) Burns or erosion
   a) It is permitted to have burns, erosion and a decrease in the quantity of the ceramic layer if they have not gone into the inner or outer platform.
      1. If you find burns on the inner or outer platforms, make sure the fuel spray nozzles are in the correct location in the heatshield seals.
      2. Also, you must do an inspection of the front combustion liner.
   b) Replace the engine in less than 50 hours, if burns or erosion have gone into the inner or outer platform.
   c) Burns, erosion, or holes that go into the vane leading edge are permitted if less than 30 percent of the leading edge is gone.
      1. Make sure no more material will release.
   d) Burns, erosion, or holes that go into the vane leading edge are permitted if less than 40 percent of the leading edge is gone.
      1. Make sure no more material will release.
      2. You must do the inspection again in less than 500 hours.
   e) Replace the engine in less than 50 hours, if more than 40 percent of the leading edge is gone.
6) Foreign object damage
   a) It is permitted to have dents in the airfoil section with these conditions:
      1. You must do an inspection of the turbine blades.
   b) It is permitted to have nicks and tears in the vane trailing edge with these conditions:
      1. The nicks and tears do not extend forward of the rear row of film cooling holes.
      2. You see no burns.
      3. Do an inspection of the turbine blades.
   c) Reject the engine in less than 50 hours if you find one or more of these conditions:
      1. Cracks, nicks or tears in the vane leading edge that extend forward of the rear row of film cooling holes.

         NOTE: You must also do an inspection of the turbine blades.

   d) Replace the engine if you see any blockage between the vanes.

Inspection of the Combustion Liners and HPNGV

S 846-166-R02

(2) Do the procedure to put the airplane back to its usual condition.

Inspection of the High Pressure (HP) Turbine

TASK 72-00-00-206-167-R02

8. Inspection of the High Pressure (HP) Turbine

A. General

(1) The subsequent operations give the HP Turbine inspection procedure and the standards you can accept.

(2) Use an impact extractor if it is not easy to remove the plugs.

(3) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 608).

(4) Inspection through the borescope access holes.

NOTE: Deterioration of the high pressure nozzle guide vane support ring heatshield may allow axial and circumferential movement of the heatshield over the support ring. After removal of the borescope plug this may partially block the HP turbine borescope hole "G". The heatshield may be repositioned by hand to allow ease of entry of the borescope. Looseness of the heatshield will not affect engine performance.

B. References

(1) AMM 72-00-00/201, Engine

(2) AMM 72-03-01/401, Compressor Fairings

C. Access

(1) Location Zones

410 Power Plant Nacelle Left

420 Power Plant Nacelle Right

D. Do the HP Turbine Inspection (Fig. 608)

S 846-168-R02

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 496-169-R02

(2) Attach the tool with which you turn the HP system (AMM 72-00-00/201).

S 946-170-R02

(3) If not already done, do the procedure to prepare the equipment for the inspection.

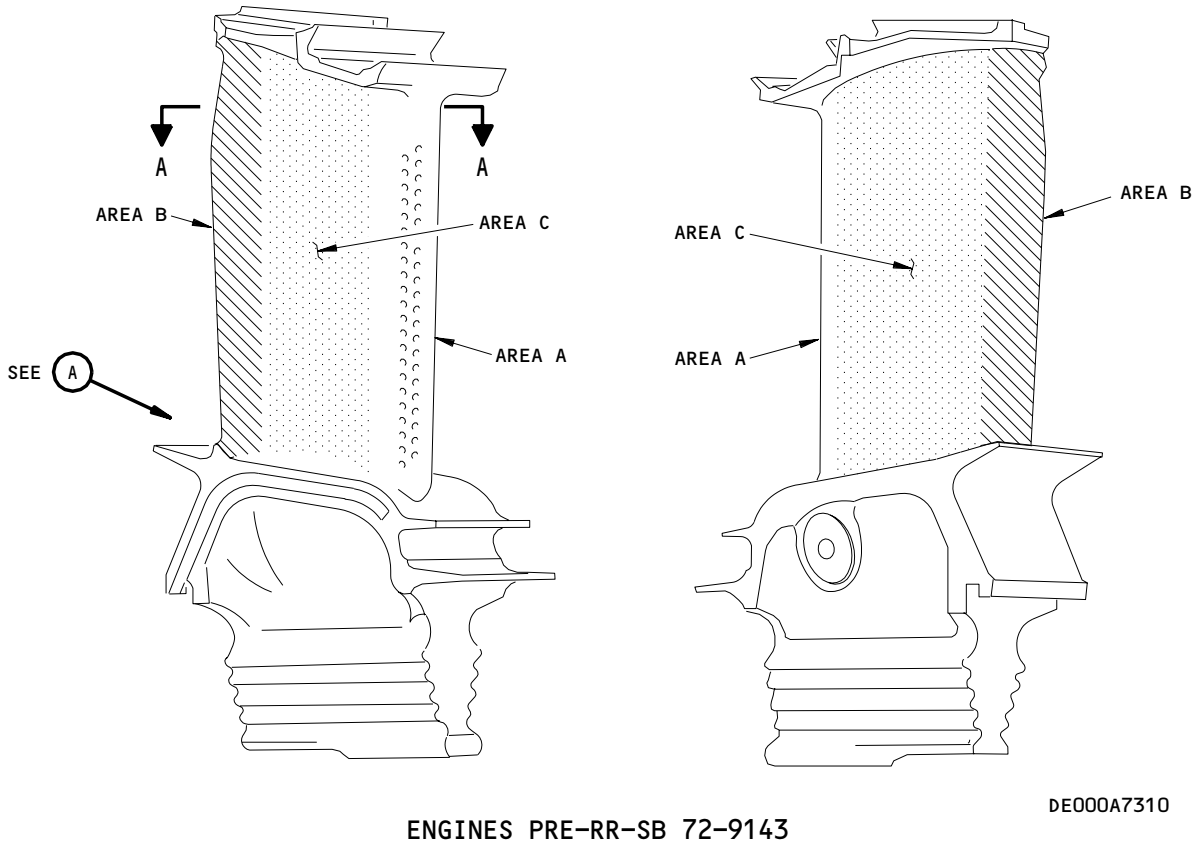
S 296-171-R02

(4) Do an inspection of the HP turbine blades as follows:

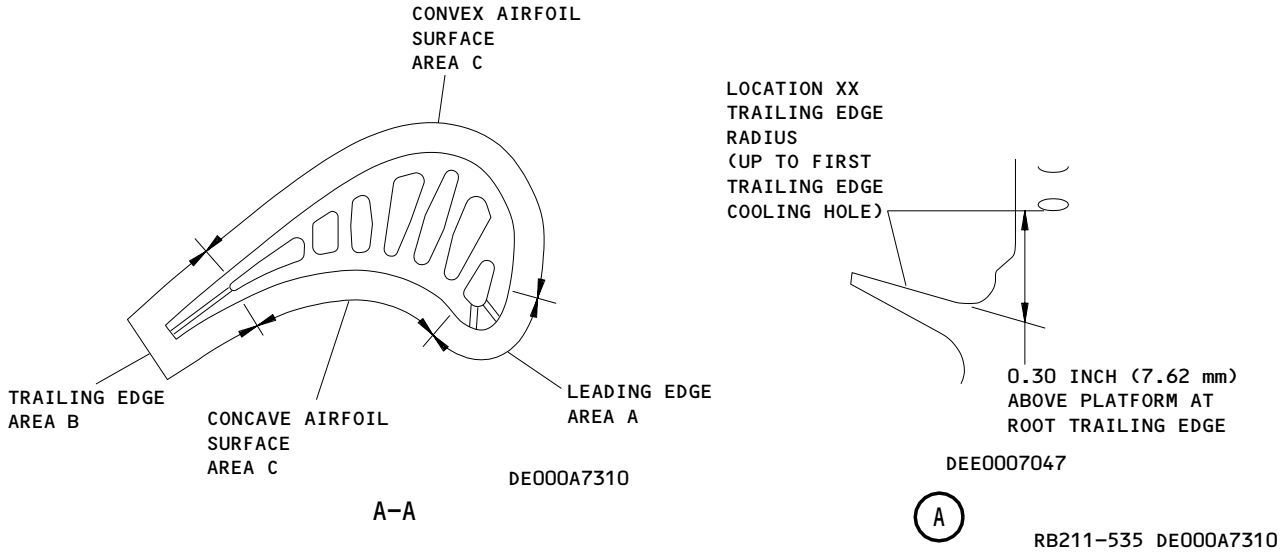
(a) Concave and convex airfoil surfaces (Area C)

1) Cracks

a) It is not permitted to have axial cracks.



ENGINES PRE-RR-SB 72-9143



HP Turbine Blades
Figure 608 (Sheet 1)

EFFECTIVITY
ENGINES PRE RR SB 72-9143

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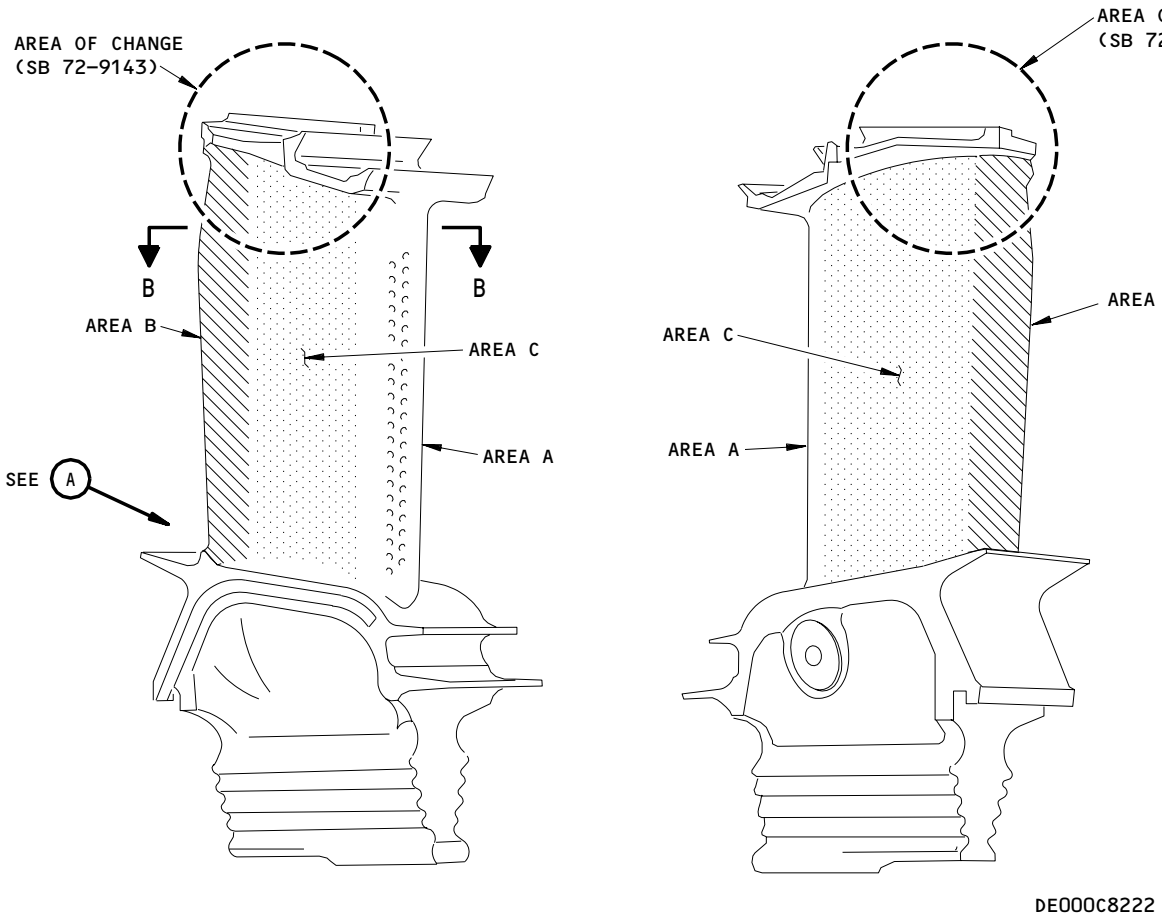
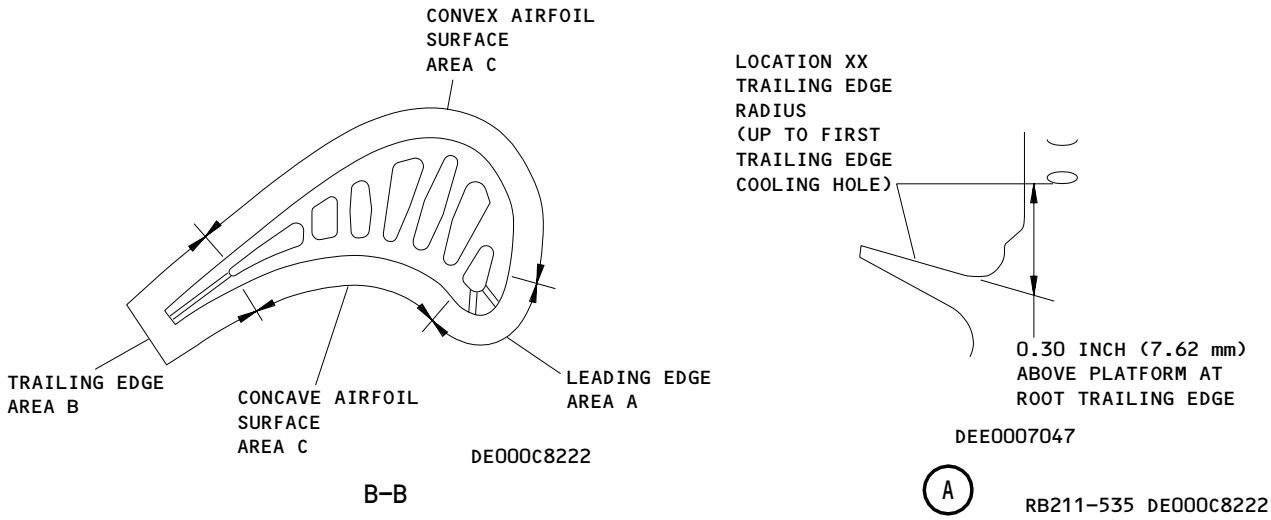


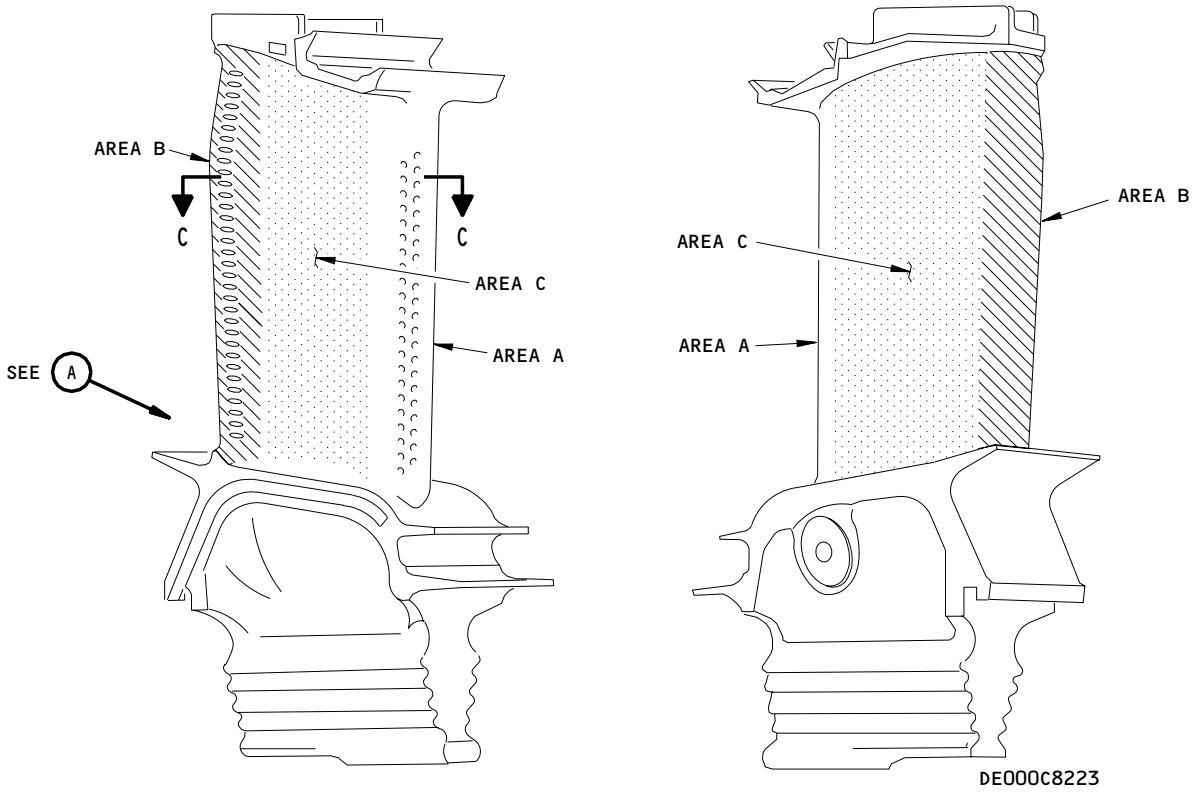
ENGINES POST-RR-SB 72-9143 AND PRE-RR-SB 72-9677



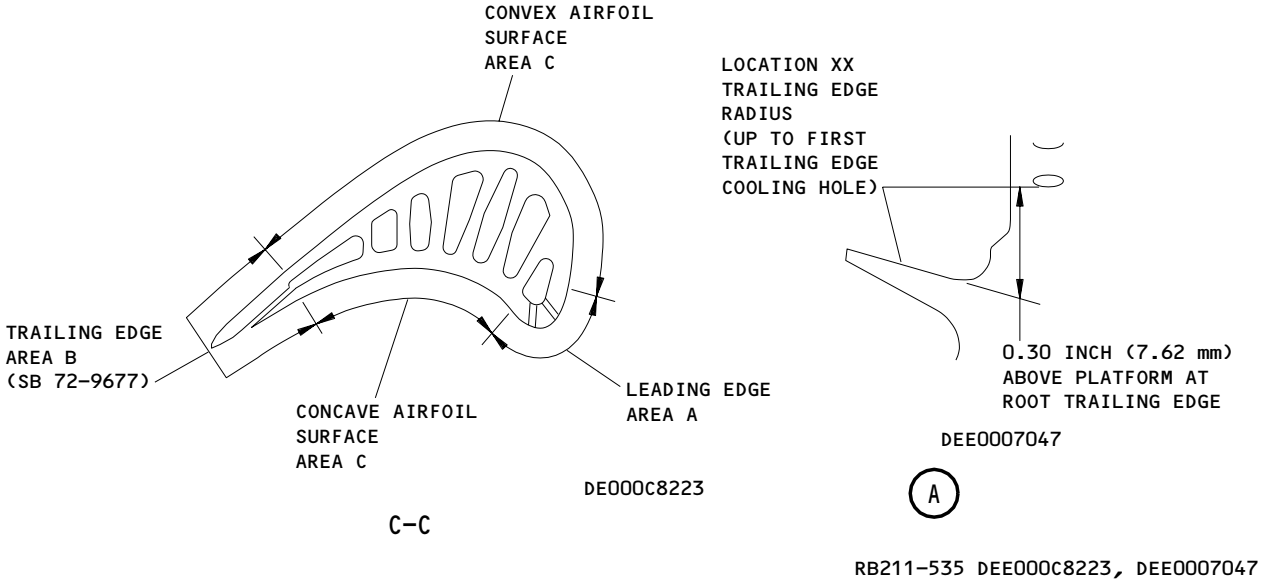
HP Turbine Blades
Figure 608 (Sheet 2)

EFFECTIVITY
ENGINES POST RR SB 72-9143

GD2664



ENGINES POST-RR-SB 72-9677



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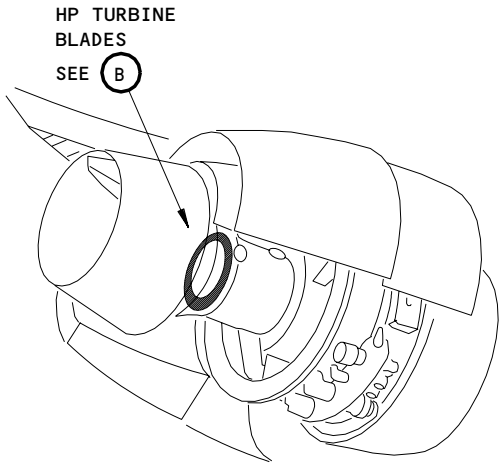
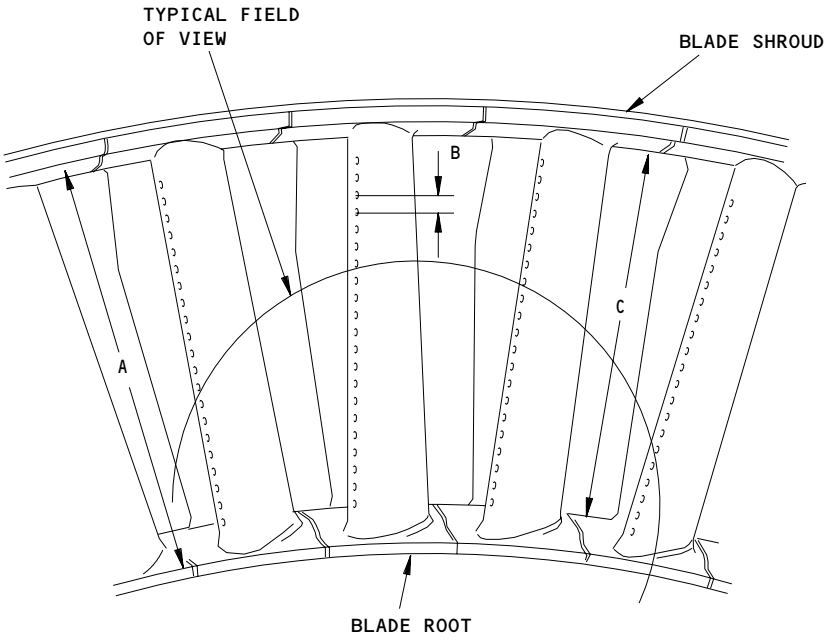
HP Turbine Blades
Figure 608 (Sheet 3)

EFFECTIVITY
ENGINES POST RR SB 72-9677

GD2675





NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

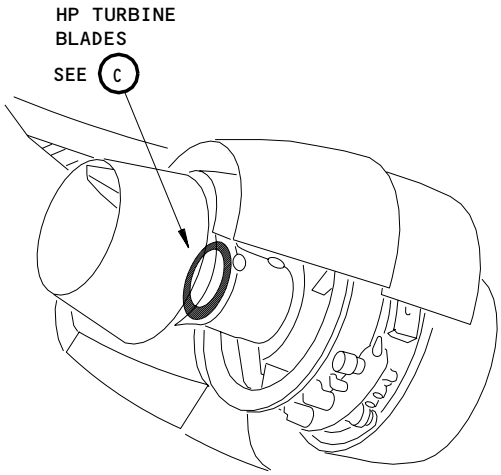
A = 2.401 INCHES (61.0 mm)
B = 0.078 INCH (2.0 mm) APPROXIMATELY BETWEEN FILM COOLING AIR HOLES
C = 2.519 INCHES (64.0 mm)

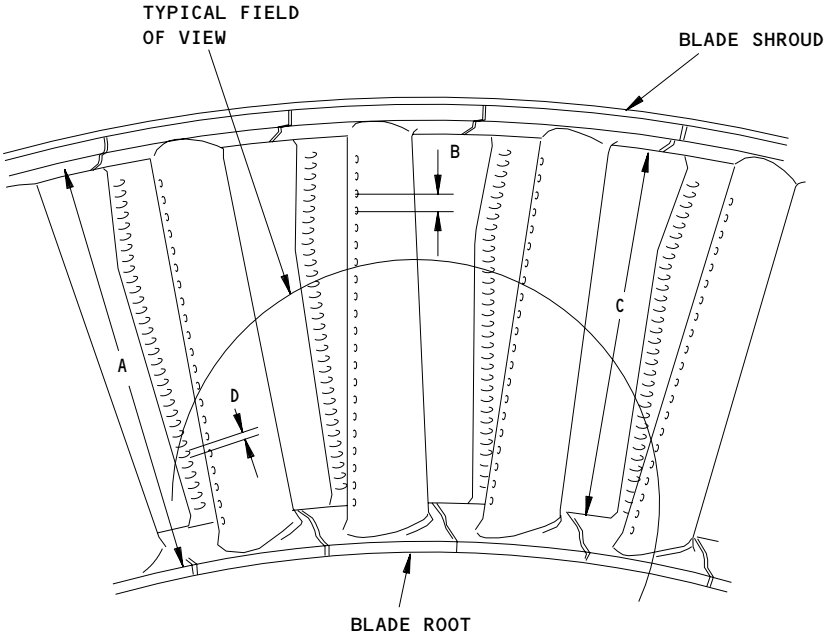
HP TURBINE BLADES
(VIEW IN THE AFT DIRECTION)
B

ENGINES PRE-RR-SB 72-9677

DE000C8224

HP Turbine Blades
Figure 608 (Sheet 4)





NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

A = 2.401 INCHES (61.0 mm)
B = 0.078 INCH (2.0 mm) APPROXIMATELY BETWEEN FILM COOLING AIR HOLES
C = 2.519 INCHES (64.0 mm)
D = 0.051 INCH (3.1 mm) BETWEEN TRAILING EDGE COOLING AIR HOLES

HP TURBINE BLADES
(VIEW IN THE AFT DIRECTION)

C

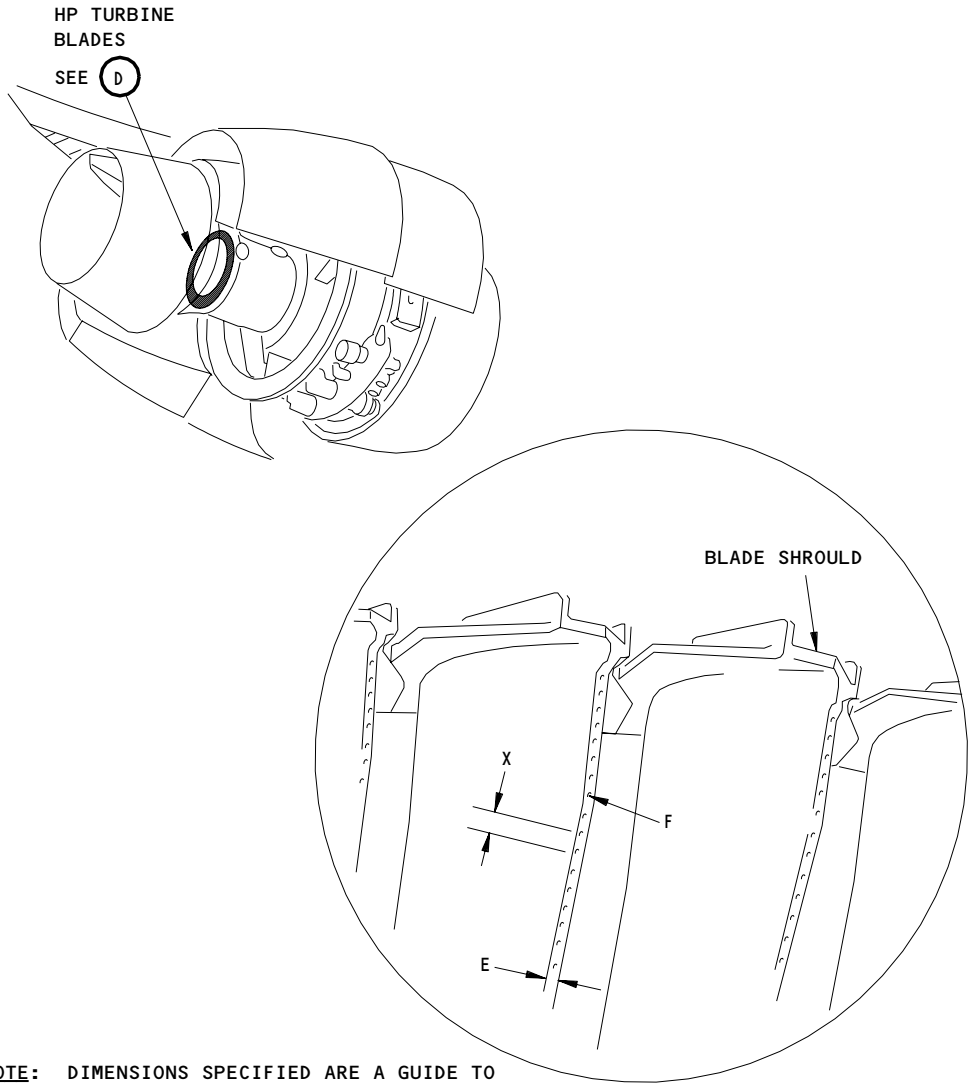
ENGINES POST-RR-SB 72-9677

DE000C8225

HP Turbine Blades
Figure 608 (Sheet 5)

EFFECTIVITY
ENGINES POST RR SB 72-9677

G02700



NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

E = TRAILING EDGE THICKNESS 0.042 INCH (1.07 mm)
F = HOLE SIZE 0.018 INCH (0.46 mm) DIAMETER
X = 0.094 INCH (2.4 mm) BETWEEN CENTER OF TRAILING EDGE COOLING HOLES

HP TURBINE BLADES
(VIEW IN THE FORWARD DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 14)
(ENDOPROBE)

D

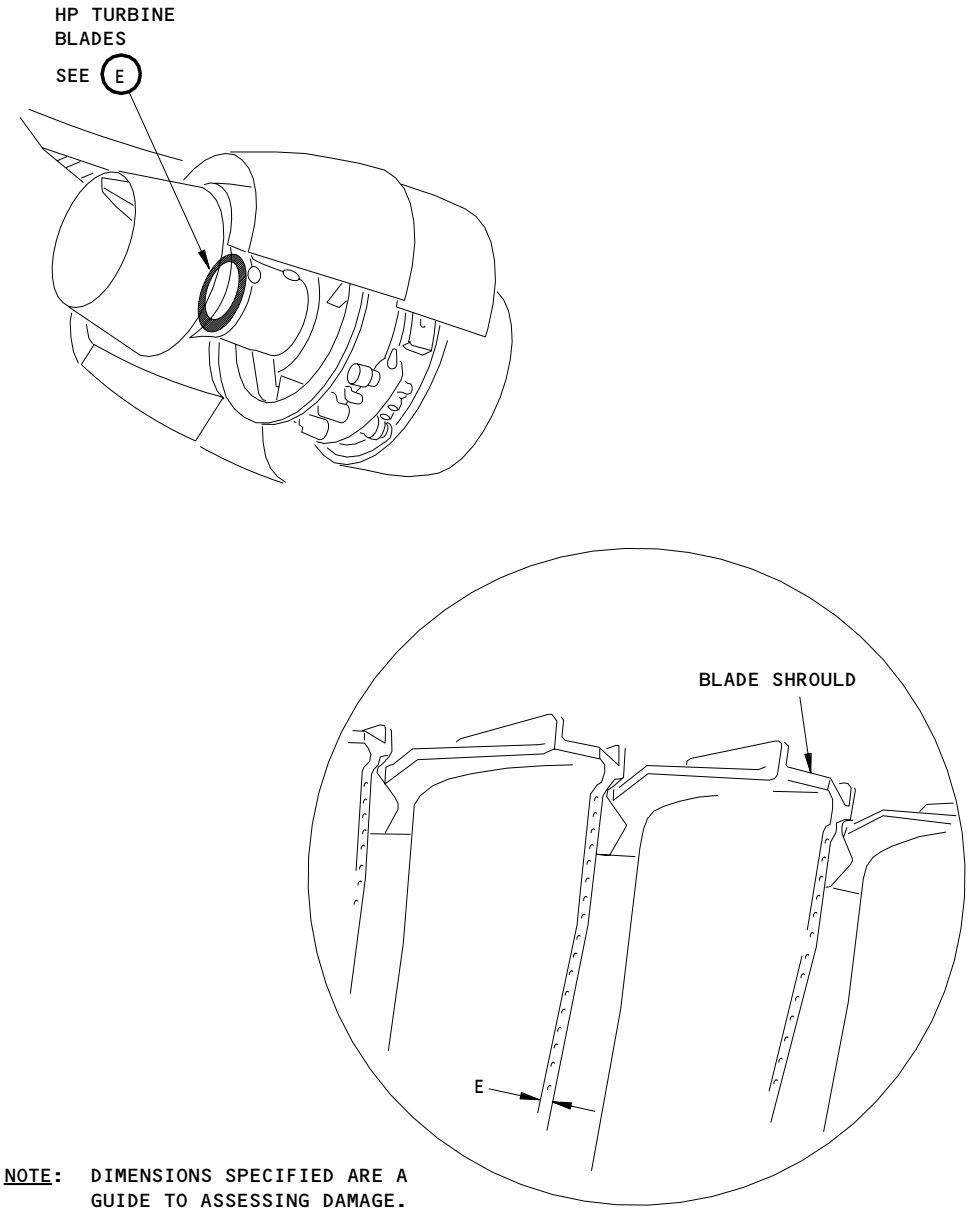
ENGINES PRE-RR-SB 72-9677

DE000C8226

HP Turbine Blades
Figure 608 (Sheet 6)

EFFECTIVITY
ENGINES PRE RR SB 72-9677

GD2716



NOTE: DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE.

E = TRAILING EDGE THICKNESS
0.025 INCH (0.64 mm)

HP TURBINE BLADES
(VIEW IN THE FORWARD DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 14)
(ENDOPROBE)

E

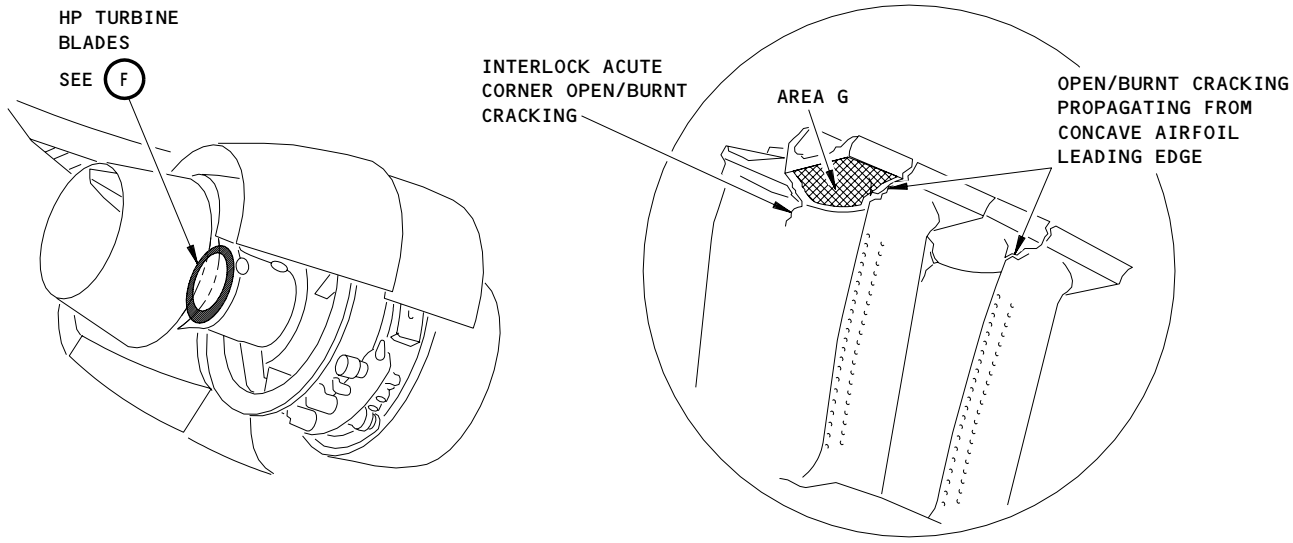
ENGINES POST-RR-SB 72-9677

DE000C8227

HP Turbine Blades
Figure 608 (Sheet 7)

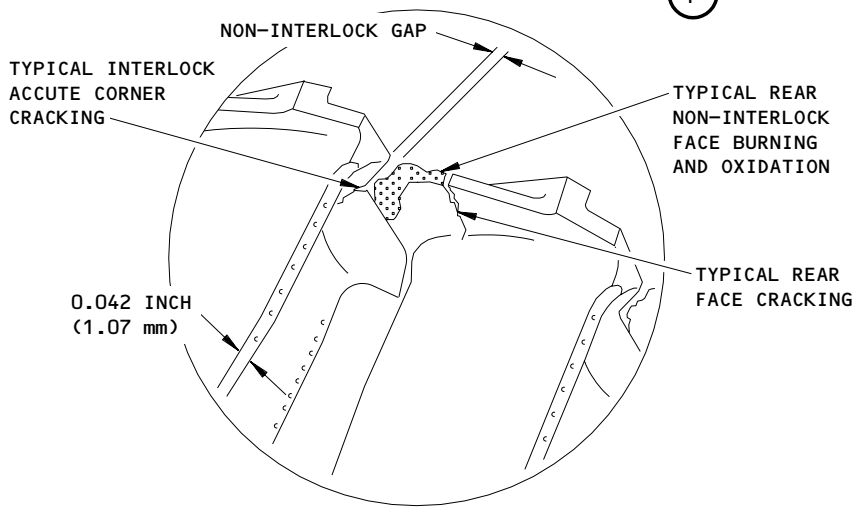
EFFECTIVITY
ENGINES POST RR SB 72-9677

G02724



HP TURBINE BLADES
(VIEW IN THE AFT DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 15)
(ENDOPROBE)

F



HP TURBINE BLADES
(VIEW IN THE FORWARD DIRECTION)
(TYPICAL FIELD OF VIEW AS VIEWED THROUGH ITEM 15)
(ENDOPROBE)

F 1

1 RR ENGINES PRE–SB 72–9677

DE000C8228

HP Turbine Blades
Figure 608 (Sheet 8)

Inspection of the High Pressure (HP) Turbine

b) It is permitted to have radial cracks if you obey the limits that follow:
1. The cracks are not more than 0.250 inch (6.35 mm) in length.
2. The cracks are between 0.250 inch (6.35 mm) and 0.500 inch (12.7 mm) in length with no signs of burns or holes, examine them again before 100 hours.
c) If the radial cracks are longer than 0.500 inch (12.7 mm) and burns or holes are not seen, replace the engine before the next 50 hours.

2) Dents
a) It is permitted to have one dent with a round bottom on one of the two surfaces if it has no related cracks or holes.

3) Replace the engine if the damage is larger than the limits given above.

(b) Shroud (Fig. 608)
1) Cracks
a) Accept radial cracks from the rear face if they are not longer than 0.200 inch (5.08 mm) and they do not turn in the axial direction.
b) It is permitted to have radial cracks from the rear face for these conditions:
1. The cracks are longer than 0.200 inch (5.08 mm) but less than 0.250 inch (6.35 mm), and they do not turn in the axial direction. You can accept these cracks if you do an inspection again before 250 hours.
c) It is not permitted to have cracks that are more than the limits above before 250 hours.
d) It is permitted to have cracks that are not open, that extend from the interlock acute corner but does not extend to the airfoil.
e) It is permitted to have cracks that are not open, that go from the interlock acute corner but does not extend more than 0.100 inch (2.54 mm) in length to the airfoil.
1. The cracks must not be axial.
2. Do an inspection again before 100 hours.
f) Replace the engine if the cracks are more than the limits given above.
g) It is not permitted to have cracks that are open or burned that extend from the interlock acute corner.

2) Burns or oxidation
a) It is permitted to have burns or oxidation on the bottom of the outer shroud near the rear non-interlock faces if you find these conditions:

Inspection of the High Pressure (HP) Turbine

1. The increased clearance between the adjacent rear non-interlock faces is not more than 0.035 inch (0.89 mm) around the rotor.
2. The increased clearance is more than 0.035 inch (0.89 mm) around, but less than 50% around the rotor.

NOTE: The loss of material caused by burns and oxidation causes the increased clearance between the rear non-interlock faces.

NOTE: You must use a rigid borescope with a 90 degree view angle and a 10 degree field of view.

b) Replace the engine before 100 hours if the damage from the burns or oxidation is more than the limits given above.

3) Interlock damage
   a) Replace the engine before 25 hours if sections of the interlock or shroud are gone.

(c) Leading edge (Area A)
1) Cracks and holes
   a) It is permitted to have cracks that are not open, that extend from the leading edge of the concave airfoil to the shroud fillet radius (Fig. 609).
   b) Accept open or burned cracks, or holes in the leading edge if you obey the limits that follow:
      1. The crack or holes extend from the leading edge of the concave airfoil, to the shroud fillet radius (Fig. 609).
      1. The total area of open cracks and holes in the leading edge of the concave airfoil to the shroud fillet radius, for all the blades in the set, is not more than 0.229 square inches (148.00 square mm).
      1. The area of the open crack or holes on each blade is not more than 0.011 square inches (7.00 square mm).
      1. Do an inspection again before 700 hours.
   c) Replace the engine before 50 hours of engine operation if the area of the holes is more than the above limit.
   d) Reject axial cracks that are open.
   e) It is permitted to have one radial crack if you obey the limits that follow:
      1. The crack is not more than 0.250 inch (6.35 mm) in length.

Inspection of the High Pressure (HP) Turbine

2. The crack connects not more than four cooling holes.
3. The crack must not extend to the airfoil fillet radius.

f) It is permitted to have radial cracks if you obey the limits that follow:
1. The cracks are not more than 0.50 inch (12.7 mm) in length.
2. The cracks do not connect more than eight cooling holes.
3. The cracks must not extend to the radius of the aft airfoil fillet.
4. Do an inspection again before 100 hours.

g) Replace the engine before 50 hours if these conditions are found:
1. Radial cracks are more than 0.50 inch (12.7 mm).
2. There are more than eight cooling holes that are connected.

h) Replace the engine before 50 hours if the radial cracks are open, is burned or extend to the airfoil fillet radius.

2) Foreign object damage (Area A)

a) It is permitted to have foreign object damage if you obey these conditions:
1. You do not find holes or cracks caused by other damage.
2. Do an inspection again before 100 hours.

b) Replace the engine before 50 hours if these conditions are found:
1. There are holes or cracks caused by foreign object damage.
2. Axial cracks are not permitted.

c) Replace the engine if holes or cracks with related axial cracks are found because of foreign object damage.

3) Erosion (Area A)

a) It is permitted to have erosion if there are no signs of holes caused by erosion.

b) If there are signs of holes caused by erosion, other than as specified in the limits for open or burned cracks, replace the engine before 50 hours.

Inspection of the High Pressure (HP) Turbine

(d) Trailing edge (Area B)
1) Cracks
a) It is permitted to have more than one crack in the root radius of the trailing edge, (location xx) if they are not more than 0.10 inch (2.54 mm) in length.

NOTE: Location XX is defined as the area of the trailing edge root radius up to the first trailing edge cooling hole.

b) It is permitted to have one crack in the root radius of the trailing edge more than 0.10 inch (2.54 mm) location xx if you obey the limits that follow:
1. Do an inspection before 500 hours.
2. If the crack is more than 0.150 inch (3.81 mm) the engine is to be rejected in less than 50 hours.

c) It is permitted to have cracks from the trailing edge at positions other than the root or outer shroud radius if you obey the limits that follow:
1. The cracks are not more than 0.050 inch (1.27 mm) in length.
2. If the cracks are more than 0.050 inch (1.27 mm) but less than 0.100 inch (2.54 mm) you must do an inspection again in less than 100 hours.
3. If the cracks are more than 0.100 inch (2.54 mm) the engine must be rejected in less than 50 hours.

d) It is permitted to have cracks that extend from the radius of the trailing edge outer shroud if you obey the limits that follow:
1. The cracks are not more than 0.050 inch (1.27 mm) in length.

e) It is permitted to have an axial crack that extends from the radius of the trailing edge outer shroud if more than the above limit if you obey the limits that follow:
1. The crack is not more than 0.100 inch (2.54 mm) in length.
2. Do an inspection before 900 hours.

f) It is permitted to have an axial crack that extends from the radius of the trailing edge outer shroud if more than the above limit if you obey the limits that follow:
1. The crack is not more than 0.150 inch (3.81 mm) in length.
2. Do an inspection before 450 hours.

g) Replace the engine before 50 hours if the cracks are more than the limits given above.

Inspection of the High Pressure (HP) Turbine

2) Burns and oxidation (Area B)
   a) It is permitted to have burns and oxidation at the trailing edge if you obey the limits that follow:
      1. It is not more than 0.40 inch (10.16 mm) axially from the trailing edge.
      2. Material decrease from the trailing edge must not be more than 0.020 inch (0.508 mm) axial length.
   b) It is permitted to have burns and oxidation more than the limits given in the step above, if you obey the limits that follow:
      1. The material decrease from the trailing edge must not be more than 0.100 inch (2.54 mm) axial length.
      2. Do an inspection before 500 hours if this condition occurs.
   c) Decrease in material from the trailing edge of more than 0.100 in. (2.54 mm) axial length but less than 0.120 in. (3.05 mm) axial length, inspect again at 100 hours intervals.

      NOTE: If no further deterioration is seen after three successive inspections at 100 hour intervals, you can increase the repeat inspection interval to twice the original value, up to a maximum of 500 hours. If further degradation is subsequently seen, you must decrease the repeat inspection interval to 100 hours again.
   d) Decrease in material from the trailing edge more than the limits above, reject the engine before 50 hours.
3) Foreign object damage (Area B)
   a) It is permitted to have dents with smooth, circular bottoms if you do not see other related holes or cracks.
   b) Replace the engine before 50 hours if you see these conditions:
      1. There are dents with related holes or cracks.
      2. There must be no signs of axial cracks.
   c) Replace the engine if there are signs of axial cracks caused by dents.

Inspection of the High Pressure (HP) Turbine

S 296-248-R02

(5) Do an inspection of the intrascope nozzle guide vane through the borescope access hole in the IP turbine casing (Fig. 602).
   (a) Make sure you can see the bush in the vane boss.
      1) if the bush can be seen, it is acceptable.
      2) If the bush is missing, replace the engine before 10 hours.

S 846-172-R02

(6) Do the procedure to put the airplane back to its usual condition.

Inspection of the Intermediate Pressure (IP) Turbine

TASK 72-00-00-206-173-R02

9. Inspection of the Intermediate Pressure (IP) Turbine

A. General

(1) The subsequent operations give the IP turbine inspection procedure and the standards you can accept.

(2) Use an impact extractor if it is not easy to remove the plugs.

(3) Access location, the view area and the number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
LP 1S	Trailing Edge - IP	112
	Leading Edge - LP1	78

(4) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 609).

B. References

(1) AMM 72-00-00/201, Engine

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Do the Intermediate Turbine (IP) Inspection

S 846-174-R02

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 496-175-R02

(2) Attach the tool with which you turn the IP system (AMM 72-00-00/201).

S 946-176-R02

(3) If not already done, do the procedure to prepare the equipment for the inspection.

S 296-177-R02

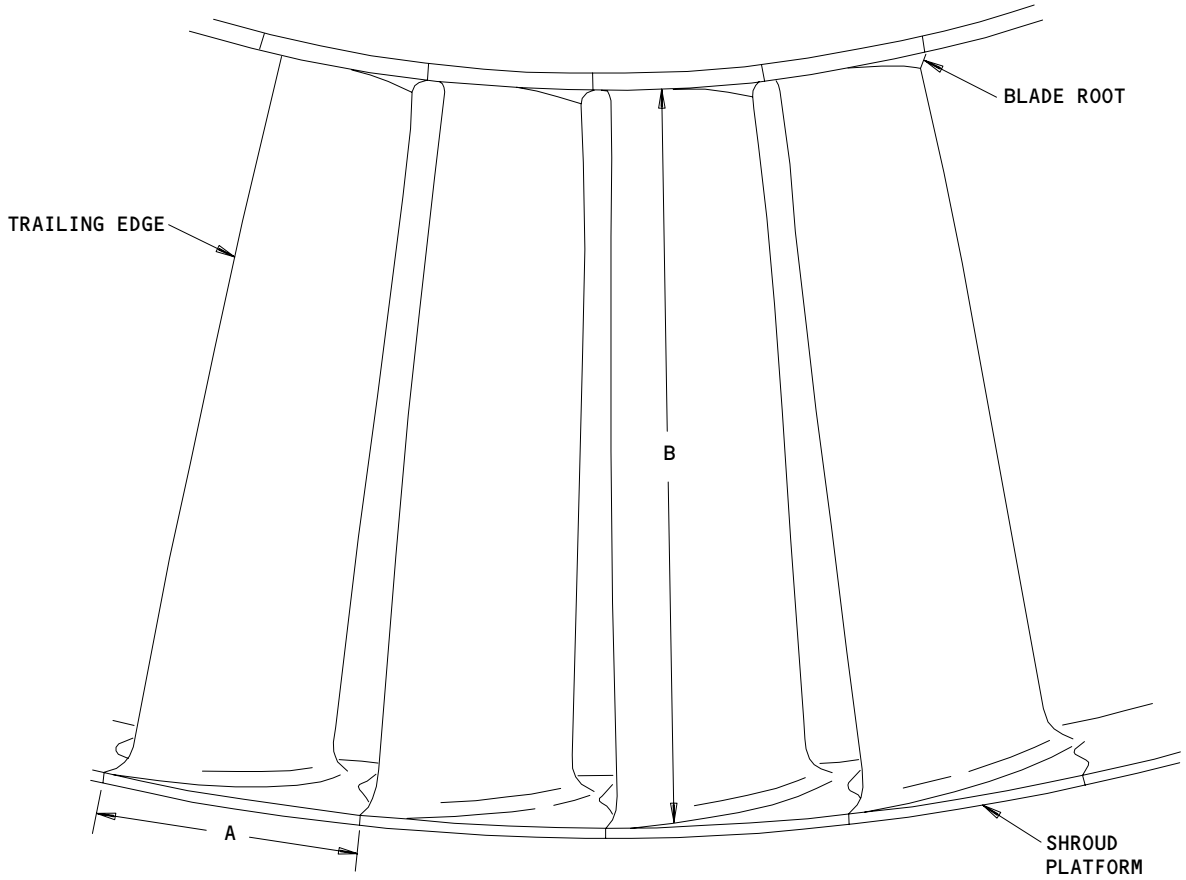
(4) Do an inspection of the IP turbine blades as follows (Fig. 609):

(a) Cracks

1) It is not permitted to have cracks in the blades.

2) It is not permitted to have sharp or sudden changes in the leading or trailing edge contour.

3) It is not permitted to have damage less than 0.50 inch (12.7 mm) in length from the blade root or 0.20 inch (5.08 mm) in length from the blade shroud platform.



VIEW IN THE FORWARD DIRECTION

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE
QTY 112 BLADES

A = 1.149 INCHES (29.185 mm)
B = 4.493 INCHES (114.13 mm)

67962

IP Turbine Blades
Figure 609

Inspection of the Intermediate Pressure (IP) Turbine

(b) Dents
  1) It is permitted to have more than one dent with a smooth bottom if you see these conditions:
    a) Leading edge dents are not more than 0.050 inch (1.27 mm) in length and there is not less than 0.100 inch (2.54 mm) between dents.
    b) Trailing edge dents are not more than 0.020 inch (0.51 mm) in length and there is less than 1.500 inch (38.1 mm) between dents.
    c) Airfoil dents are not more than 0.100 inch (2.54 mm) in diameter.
  2) It is permitted to have one dent with a smooth bottom in the leading edge if it is not longer than 0.125 inch (3.175 mm).

(c) Nicks, scratches and spatter
  1) It is permitted to have nicks and scratches in the airfoil surface if each is not larger than 0.02 inch (0.51 mm) in width and is not more than 0.05 inch (1.27 mm) in length.
  2) It is permitted to have foreign object spatter.

S 296-247-R02

(5) Do an inspection of the intrascope nozzle guide vane through the borescope access hole in the IP turbine casing (Fig. 602).
  (a) Make sure you can see the bush in the vane boss.
    1) if the bush can be seen, it is acceptable.
    2) If the bush is missing, replace the engine before 10 hours.

S 846-178-R02

(6) Do the procedure to put the airplane back to its usual condition.

Inspection of the Low Pressure (LP) Turbine

TASK 72-00-00-206-179-R02

10. Inspection of the Low Pressure (LP) Turbine

A. General

(1) The subsequent operations give the LP turbine inspection procedure and the standards you can accept.

(2) Use an impact extractor if it is not easy to remove the plugs.

(3) Access location, the view area and the number of blades for each compressor stage are as follows (Fig. 602):

Access	View Area	Number of Blades
LP 2S	Trailing Edge - LP1	78
	Leading Edge - LP2	64
LP 3S	Trailing Edge - LP2	64
	Leading Edge - LP3	64

(4) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 610).

B. References

(1) AMM 72-00-00/201, Engine

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

D. Do the Low Pressure (LP) Turbine Inspection

S 846-180-R02

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 946-181-R02

(2) If not already done, do the procedure to prepare the equipment for the inspection.

S 296-182-R02

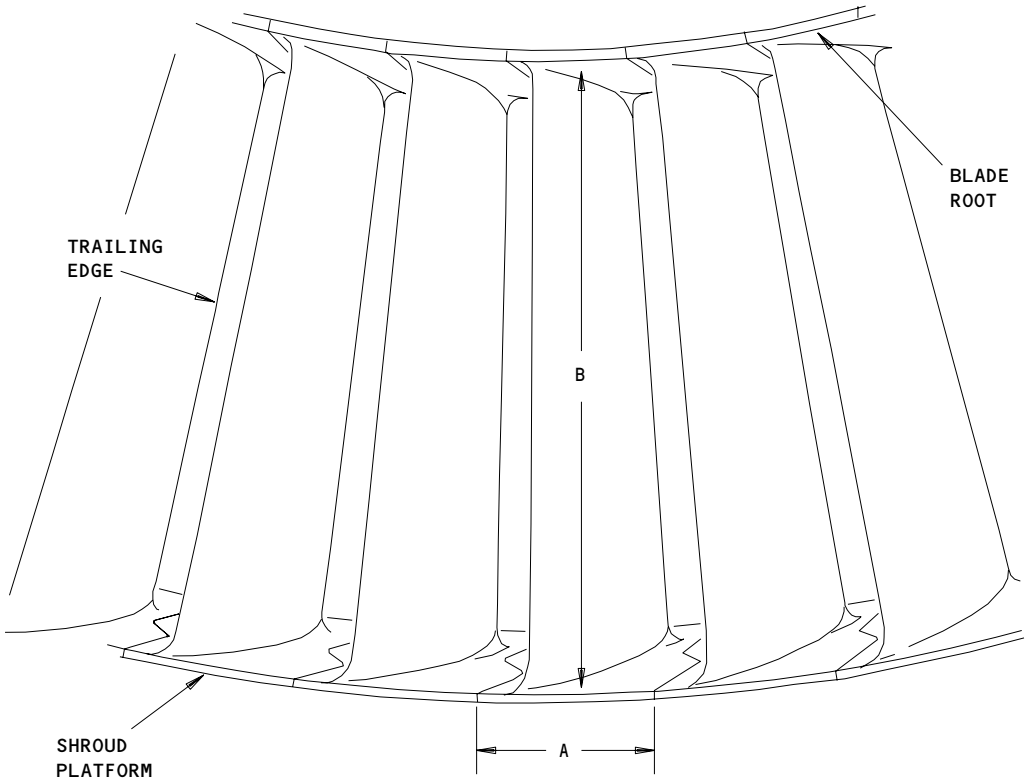
(3) Do an inspection of the LP turbine blades as follows (Fig. 610):

NOTE: Use an inspection lamp through the tail bearing housing to examine the trailing edge of the stage 3 turbine blades.

(a) Cracks

1) It is not permitted to have cracks.

2) It is not permitted to have damage to the blade less than 0.50 inch (12.7 mm) from the blade root.



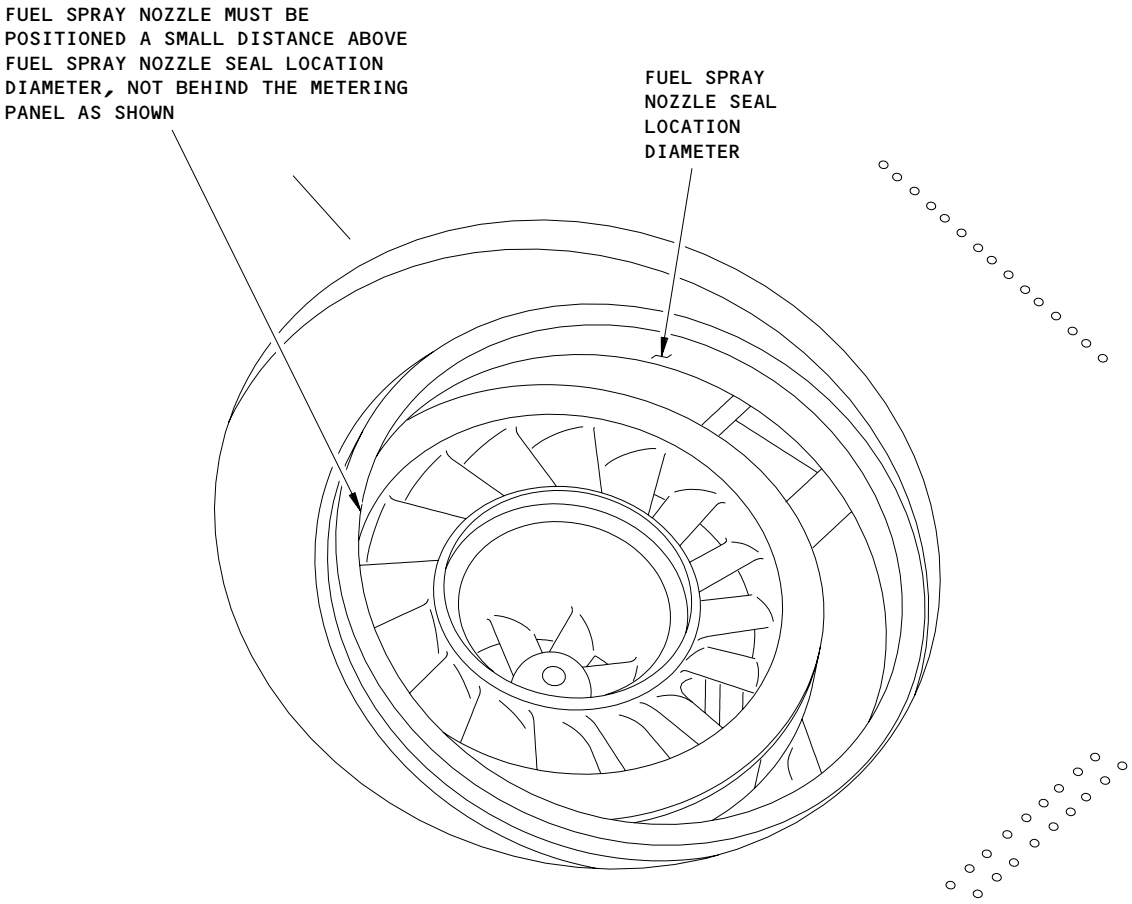
VIEW IN THE FORWARD DIRECTION

DIMENSIONS SPECIFIED ARE A GUIDE TO ASSESSING DAMAGE

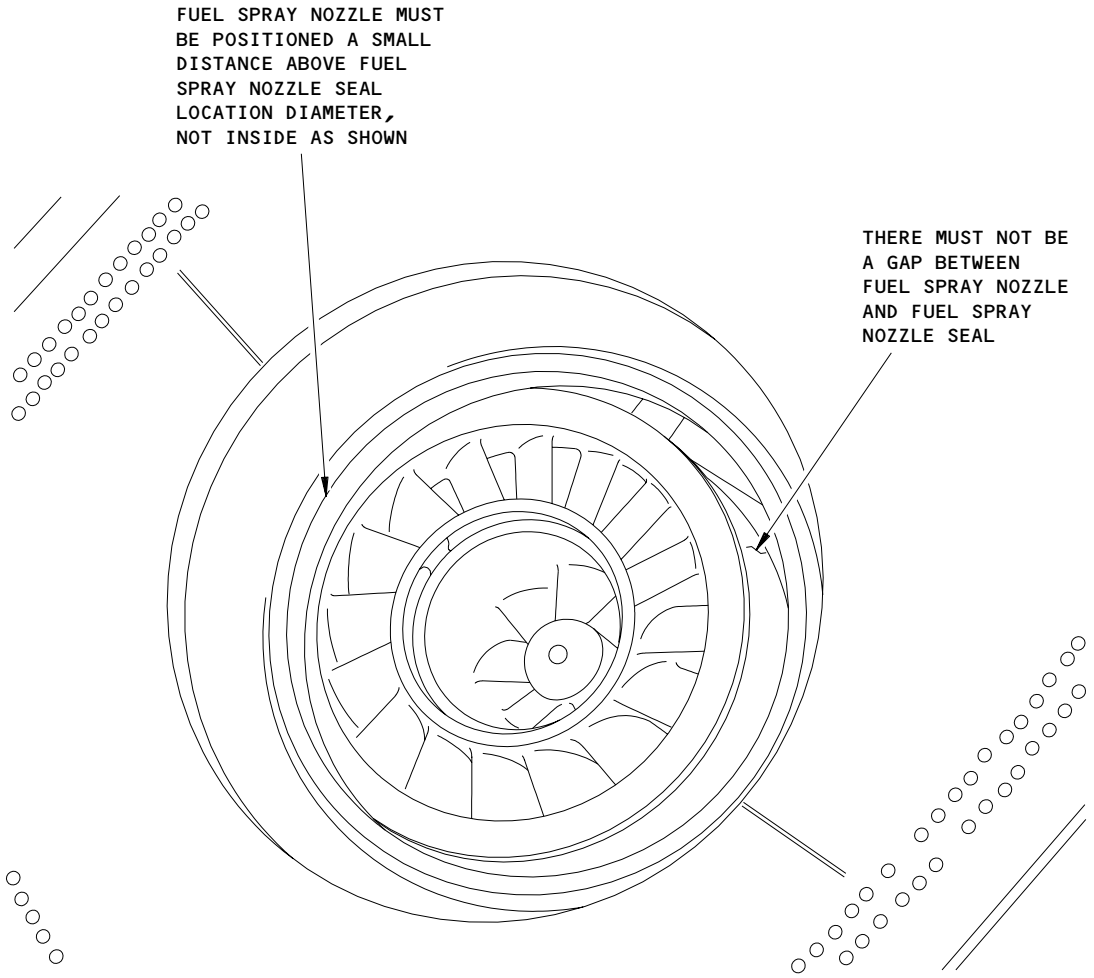
STAGE	QTY	DIMENSION A	DIMENSION B
1ST	78	2.268 INCHES (57.63 mm)	6.768 INCHES (171.92 mm)
2ND	64	2.265 INCHES (57.54 mm)	9.200 INCHES (233.69 mm)
3RD	64	1.795 INCHES (45.60 mm)	11.143 INCHES (283.05 mm)

59369

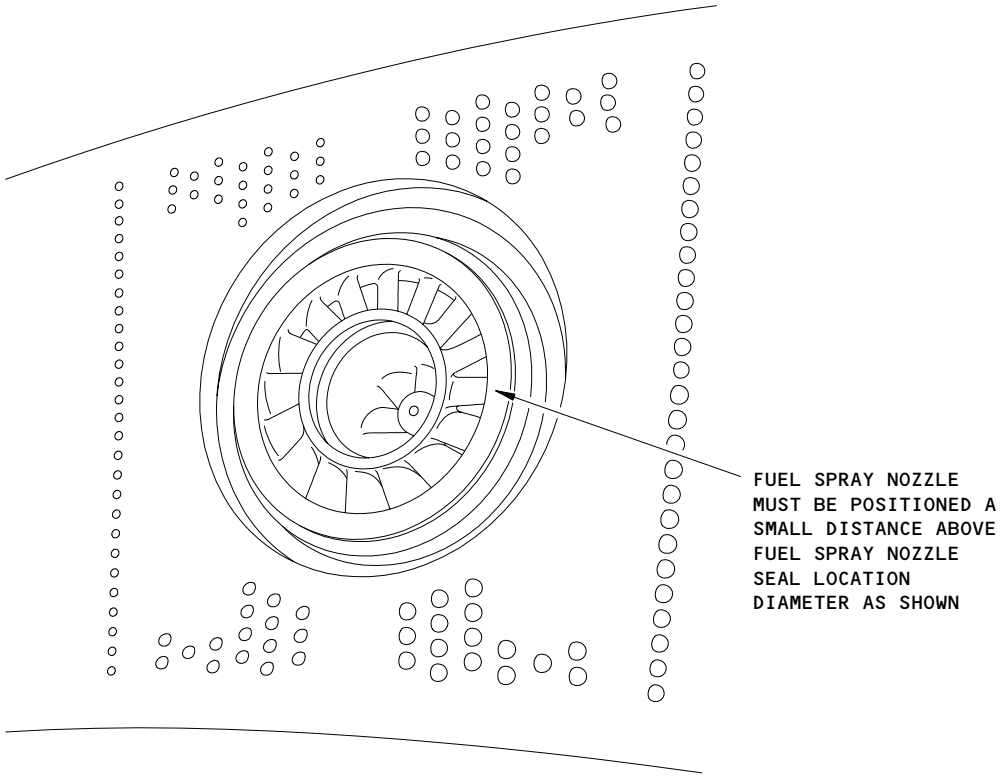
LP Turbine Blade
Figure 610



Incorrect Location of the Fuel Spray Nozzle in the Fuel Spray Nozzle Seal
Figure 611



Moderately Incorrect Location of the Fuel Spray Nozzle in the Fuel Spray Nozzle Seal
Figure 612



ACCEPT THE ENGINE

DEE0008443

Correct Location of the Fuel Spray Nozzle in the Fuel Spray Nozzle Seal
Figure 613

Inspection of the Low Pressure (LP) Turbine

3) It is not permitted to have damage which causes sharp changes in the leading or trailing edge contour.

(b) Dents

1) It is permitted to have one dent with a smooth bottom in the leading edge if you obey the limit that follows:
   a) Dents are not more than 0.250 inch (6.35 mm) in length and is not more than 0.020 inch (0.51 mm) in depth.
2) Two dents in each trailing edge are permitted if the limits below are obeyed:
   a) The dent is not more than 1.00 in. (25.4 mm) long and not more than 0.020 in. (0.51 mm) deep, with no sharp edges.
   b) There is a minimum separation of 1 in. (25.4 mm) between the dents.
3) A dent on the surface of the airfoil, which causes a protrusion on the same surface, is permitted. You must obey the limits below:
   a) The maximum permitted height of the protrusion is 0.005 in. (0.13 mm).
   b) The protrusion is no closer than 0.500 in. (12.7 mm) to the blade shroud or root radius.
4) Reject all dents that are more than the limits.

(c) Nicks, scratches and spatter

1) It is permitted to have nicks and scratches to the airfoil surface if you obey the limits that follow:
   a) Nicks and scratches are not more than 0.050 inch (1.27 mm) in length and is not more than 0.010 inch (0.25 mm) in depth.
2) It is permitted to have foreign object spatter.

(d) Pin and gas holes

1) A maximum of two holes are permitted on each of the concave and convex airfoil surfaces. You must obey the limits that follow:
   a) The maximum diameter of each hole is 0.080 in. (2.03 mm).
   b) The holes are not on the leading or trailing edge, or the fillet radii.
   c) Only one hole is in the lower 1/3 of the airfoil.

S 846-183-R02

(4) Do the procedure to put the airplane back to its usual condition.

Inspection of the 3rd-Stage LPT Nozzle-Guide-Vanes

TASK 72-00-00-206-184-R02

11. Inspection of the 3rd-Stage LPT Nozzle-Guide-Vanes

A. General

(1) The subsequent operations give the 3rd-Stage nozzle-guide-vanes to the LP turbine inspection procedure and the standards you can accept.

(2) Access location, the view area and the number of blades for the turbine 3rd-stage is as follows (Fig. 602):

Access	View Area	Number of Blades
LP 3S	Rear - 3rd-Stage	64

(3) To help you make an estimate of the damage, the acceptance zones on the blades are given (Fig. 610).

B. References

(1) AMM 72-00-00/201, Engine

C. Access

(1) Location Zones

410 Power Plant Nacelle Left
420 Power Plant Nacelle Right

(2) Access Panel

415AL Thrust Reverser
416AR Thrust Reverser
425AL Thrust Reverser
426AR Thrust Reverser

D. Procedure

S 846-185-R02

(1) If not already done, do the procedure to prepare the airplane for the inspection.

S 496-186-R02

(2) Attach the tool with which you turn the IP system (AMM 72-00-00/201).

S 946-187-R02

(3) If not already done, do the procedure to prepare the equipment for the inspection.

Inspection of the 3rd-Stage LPT Nozzle-Guide-Vanes

S 296-188-R02

(4) Do an inspection of the 3rd-stage nozzle-guide-vane of the LP turbine as follows:

NOTE: Use an inspection lamp through the tail bearing housing to examine the nozzle-guide-vanes.

(a) Cracks
  1) Accept axial cracks not more than 0.75 inch (19.05 mm) in length, provided the cracks are not closer than 0.050 inch (12.0 mm) to the leading edge or the trailing edge.
  2) Replace the engine before 50 hours if the radial cracks are more than these limits:
    a) Radial cracks are not more than 1.00 inch (25.4 mm) in length and are more than or equal to 1.00 inch (25.4 mm) between them.
    b) Cracks must not come together.
    c) Cracks must be more than or equal to 0.500 inch (12.7 mm) from the trailing edge.

(b) Dents and nicks
  1) It is permitted to have dents and nicks if you obey the limits that follow:
    a) The dents do not go through the vane.
    b) The dents are more than or equal to 0.50 inch (12.7 mm) from the trailing edge.
  2) Replace the engine if the damage to the vanes is more than the limits given above.

S 846-189-R02

(5) Do the procedure to put the airplane back to its usual condition.

Remove the Borescope Equipment

TASK 72-00-00-946-190-R02

12. Remove the Borescope Equipment

A. Procedure

S 086-204-R02

(1) Set the power supply switch to the OFF position and let the power supply decrease in temperature for 30 seconds.

S 086-205-R02

(2) Remove the borescope from the light cable.

NOTE: The light cable on the flexible borescope is an integral part of the probe.

S 086-206-R02

(3) Disconnect the light cable from the light source box.

S 086-207-R02

(4) Disconnect the power supply from the light source box.

Put the Airplane Back to Its Usual Condition

TASK 72-00-00-846-191-R02

13. Put the Airplane Back to Its Usual Condition

A. References

(1) AMM 70-42-12/201, Local Surface Protection
(2) AMM 70-51-00/201, Torque Tightening Technique
(3) AMM 72-00-00/201, Engine
(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 73-11-05/401, Fuel Spray Nozzles
(6) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

210 Control Cabin
411 No. 1 Engine
421 No. 2 Engine

C. Procedure

S 416-192-R02

(1) Install the fuel spray nozzle (AMM 73-11-05/401).

S 436-193-R02

CAUTION: MAKE SURE THE BORESCOPE PLUGS ARE CORRECTLY INSTALLED AFTER THE INTERNAL INSPECTION. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE ENGINE.

(2) Install the access details which were removed to do the borescope inspection of the engine as follows (Fig. 602):

WARNING: DO NOT GET CLEANING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM CLEANING FLUID. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE CLEANING FLUID. KEEP CLEANING FLUID AWAY FROM SPARKS, FLAME AND HEAT. CLEANING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT GET THE CLEANING FLUID ON THE SURFACE OF THE OUTER CASE. THE CLEANING FLUID WILL DAMAGE THE SURFACE PROTECTION ON THE OUTER CASE. IF THE SURFACE PROTECTION IS DAMAGED, REFER TO (AMM 70-42-12/201) FOR THE PROCEDURE TO PROTECT THE SURFACE OF THE OUTER CASE AGAIN.

(a) Clean the borescope access details.
1) Make a lint-free cloth moist with cleaning fluid.
2) Clean the faces of the borescope access details that will touch the outer faces of the engine case when it is assembled.

Put the Airplane Back to Its Usual Condition

3) Clean the faces of the engine case that will touch the borescope access details when it is assembled.

NOTE: Make sure you remove all the used jointing compound from the engine case and the borescope access details.

(b) Do this procedure to install the access details at borescope port A (Fig. 602).

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUG MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND DAMAGE THE ENGINE.

1) Apply the jointing compound to the mating faces of the plugs and the spacers.
2) Make sure that no jointing compound goes in the central passageway of the plug or the spacers.
3) Put the spacers and the plug in their correct position on the LP compressor inner case.
4) Make sure the blanking plug is in the correct position at its inner end.
5) Make sure the blanking plug mating flange fully touches the L.P. Compressor case.
6) Apply clean approved engine oil to the threads of the bolts.
7) Install the washers and the bolts.
8) Tighten the bolts (AMM 70-51-00/201).

(c) Do this procedure to install the access details at borescope ports B, C, D and E (Fig. 602).

CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUGS AT B AND E MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND DAMAGE THE ENGINE.

1) Apply the jointing compound to the mating faces of the access details.
2) Put the access details in their correct positions on the engine.
3) Make sure the blanking plate plugs are in the correct positions at their inner ends.
4) Make sure the blanking plug mating flanges fully touch the case.
5) Apply clean approved engine oil to the threads of the bolts.
6) Install the bolts.
7) Tighten the bolts (AMM 70-51-00/201).

Put the Airplane Back to Its Usual Condition

(d) Do this procedure to install the access details at borescope port G (Fig. 602).
   1) Apply the Anti-Seize Compound to the threads and the mating faces of the HPNGV blanking plug.
   2) Install the HPNGV blanking plug and tighten to 370 pound-inches (41.81 Newton meters).
   3) Apply the Anti-Seize Compound to the mating faces of the HPNGV blanking cover.
   4) Put the blanking cover in the correct position on the engine.
   5) Apply clean approved engine oil to the threads of the bolts.
   6) Install the bolts.
   7) Tighten the bolts (AMM 70-51-00/201).

(e) Do this procedure to install the access details at borescope ports F, H, I and J (Fig. 602).
   1) Apply the Anti-Seize Compound to the mating faces of the access details.

   CAUTION: THE BOLTS THAT HOLD THE BLANKING PLUG MUST NOT BE USED TO PULL THE PLUG INTO POSITION. IF YOU DO, IT CAN CAUSE THE PLUG STEM TO BEND AND DAMAGE THE ENGINE.

   2) Put the access details in their correct position on the engine.
   3) Make sure the blanking plugs are in the correct position at their inner end.
   4) Make sure the blanking plug mating flanges fully touch the case.
   5) Apply clean approved engine oil to the threads of the bolts.
   6) Install the bolts.
   7) Tighten the bolts (AMM 70-51-00/201).

S 496-194-R02

(3) Remove the tools used to turn the IP and HP system (AMM 72-00-00/201).

S 416-209-R02

(4) Install the applicable borescope access plugs (Fig. 602).

S 416-195-R02

(5) Install the lower right panel on the compressor fairing (AMM 72-03-01/401).

Put the Airplane Back to Its Usual Condition

S 416-196-R02

WARNING: OBEY THE INSTRUCTIONS IN (AMM 78-31-00/201) WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(6) Close the thrust reversers (AMM 78-31-00/201).

S 866-197-R02

(7) For the left engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
   (a) P11 Overhead Circuit Breaker Panel
      1) 11D7, ENGINES STBY IGN LEFT 1
      2) 11D8, ENGINES STBY IGN LEFT 2
      3) 11L1, LEFT ENGINE IGN 1
      4) 11D19, ENGINE START CONT LEFT

S 866-198-R02

(8) For the right engine, remove the DO-NOT-CLOSE tags and close these circuit breakers:
   (a) P11 Overhead Circuit Breaker Panel
      1) 11D9, ENGINES STBY IGN RIGHT 1
      2) 11D10, ENGINES STBY IGN RIGHT 2
      3) 11L28, RIGHT ENGINE IGN 1
      4) 11D20, ENGINE START CONT RIGHT

ENGINE - CLEANING/PAINTING

1. General
   A. This task gives the procedure to safely remove bird residue from an engine after a bird strike.
   B. It is possible that samples of the bird residue will be required for analysis by Rolls-Royce. Contact the local Rolls-Royce representative for requirements.

TASK 72-00-00-677-001-R00

2. Disinfection of Engine Parts After a Bird Strike
   A. Consumable Materials
      (1) OMat 1/24 - Primary cleaner
      (2) OMat 1/264 - Primary cleaner, thickened
      (3) OMat 2/101 - Lint-free cloth
      (4) OMat 1083 - Disinfectant, cleaner aircraft
      (5) OMat 1084 - Disinfectant, aircraft
      (6) Water

      NOTE: The permitted level of impurities in the water used to rinse the engine or parts of the engine, or to dilute the disinfectant chemical is as follows:

Impurity	Maximun Permitted
Na + K	50 parts per million
Ca + Mg	100 parts per million
Total Halides	100 parts per million
SO4	100 parts per million
PO4	50 parts per million
Total Dissolved Solids	500 parts per million
pH	6.4 - 8.5

   B. Access
      (1) Location Zones
          410 Left Power Plant
          420 Right Power Plant

C. Prepare for the Procedure

S 677-002-R00

(1) Put on a waterproof coverall and impervious rubber boots to avoid contamination of work clothes.

NOTE: It is important that personnel who remove bird residue follow good hygiene practice at all times (bird feathers are classified as residue). Do not remove residue or clean the contaminated surface with hands or face that are not protected. Do not touch your face, nose or mouth, or eyes with contaminated gloves, and do not eat, drink or smoke at the cleaning location. If the residue touches your skin, wash it off with disinfectant, soap and water. If any residue touches your eyes, flush the eyes with water and get medical aid immediately. Wash fully all equipment that has touched the bird residues with detergent and suitable disinfectant, and/or dispose of them in a biohazard container. Refer to local regulations for specific instructions. After completion of the procedure to clean the contaminated surface, carefully remove personal protective equipment and then wash your hands and other exposed skin fully with clean, hot water and a good quality disinfectant soap. Make sure that you dry yourself fully.

S 677-003-R00

(2) Put on impervious rubber gloves (thin disposable rubber gloves are not suitable), a face shield and suitable mouth mask.

NOTE: To obtain the correct equipment to comply with local regulations, contact the local supplier of safety equipment.

S 867-009-R00

(3) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-010-R00

(4) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

D. Procedure

S 677-006-R00

(1) Do the steps that follow to disinfect the engine parts after a bird strikes:

(a) Remove the larger pieces of residue with a gloved hand.

1) Put the residue in a biohazard bag or container.

(b) Wash the contaminated surfaces and adjacent areas with OMat 1/24 or OMat 1/264.

NOTE: Make sure that all residues are removed.

(c) Rinse fully with clean water.

NOTE: Make sure that all the detergent is removed from the parts.

1) Do this step again as necessary to remove the residue.

(d) Mix the disinfectant in accordance with the manufacturer's instructions.

NOTE: Use clean water and do not use hypochlorite bleach.

(e) Wipe the cleaned surface with OMat 2/101 lint-free cloth moistened with OMat 1083 or OMat 1084 disinfectant solution.

1) Let the surface stand for 5 minutes and then rinse fully with clean, cold water.

2) Let the surface dry in air or swab dry with clean OMat 2/101 lint-free cloth.

(f) Dispose of the bird residues and contaminated clothes, cloths and equipment in labelled biohazard containers in accordance with local regulations.

NOTE: It is the responsibility of the operator to make sure that biohazard residue is disposed of correctly.

E. Put the Airplane Back to Its Usual Condition

S 867-011-R00

(1) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D19, ENGINES START CONT LEFT

S 867-012-R00

(2) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D20, ENGINES START CONT RIGHT

ENGINE - APPROVED REPAIRS

TASK 72-00-00-728-003-R00

1. Intrascope Dress Damaged IP and HP Compressor Blades (FRS7161)
   A. General
      (1) This task gives the procedure to intrascope dress damaged IP and HP Compressor Blades.
      (2) Source demonstration is necessary for this repair. Only those personnel and organizations that hold letters of approval from Rolls-Royce plc are authorized to do this repair.
      (3) Prior to arranging the task, check the engine logbook. Make sure the total number of blended blades in both IP and HP compressors will not exceed the limit defined in the task.
      (4) Contact Rolls-Royce plc, Operation Room - Technical Help Desk (+44 1332248449) or a Rolls-Royce representative to organize accomplishment of intrascope blending of damaged compressor blades.

HIGH SPEED (HS) EXTERNAL GEARBOX - REMOVAL/INSTALLATION

1. General
   A. This task contains two tasks. The first task removes the HS external gearbox. The second task installs the HS external gearbox.

TASK 72-00-61-004-001-R00

2. Remove the HS External Gearbox
   A. Equipment
      (1) CP30264 Trolley, Rolls-Royce
      (2) CP30313/2 Parking Frame, Rolls-Royce
      (3) CP30430/2 Sling, Rolls-Royce
      (4) E2J53172 Impact Extractor, Rolls-Royce
      (5) E2J53173 Extractor, Rolls-Royce
      (6) B71018-28 Handling Fixture
      (7) Container, clean (with capacity of 10 U.S. gallons, 8 imperial gallons, or 37 litres)
   B. References
      (1) AMM 24-11-01/401, Integrated Drive Generator
      (2) AMM 24-22-00/201, Electrical Power Control
      (3) AMM 26-11-01/401, Engine Fire and Overheat Detectors
      (4) AMM 29-11-05/401, Engine Driven Pump (EDP)
      (5) AMM 71-11-04/201, Fan Cowl Panels
      (6) AMM 72-03-01/401, Compressor Fairings
      (7) AMM 73-11-01/401, Low Pressure Fuel Pump
      (8) AMM 73-11-03/401, High Pressure Fuel Pump
      (9) AMM 73-21-01/401, Fuel Flow Governor
      (10) AMM 73-21-08/401, Dedicated Generator
      (11) AMM 77-12-02/401, N3 (HP) Tachometer Transmitter
      (12) AMM 78-31-00/201, Thrust Reverser System
      (13) AMM 79-00-00/701 Preserve the Main Line Bearings and Gearbox.
      (14) AMM 79-11-00/301, Engine - Servicing (Oil Change)
      (15) AMM 79-32-01/401, Oil Pressure Transmitter
      (16) AMM 79-33-01/401, Low Oil Pressure Warning Switch
      (17) AMM 79-35-01/401, Pressure Oil Filter, Differential Pressure Switch
      (18) AMM 79-35-02/401, Scavenge Oil Filter Differential Pressure Switch
      (19) AMM 80-11-01/401, Pneumatic Starter
   C. Access
      (1) Location Zones
          413/423 Fan Cowl Panels (Left)
          414/424 Fan Cowl Panels (Right)

   D. Prepare to Remove the Gearbox

      S 624-044-R00
      (1) Do this task: Preserve the Main Line Bearings and Gearbox (AMM 79-00-00/701).

      S 864-002-R00
      (2) Remove the electrical power (AMM 24-22-00/201).

S 014-003-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(3) Open the fan cowl panels (AMM 71-11-04/201).

S 014-004-R00

(4) Open the thrust reversers (AMM 78-31-00/201).

S 014-005-R00

(5) Remove the gas generator fairings from the radial drive shaft of the high speed gearbox (AMM 72-03-01/401).

S 684-006-R00

(6) Put the container below the engine and the external gearbox.

S 684-007-R00

WARNING: DO NOT GET THE SYNTHETIC LUBRICATING OIL ON YOUR SKIN. THE OIL IS POISONOUS AND CAN CAUSE INJURY TO PERSONS IF ABSORBED THROUGH THE SKIN.

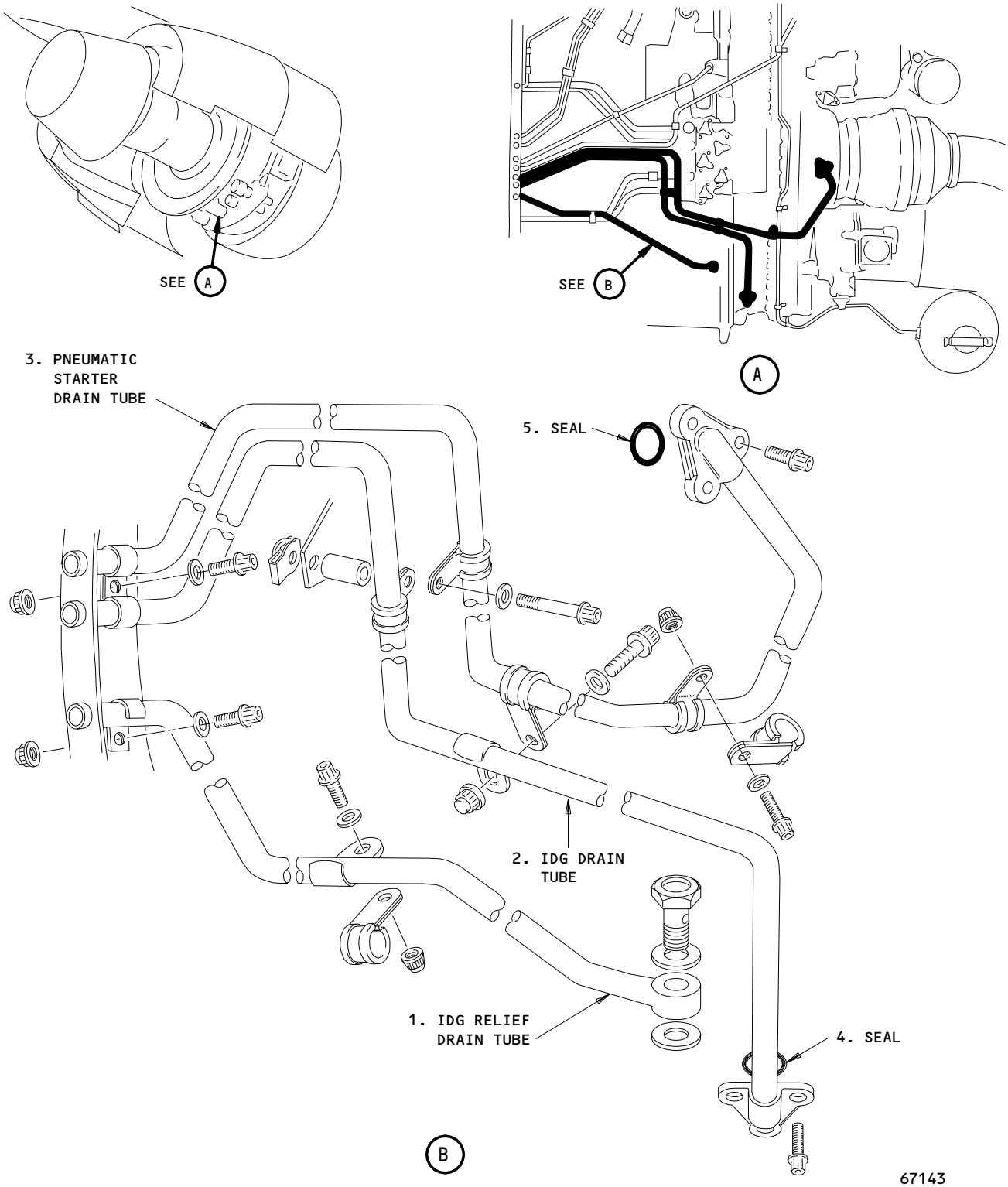
CAUTION: DO NOT GET THE OIL ON PAINTED SURFACES, RUBBER SURFACES, OR PARTS OF THE ENGINE NOT USUALLY TOUCHED BY THE OIL. CLEAN ALL OIL LEAKAGE DURING THIS PROCEDURE IMMEDIATELY. DAMAGE TO THE ENGINE AND ITS COMPONENTS CAN OCCUR BECAUSE OF THE OIL.

(7) Drain the oil from the engine and the external gearbox (AMM 79-11-00/301).

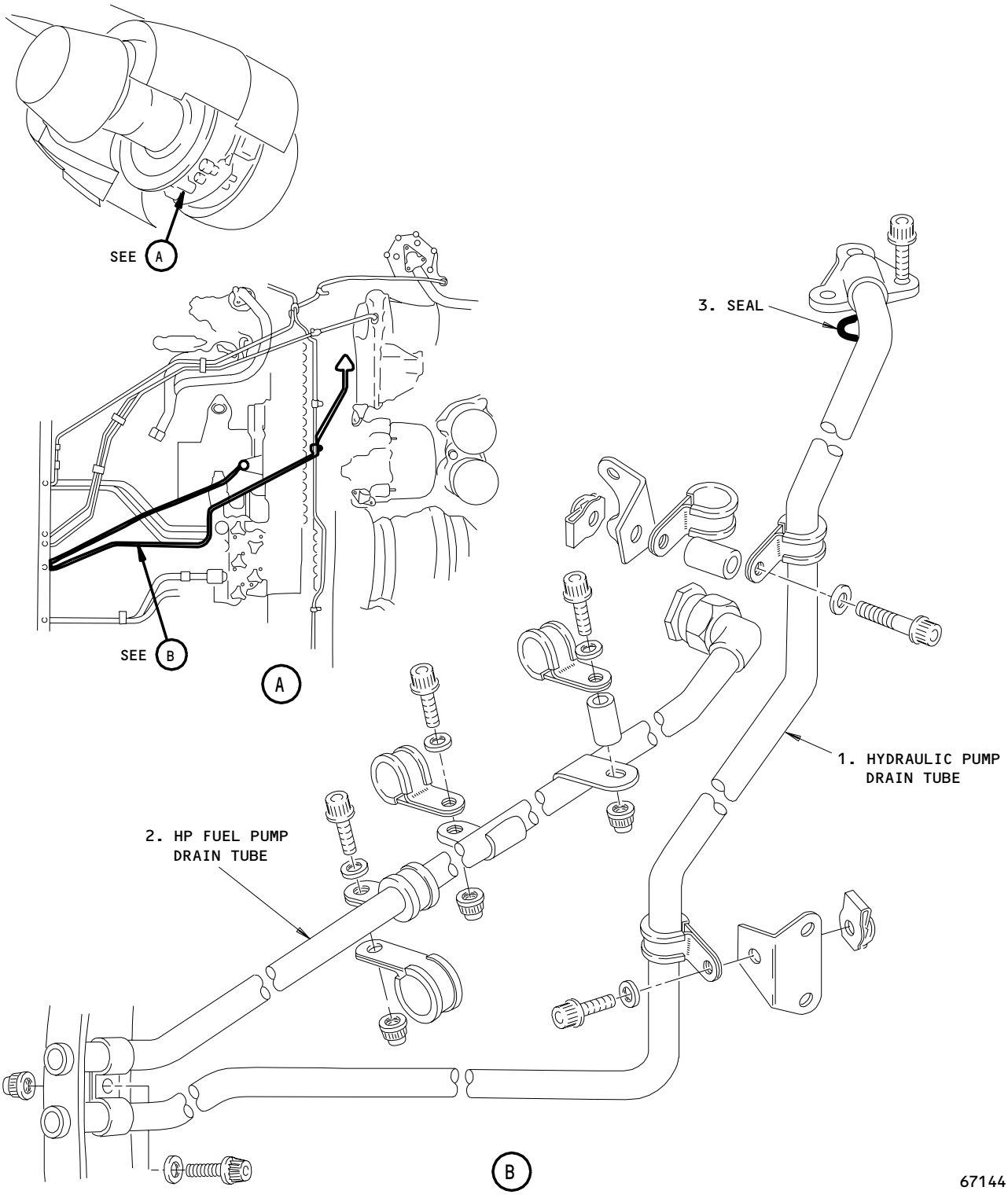
E. Remove the HS External Gearbox

S 014-008-R00

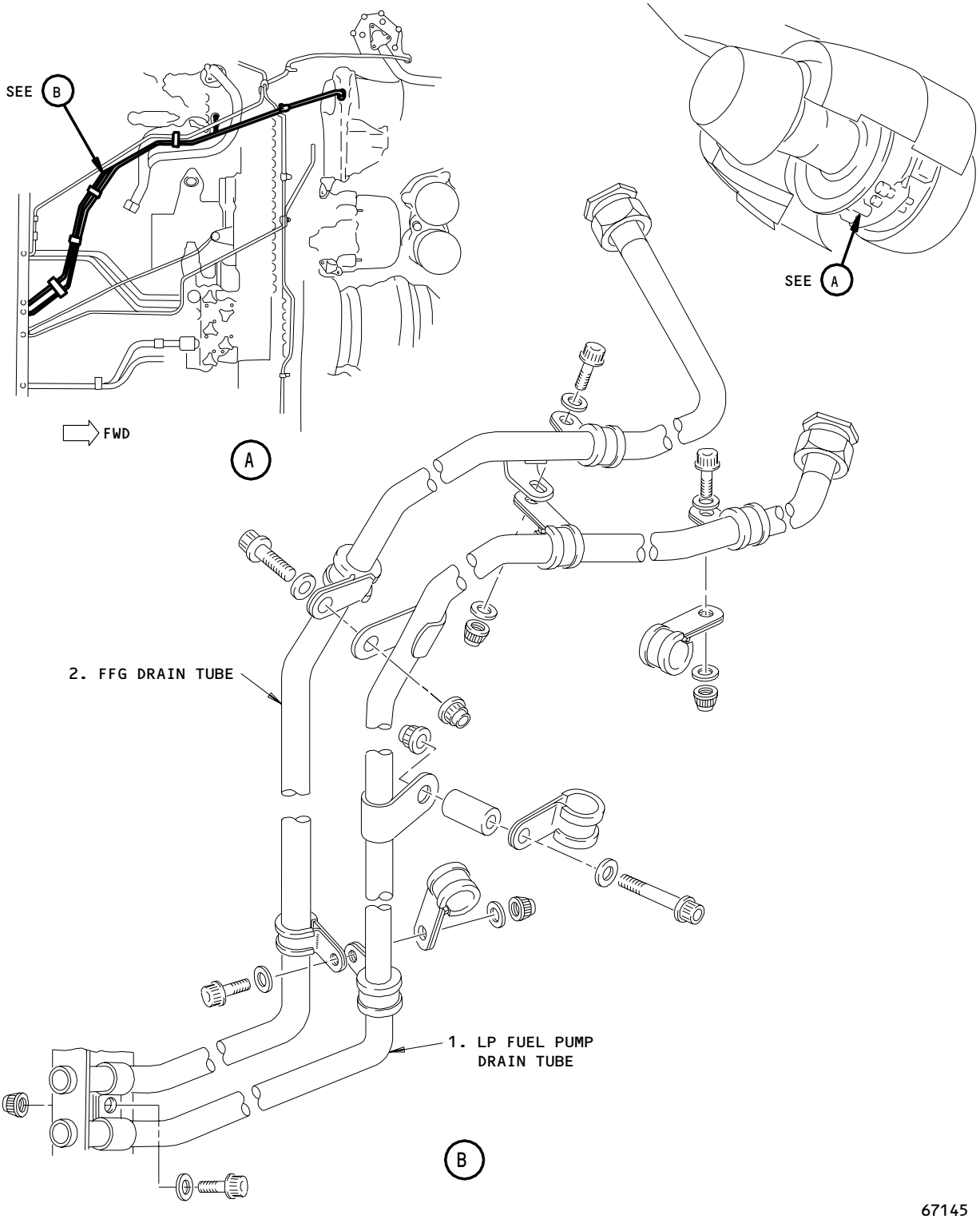
(1) Remove the engine drain tubes as follows:
  (a) Remove the clip details from the tubes (1), (2) and (3) (Fig. 401).
  (b) Remove the tubes (1, 2, 3) (Fig. 401).
  (c) Remove the clip details from the tubes (1) and (2) (Fig. 402).
  (d) Remove the tubes (1, 2) (Fig. 402).
  (e) Remove the clip details from the tubes (1), (2) and (3) (Fig. 403).
  (f) Remove the tubes (1, 2, 3) (Fig. 403).
  (g) Remove the clip details from the tube (1) (Fig. 404).
  (h) Remove the tube (1) (Fig. 404).



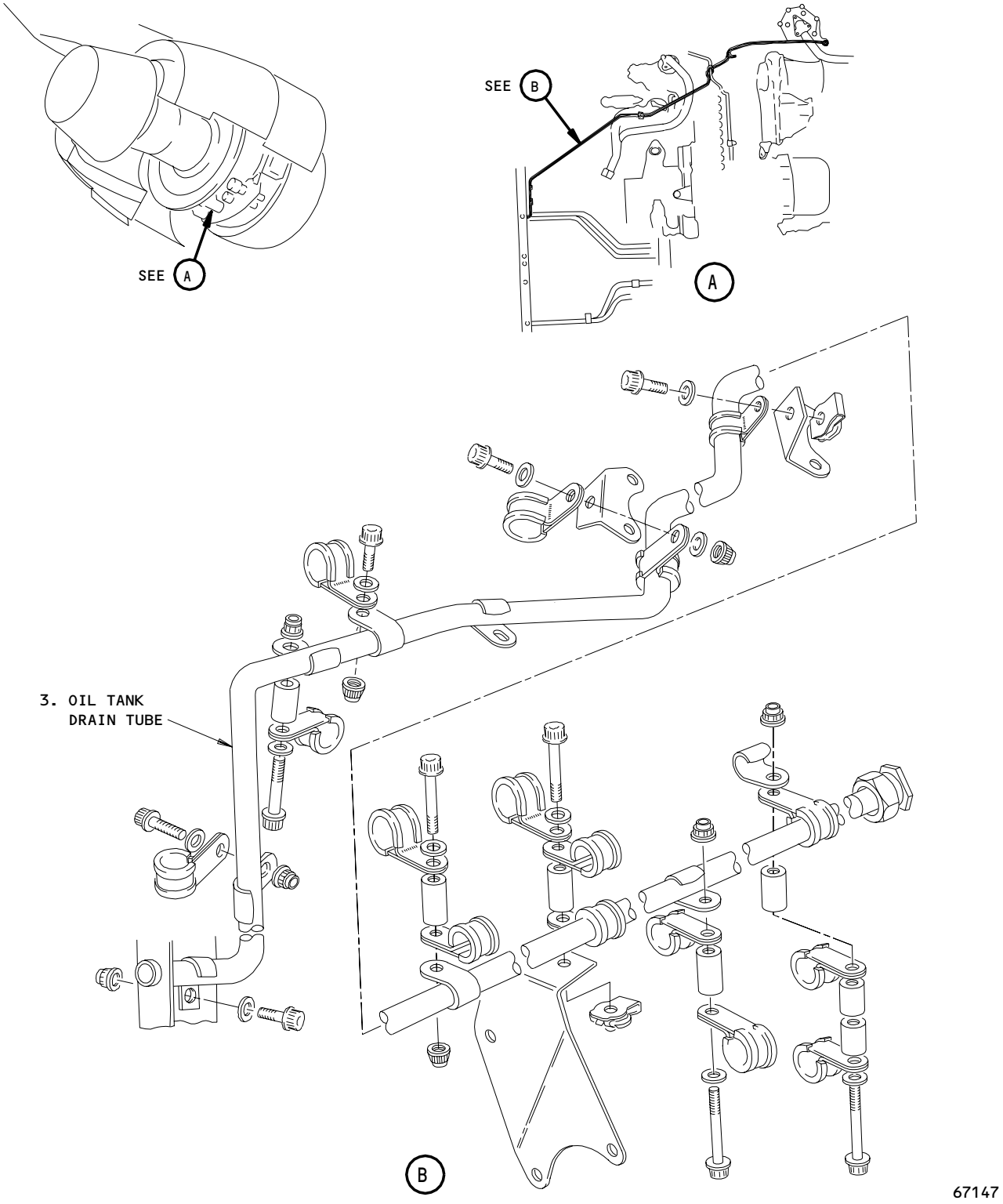
IDG and Starter Drain Tubes - Installation
Figure 401



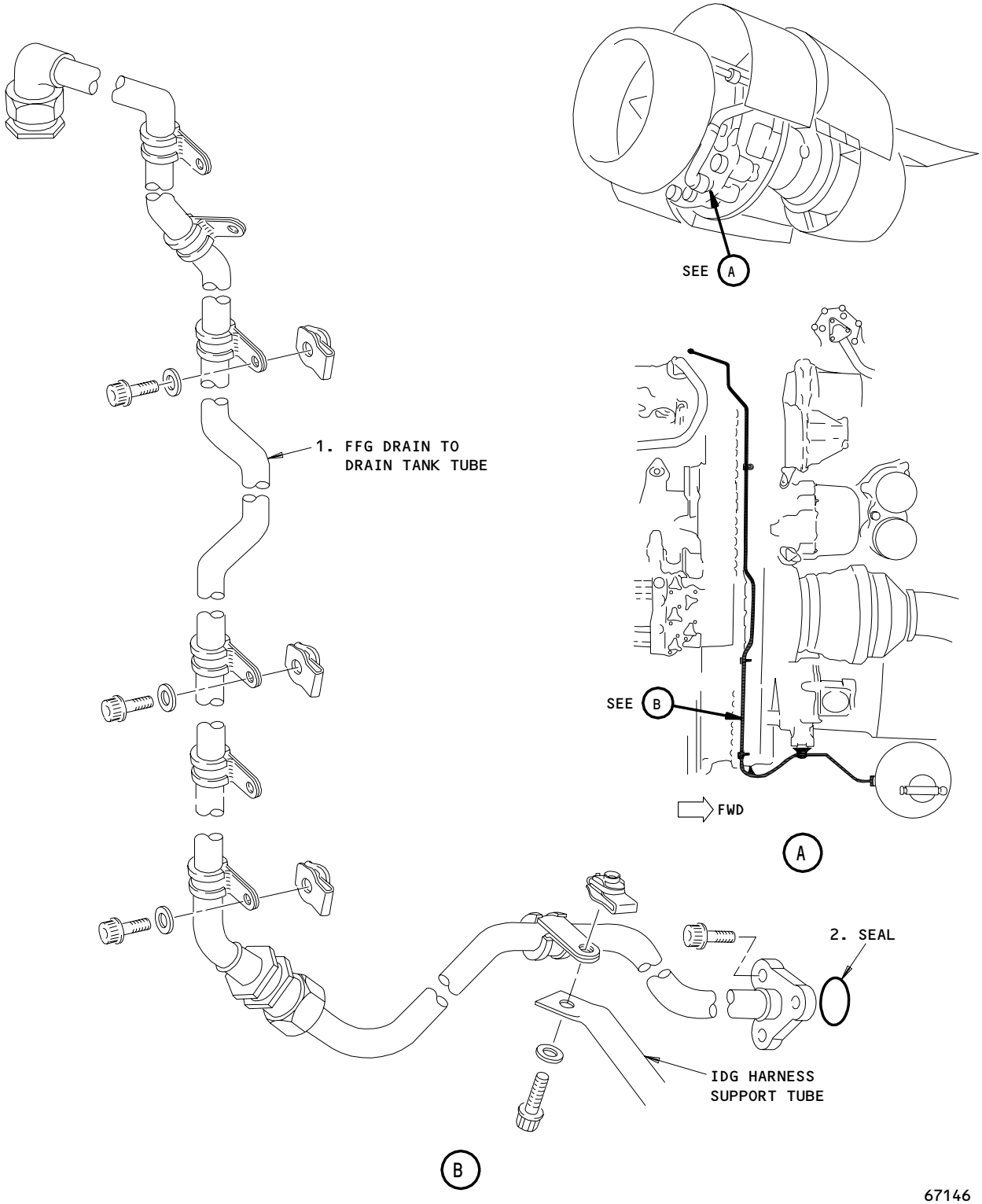
Hydraulic Pump and HP Fuel Pump Drain Tubes - Installation
Figure 402



LP Fuel Pump, FFG, and Oil Tank Drain Tubes - Installation
Figure 403 (Sheet 1)



LP Fuel Pump, FFG, and Oil Tank Drain Tubes - Installation
Figure 403 (Sheet 2)



FFG Drain Tube – Installation
Figure 404

(i) Put caps on all openings.

S 014-009-R00

(2) Remove the fire detectors as follows:
(a) Remove the fire detector assemblies from the left side of the fan case (AMM 26-11-01/401).
(b) Remove the fire detector assemblies from the right side of the fan case (AMM 26-11-01/401).

S 014-010-R00

(3) Disconnect the harness support from the bracket on the right side of the gearbox.

S 014-011-R00

(4) Remove the oil return tubes as follows (Fig. 405):
(a) Remove the clip details from the tubes.
(b) Remove the tubes (1, 2, 3, 4).

NOTE: Some of the oil can drain out when you disconnect the tubes.

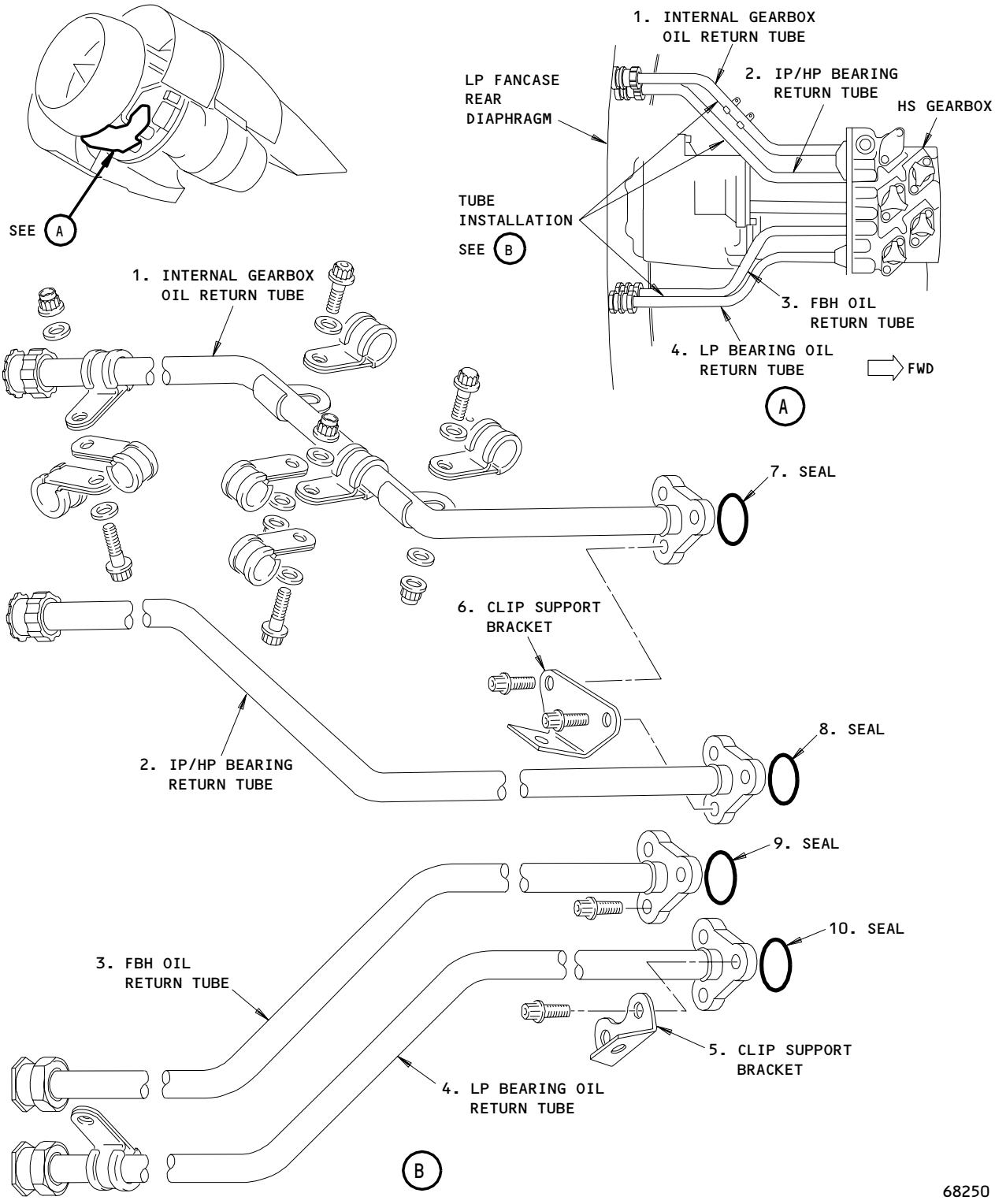
(c) Put caps on all openings.

S 014-012-R00

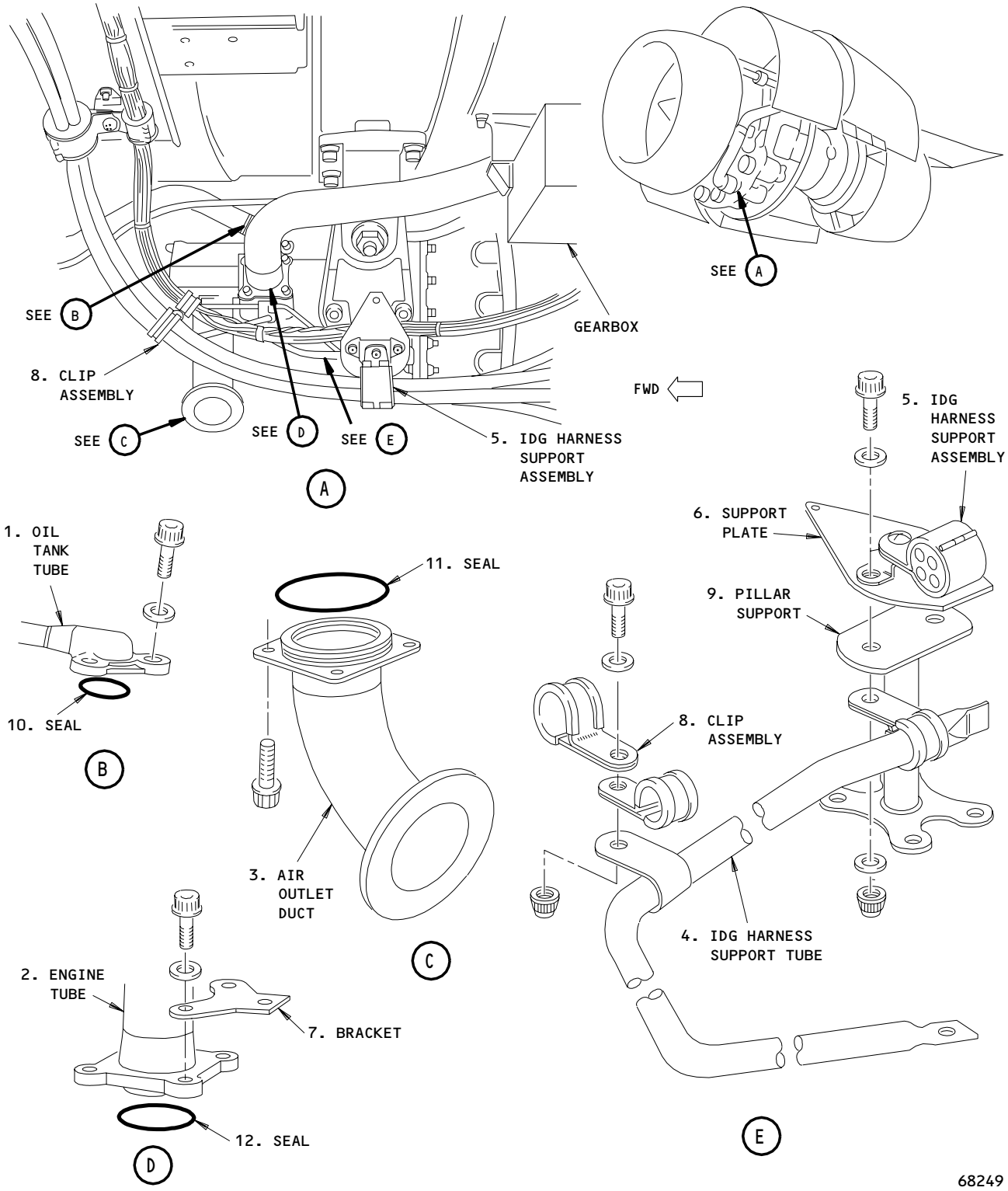
(5) Remove the components installed on the external gearbox as follows:
(a) Remove the fuel flow governor (AMM 73-21-01/401).
(b) Remove the N3 (HP) tachometer transmitter (AMM 77-12-02/401).
(c) Remove the HP fuel pump (AMM 73-11-03/401).
(d) Remove the dedicated generator (AMM 73-21-08/401).
(e) Remove the low-oil-pressure warning switch (AMM 79-33-01/401).
(f) Remove the oil pressure transmitter (AMM 79-32-01/401).
(g) Remove the integrated drive generator (AMM 24-11-01/401).
(h) Remove the LP fuel pump (AMM 73-11-01/401).
(i) Remove the hydraulic pump installed on the engine (AMM 29-11-05/401).
(j) Remove the pneumatic starter (AMM 80-11-01/401).
(k) Remove the differential pressure switch for the pressure filter (AMM 79-35-01/401).
(l) Remove the differential pressure switch for the scavenge filter (AMM 79-35-02/401).

S 014-013-R00

(6) Remove the components which attach to the engine breather as follows (Fig. 406):
(a) Disconnect the tubes (1, 2).
(b) Remove the outlet duct (3).



Oil Return Tubes Installation
Figure 405



Engine Breather Attachments
Figure 406

(c) Put caps on all openings.

S 014-014-R00

(7) Do these steps to remove the IDG harness support (Fig. 406):
(a) Remove the clip assembly (8) from the tube (4).
(b) Remove the bolts which attach the support assembly (5) and the support plate (6) to the pillar support (9).
(c) Remove the support tube (4).
(d) Temporarily attach the IDG harness away from the gearbox.

S 014-015-R00

(8) Disconnect the oil pump tubes as follows (Fig. 407):
(a) Remove the details used to attach the oil pump tubes.
(b) Disconnect the tubes (1, 2, 3).

NOTE: Some of the oil can drain out when you disconnect the tubes.

(c) Put caps on all openings.

S 014-016-R00

(9) Disconnect the gearbox oil and air supply as follows (Fig. 408):
(a) Disconnect the tube (1) at the position 'D'.
(b) Disconnect the tube (5).

NOTE: Some of the oil can drain out when you disconnect the tubes.

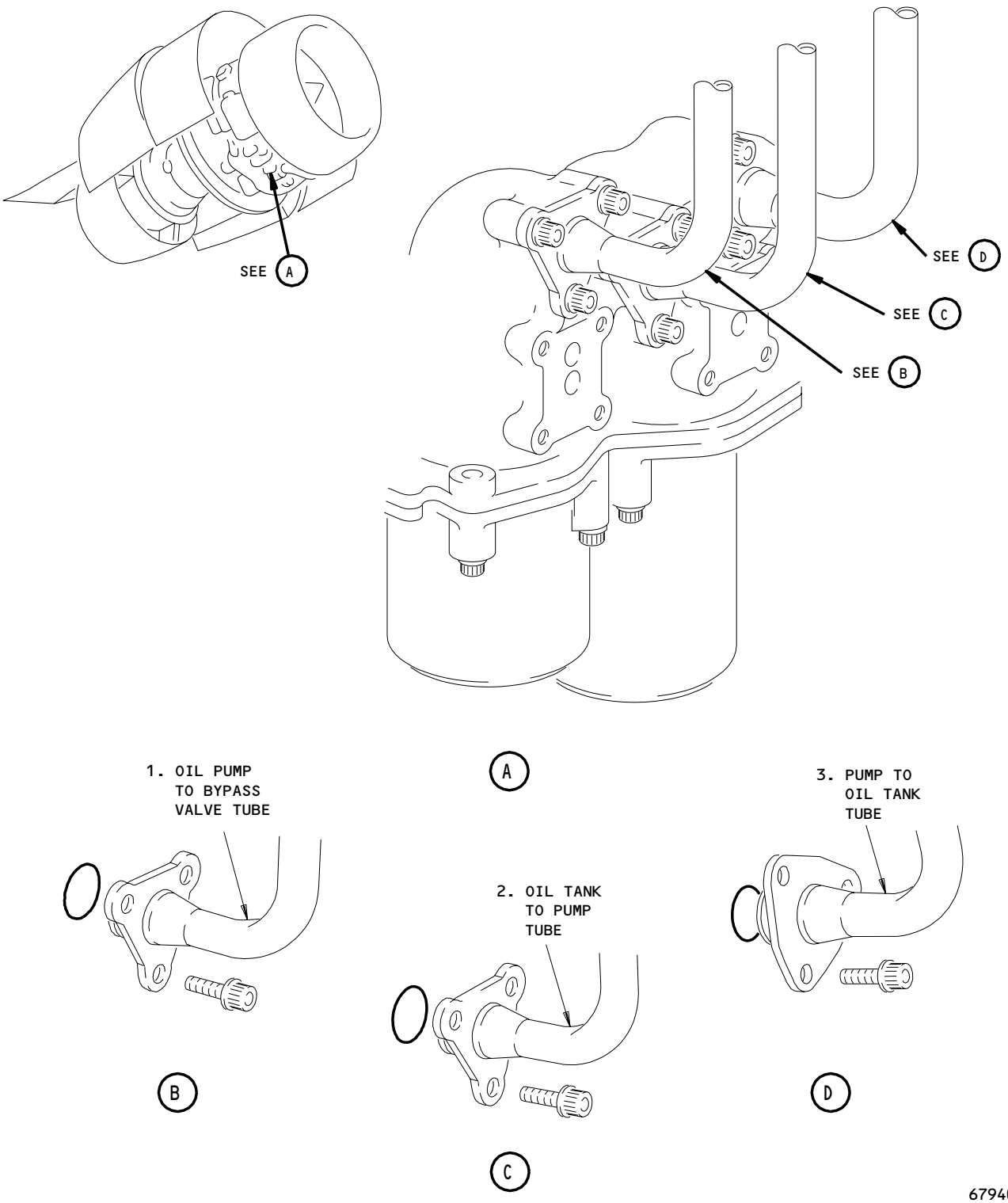
(c) Put caps on all openings.

S 014-017-R00

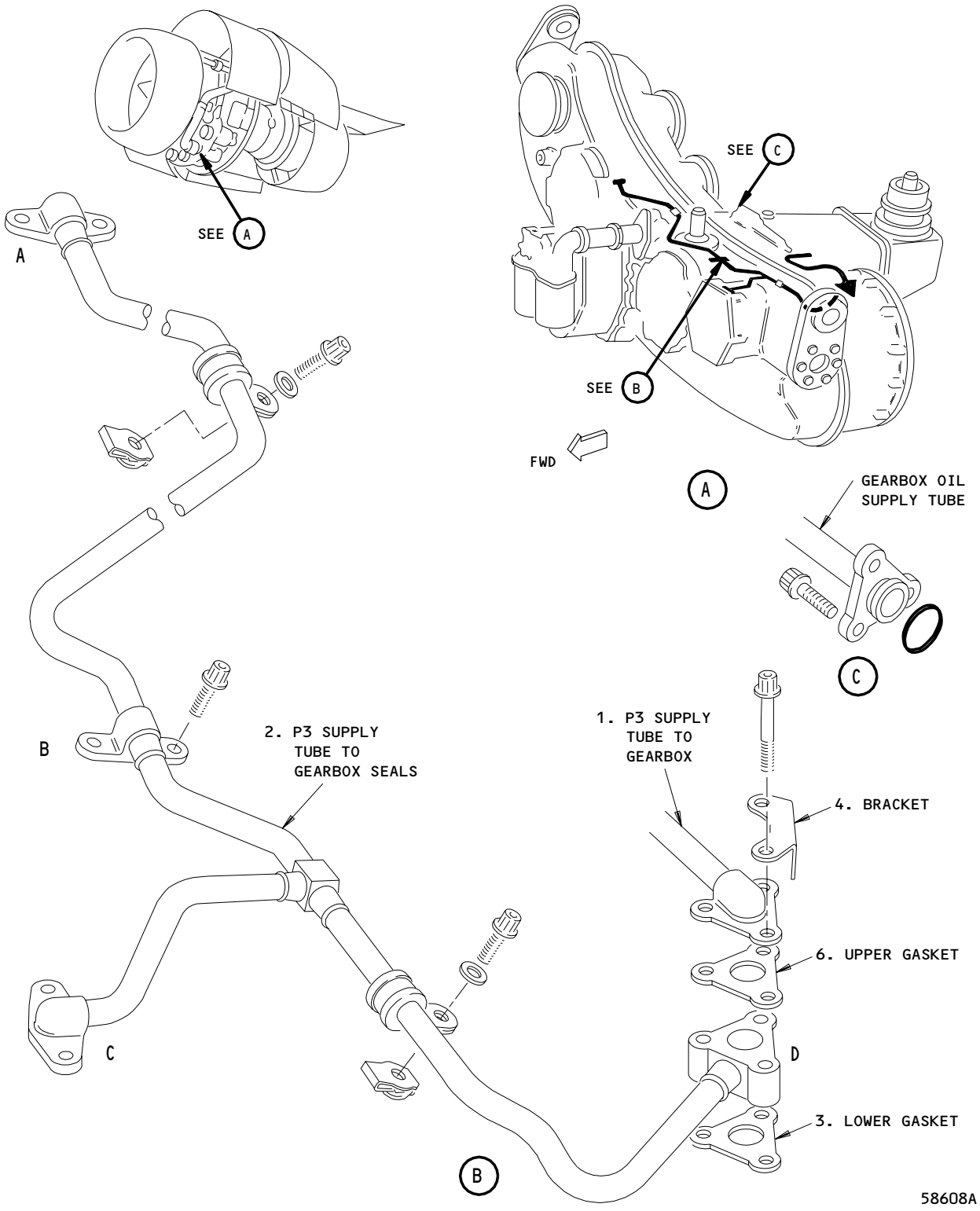
(10) ENGINES POST RR SB 72-9008 AND 72-B061;
Remove the oil sealing sleeve as follows (Fig. 409):
(a) Remove the band clamps (5, 6).
(b) Move the oil sealing sleeve (1) on the tube assembly of the outer shroud.

S 024-019-R00

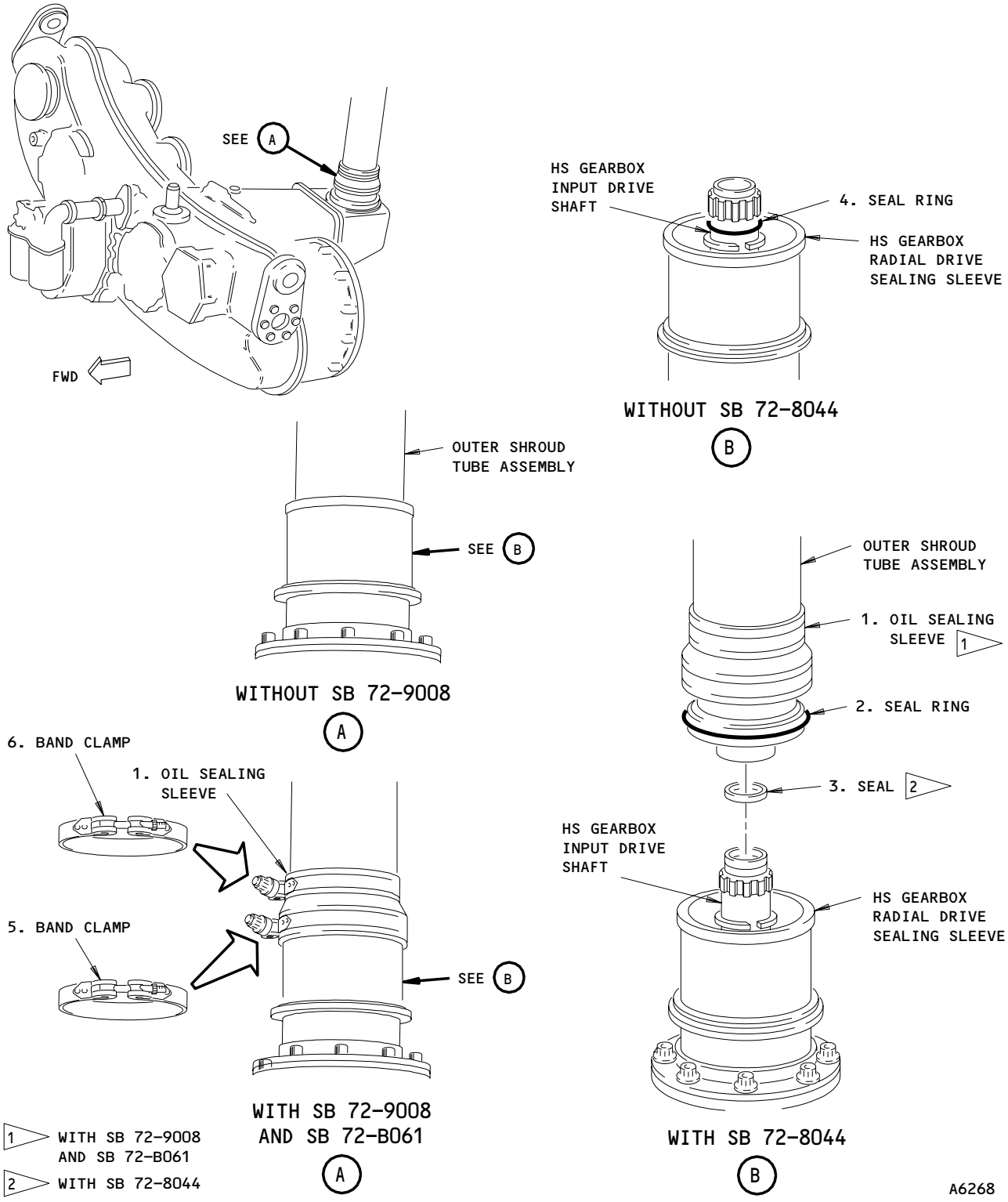
(11) Do these steps to remove the HS external gearbox (Fig. 410):
(a) Install the fan case outriggers (1).
(b) Install the chain blocks (2) to the outriggers (1).
(c) Remove the support brackets (4) from the lifting cradle (3).
(d) Install the support brackets (4) on the gearbox.
(e) Put the lifting cradle (3) in the correct position.
(f) Connect the slinging arms (7) to the chain blocks.
(g) Release the lifting cradle (3) from the trolley.



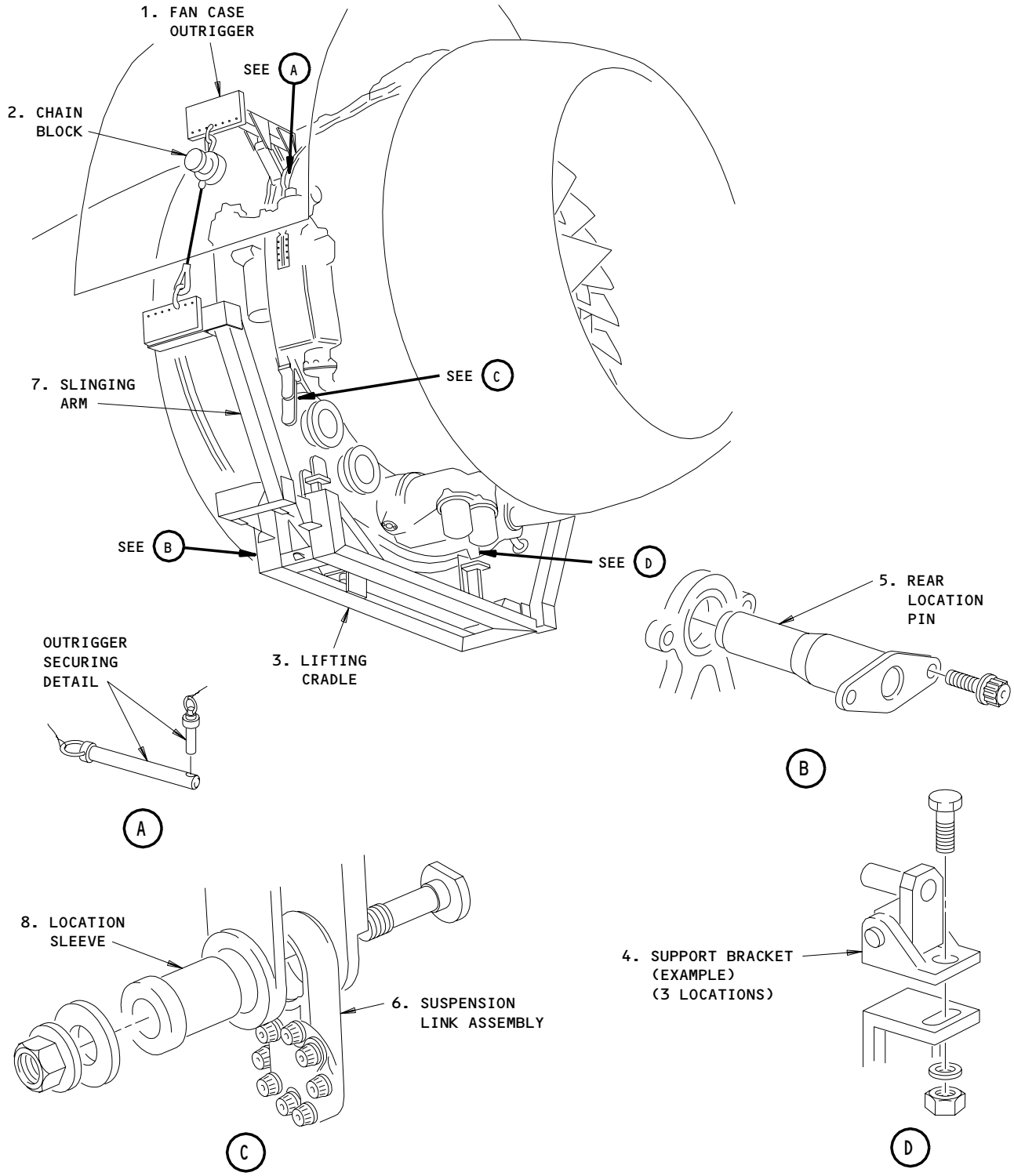
Oil Pump Connection Points
Figure 407



Gearbox Oil/Air Supply Connection Points
Figure 408



High Speed Gearbox Radial Drive Shaft Disconnect/Reconnect
Figure 409



EXAMPLE LEFT/RIGHT HAND ASSEMBLIES

58609B

Gearbox Installation
Figure 410

(h) Lift the assembly to the correct position on the gearbox.
(i) Attach the support brackets (4) to the lifting cradle (3).
(j) Apply a force to the chain blocks (2) which is equal to the weight of the gearbox.
(k) Remove the bolts which attach the rear location pin (5).
(l) Use an extractor to remove the rear location pin (5).
(m) Remove the nuts, washers and bolts which attach the suspension links (6).
(n) Use an impact extractor to remove the location sleeves (8).
(o) Lower the gearbox until the lifting cradle is in the correct position on the trolley.
(p) Attach the lifting cradle to the trolley.
(q) Release the lifting assembly from the engine.
(r) Move the gearbox away from the engine.
(s) Remove the remaining lifting equipment from the engine.

S 024-020-R00

(12) Remove the P3 air tube as follows (Fig. 408):
(a) Remove the bolts which attach the P3 tube (2).
(b) Remove the P3 air tube (2) from the gearbox.
(c) Put caps on all openings.

TASK 72-00-61-404-021-R00

3. Install the HS External Gearbox

A. General
(1) Use the procedures in 70-51-00/201 to tighten the fasteners.
(2) Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is specified in this procedure.
(3) Use the procedures in 70-02-01/201 to install the seal rings.

B. Equipment
(1) CP30264 Trolley, Rolls-Royce
(2) CP30313/2 Parking Frame, Rolls-Royce
(3) CP30430/2 Sling, Rolls-Royce
(4) B71018-28 Handling Fixture

C. Consumable Materials
(1) Jointing Compound
British Spec/Ref - DTD 900/4586, Hylomar - PL32L
OMat No. 4/46
(2) Cleaning fluid - Methylene Chloride (Dichloromethane)
British Spec/Ref - BS 1994, or 1953
OMat No. 169
(3) Lockwire
British Spec/Ref - DTD 189A, 22 S.W.G.
American Spec/Ref - 21 A.W.G.
OMat No. 238

D. References
(1) AMM 12-13-01/301, Engine - Servicing (Oil Replenishing)
(2) AMM 24-11-01/401, Integrated Drive Generator
(3) AMM 24-22-00/201, Electrical Power Control
(4) AMM 26-11-01/401, Engine Fire and Overheat Detectors
(5) AMM 29-11-05/401, Engine Driven Pump (EDP)
(6) AMM 70-42-12/201, Local Surface Protection
(7) AMM 71-00-00/501, Power Plant
(8) AMM 71-11-04/201, Fan Cowl Panels
(9) AMM 72-03-01/401, Compressor Fairings
(10) AMM 72-62-01/401, High Speed Gearbox Radial Drive Shaft
(11) AMM 73-11-01/401, Low Pressure Fuel Pump
(12) AMM 73-11-03/401, High Pressure Fuel Pump
(13) AMM 73-21-01/401, Fuel Flow Governor
(14) AMM 73-21-08/401, Dedicated Generator
(15) AMM 77-12-02/401, N3 (HP) Tachometer Transmitter
(16) AMM 78-31-00/201, Thrust Reverser System
(17) AMM 79-32-01/401, Oil Pressure Transmitter
(18) AMM 79-33-01/401, Low Oil Pressure Warning Switch
(19) AMM 79-35-01/401, Pressure Oil Filter, Differential Pressure Switch
(20) AMM 79-35-02/401, Scavenge Oil Filter Differential Pressure Switch
(21) AMM 80-11-01/401, Pneumatic Starter

E. Access
(1) Location Zones
413/423 Fan Cowl Panels (Left)
414/424 Fan Cowl Panels (Right)

F. Apply Jointing Compound to Seal the Joints

S 394-022-R00
(1) Do these steps when you apply jointing compound during the installation:

WARNING: DO NOT GET THE CLEANING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE CLEANING FLUID. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE CLEANING FLUID. CLEANING FLUID IS POISONOUS AND CAN CAUSE INJURY TO PERSONS.

CAUTION: BE CAREFUL WHEN YOU USE THE CLEANING FLUID BECAUSE THE SURFACE PROTECTION CAN BE DAMAGED. NEW SURFACE PROTECTION MUST BE APPLIED TO THE DAMAGED AREAS (AMM 70-42-12/201).

BE VERY CAREFUL THAT THE JOINTING COMPOUND DOES NOT GET IN THE INTERNAL COMPONENTS WHEN YOU TIGHTEN THE JOINT.

(a) Use cleaning fluid to remove the used jointing compound from the mating faces.

(b) Make sure the mating faces on the gearbox and fan case are clean and are not damaged.
(c) Use a brush to apply the jointing compound to the mating faces.
(d) Let the jointing compound dry for 10 minutes before you assemble the joint.

G. Install the HS External Gearbox

S 024-023-R00

(1) Make sure the high speed gearbox radial drive shaft is removed (AMM 72-62-01/401).

NOTE: It is only necessary to remove the outer radial drive shaft to avoid possible damage to the oil distribution tube.

S 424-024-R00

(2) Install the P3 air supply tube as follows (Fig. 408):
(a) Remove the applicable caps from the tube and the gearbox.
(b) Apply jointing compound to the tube (2) at the connection points A, B and C only.
(c) Install the tube (2) on the gearbox.
(d) Attach the tube (2) with the clips and at the connection points A, B and C only.
(e) Tighten the bolts (AMM 70-51-00/201).

S 424-025-R00

(3) Do these steps to install the HS gearbox (Fig. 410):
(a) Remove the applicable caps from the engine and the gearbox.
(b) Remove and discard the applicable seal (3) or the seal ring (4) (Fig. 409).
(c) Install the fan case outriggers (1).
(d) Install the chain blocks (2) to the fan case outriggers (1).
(e) With the gearbox installed in the lifting cradle (3), move the lifting assembly to the correct position below the engine.
(f) Connect the slinging arms (7) to the chain blocks (2).

CAUTION: DO NOT MIX COMPONENTS BEFORE RR SB 72-8044 WITH COMPONENTS AFTER RR SB 72-8044. MAKE SURE THE OUTER DRIVE SHAFT AND THE INPUT DRIVE SHAFT ON THE HIGH SPEED GEARBOX ARE ALIGNED. DAMAGE TO THE DRIVE SHAFTS CAN OCCUR.

(g) ENGINES PRE RR SB 72-8044;
Lubricate and install a new seal ring (4) to the input drive shaft on the gearbox (Fig. 409).

CAUTION: MAKE SURE THE GROOVES ON THE SEAL (3) POINT RADIALLY INWARD. IF YOU DO NOT DO THIS, THE DRIVE SHAFT MAY NOT BE LUBRICATED CORRECTLY AND DAMAGE TO THE DRIVESHAFT SPLINES CAN OCCUR.

(h) ENGINES POST RR SB 72-8044;
Lubricate and install a new seal (3) to the input drive shaft on the gearbox (Fig. 409).
(i) Install a new seal ring (2) on the shroud of the drive shaft (Fig. 409).
(j) Release the lifting cradle (3) from the trolley.
(k) Lift the gearbox with the lifting assembly to the correct position on the fan case.
(l) Make sure the input drive shaft and the center location pin on the gearbox correctly engage the engine.
(m) Put the suspension links (6) in the correct position in the clevis brackets for the LP compressor.
(n) Install the location sleeves (8) with the nuts, bolts and washers.
(o) Tighten the bolts which attach the location sleeves (8).
(p) Install the location sleeves (8) in the clevis brackets with the nuts, bolts and washers.
(q) Install the rear location pin (5) with the bolts.

NOTE: Make sure the rear location pin (5) correctly engages the rear diaphragm of the LP compressor case.

(r) Tighten the bolts which attach the rear location pin (5).
(s) Tighten the bolts which attach the suspension links (6) to 790 pound-inches (89 Newton meters).
(t) Release the support brackets (4) from the lifting cradle (3).

(u) Lower the lifting cradle (3) to the trolley.
(v) Attach the lifting cradle (3) to the trolley.
(w) Remove the support brackets (4) from the gearbox.
(x) Install the support brackets (4) on the lifting cradle (3).
(y) Release the lifting cradle (3) and the trolley from the chain blocks (2).
(z) Move the trolley away from the engine.
(aa) Remove the chain blocks (2) and fan case outriggers (1) from the engine.
(ab) Install the radial driveshaft (AMM 72-62-01/401).

NOTE: It is only necessary to install the radial driveshaft if it was removed to avoid damage to the oil distribution tube.

S 414-026-R00

(4) ENGINES POST RR SB 72-9008 AND 72-B061;
Do these steps to install the oil sealing sleeve (Fig. 409):
(a) Move the oil sealing sleeve (1) down until it is equally on the outer shroud and the radial drive sealing sleeve.
(b) Do these steps to install the band clamps on the oil sealing sleeve (1):

NOTE: The angular position of the band clamps is important to give sufficient clearance with the radial drive fairing.

1) Install the small clamp band (6) on the oil sealing sleeve (1).

NOTE: Make sure the clamp bolt aligns with the vertical centerline of the engine at the front of the sleeve.

2) Install the large band clamp (5) on the oil sealing sleeve (1).

NOTE: Make sure the clamp bolt aligns with the vertical centerline of the engine at the front of the sleeve.

3) ENGINES POST RR SB 72-9008;
Tighten the clamps (5, 6) to 40 pound-inches (4.4 Newton meters).
4) ENGINES POST RR SB 72-B061;
Tighten the clamps (5, 6) to 35 pound-inches (4.0 Newton meters).
(c) Put the radial drive fairing on the location brackets.

(d) Do these steps if the clearance between the clamps (5, 6) and the radial drive fairing is not sufficient:
1) Loosen the clamps that touch the fairing.
2) Change the position of the clamps to make sure they do not touch the fairing.
3) ENGINES POST RR SB 72-9008;
Tighten the clamps to 40 pound-inches (4.4 Newton meters).
4) ENGINES POST RR SB 72-B061;
Tighten the clamps (5, 6) to 35 pound-inches (4.0 Newton meters).

S 414-028-R00

(5) Connect the gearbox oil and air supply as follows (Fig. 408):
(a) Remove the applicable caps from the tubes and the gearbox.
(b) Apply jointing compound to the mating face of the tube (5).
(c) Lubricate and install a new seal on the tube (5).
(d) Install the tube (5) to the gearbox with bolts.
(e) Apply jointing compound to the mating faces between the gasket (3), gasket (6) and the gearbox.
(f) Make sure the gaskets (3, 6) at position 'D' on the tube (2) are in the correct position.
(g) Install the tube (1) and the bracket (4) to the gearbox with bolts.
(h) Tighten the bolts on the tubes (1, 5).

S 414-029-R00

(6) Connect the oil pump tubes as follows (Fig. 407):
(a) Remove the applicable caps from the tubes and the gearbox.
(b) Apply jointing compound to the mating faces of the tubes (1, 2, 3).
(c) Lubricate and install new seals to the tubes (1, 2, 3).
(d) Install the tubes (1, 2, 3) to the oil pump with bolts.
(e) Install the clips which attach the tubes (1, 2, 3) to the engine.
(f) Tighten the bolts which attach the tubes and the clips.

S 414-030-R00

(7) Do these steps to install the IDG harness support (Fig. 406):
(a) Install the tube (4), IDG harness support (5) and support plate (6) on the pillar support (9) with bolts, washers and nuts.
(b) Install the clip assembly (8) on the tube (4) with a bolt, a washer and a nut.
(c) Tighten the bolts for the pillar support (9) and the clip assembly (8).

S 414-031-R00

(8) Install the components which attach to the engine breather as follows (Fig. 406):
  (a) Remove the applicable caps from the tubes, duct and gearbox.
  (b) Apply jointing compound to the mating faces of the tubes (1, 2).
  (c) Lubricate and install the new seals (10, 12) on the tubes (1, 2).
  (d) Make sure the bracket (7) is in the correct position.
  (e) Install the tubes (1, 2).
  (f) Apply jointing compound to the mating face of the duct (3).
  (g) Lubricate and install a new seal (11) on the duct (3).
  (h) Install the duct (3).
  (i) Tighten bolts which attach the tubes (1, 2) and the duct (3).

S 414-032-R00

(9) Install the components which attach to the gearbox as follows:
  (a) Install the differential pressure switch for the scavenge filter (AMM 79-35-02/401).
  (b) Install the differential pressure switch for the pressure filter (AMM 79-35-01/401).
  (c) Install the pneumatic starter (AMM 80-11-01/401).
  (d) Install the hydraulic pump attached to the engine (AMM 29-11-05/401).
  (e) Install the LP fuel pump (AMM 73-11-01/401).
  (f) Install the integrated drive generator (AMM 24-11-01/401).
  (g) Install the oil pressure transmitter (AMM 79-32-01/401).
  (h) Install the low-oil-pressure warning switch (AMM 79-33-01/401).
  (i) Install the dedicated generator (AMM 73-21-08/401).
  (j) Install the HP fuel pump (AMM 73-11-03/401).
  (k) Install the N3 (HP) tachometer transmitter (AMM 77-12-02/401).
  (l) Install the fuel flow governor (AMM 73-21-01/401).

S 414-033-R00

(10) Install the oil return tubes as follows (Fig. 405):
  (a) Remove the applicable caps from the tubes and the gearbox.
  (b) Apply jointing compound to forward mating faces of tubes (1, 2, 3, 4).
  (c) Lubricate and install the new seals (7, 8, 9, 10) on the tubes (1, 2, 3, 4).
  (d) Install the tubes (1, 2, 3, 4) and brackets (5, 6) to the gearbox with bolts.
  (e) Install the tubes (1, 2, 3, 4) to the rear diaphragm on the LP fan case with tube connectors.
  (f) Tighten the bolts and the tube connectors.

(g) Install lockwire on the tube connectors at the rear diaphragm on the LP fan case.

S 414-034-R00

(11) Install the harness support as follows:
(a) Connect the harness support to the bracket on the right side of the gearbox.
(b) Install and tighten a bolt to attach the harness support to the bracket.

S 414-035-R00

(12) Install the fire detectors as follows:
(a) Install the fire detector assemblies on the left side of the fan case (AMM 26-11-01/401).
(b) Install the fire detector assemblies on the right side of the fan case (AMM 26-11-01/401).

S 414-036-R00

(13) Install the engine drain tubes as follows:
(a) Remove the applicable caps from the tubes and the gearbox.
(b) Install the FFG drain tube as follows (Fig. 404):
1) Lubricate and install a new seal (2) on the tube (1).
2) Install the forward end of the tube with bolts and the aft end of the tube with the end connector.
3) Tighten the end connector.
(c) Install the clip details.
1) Tighten the bolts (AMM 70-51-00/201).
2) Install lockwire to the end connector on the tube (1).
(d) Install the drain tube for the LP fuel pump, FFG and oil tank as follows (Fig. 403):
1) Install the forward end of the tubes (1, 2, 3) to the gearbox with the end connectors.
2) Install the tubes (1, 2, 3) to the engine with the clamps and the other related hardware.
3) Tighten the end connectors.
(e) Install the clip details to the tubes (1), (2) and (3).
1) Tighten the bolts (AMM 70-51-00/201).
2) Lockwire the end connectors on the tubes (1, 2, 3).
(f) Install the drain tubes for the hydraulic pump and the HP fuel pump as follows (Fig. 402):
1) Apply jointing compound to the mating face of the tube (1).
2) Lubricate and install a new seal (3) on the tube (1).
3) Install the tube (1) with the bolts and the tube (2) with the end connector.
4) Tighten the end connector.

5) Install the clip details to the tubes (1) and (2).
   a) Tighten the bolts (Ref 70-51-00/201).
6) Install the lockwire to the end connector on the tube (2).

(g) Install the drain tubes for the IDG and the pneumatic starter as follows (Fig. 401):
1) Apply jointing compound to the mating face of the tubes (2, 3).
2) Lubricate and install the new seals (4, 5) on the tubes (2, 3).
3) Install the tubes (1, 2) on the engine with bolts.
4) Install the clip details to the tubes (2) and (3).
   a) Tighten the bolts (AMM 70-51-00/201).
5) Install the forward end of the tube (1) with two new sealing washers and a bolt.
6) Install the clip details to the tube (1).
   a) Tighten the bolts (AMM 70-51-00/201).

S 614-037-R00

CAUTION: ADD OIL TO THE OIL SYSTEM BEFORE YOU START THE POWER PLANT TEST. INTERNAL DAMAGE TO THE ENGINE CAN OCCUR IF YOU OPERATE THE ENGINE AND THE OIL SYSTEM DOES NOT CONTAIN OIL.

(14) Do the procedure to Add Oil to the Oil System (When Oil is not in the System) (AMM 12-13-01/301).

S 414-038-R00

(15) Install the gas generator fairings on the radial drive shaft of the high speed gearbox (AMM 72-03-01/401).

S 414-039-R00

(16) Close the thrust reversers (AMM 78-31-00/201).

S 414-040-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(17) Close the fan cowl panels (AMM 71-11-04/201).

S 614-041-R00
(18) Do the procedure to Add Oil to the Oil System (When Oil is in the System) (AMM 12-13-01/301).

NOTE: The oil system will overflow if you fill the oil tank before you first operate the engine at minimum power. The oil comes out of the engine through the breather outlet duct.

S 864-042-R00
(19) Supply electrical power (AMM 24-22-00/201).

S 794-043-R00
(20) Do the test of the High Speed Gearbox that is shown in the Power Plant Test Reference Table (AMM 71-00-00/501).

HIGH SPEED (HS) EXTERNAL GEARBOX - INSPECTION/CHECK

1. General
   A. This procedure does an inspection of the HS external gearbox.

TASK 72-00-61-206-001-R00

2. Do an Inspection of the HS External Gearbox
   A. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
   B. Access
      (1) Location Zones
          413/423 Fan Cowl Panels (Left)
          414/424 Fan Cowl Panels (Right)

   C. Do an Inspection of the HS External Gearbox

S 016-007-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the fan cowl panels (AMM 71-11-04/201).

S 216-003-R00

(2) Visually examine the area where the HS external gearbox attaches to the engine to see if it is structurally correct.
   (a) Metal to metal contact between the inner bush and the housing - Accept.

S 216-004-R00

(3) Visually examine each area where a component attaches to the HS external gearbox.

NOTE: Make sure the areas are structurally correct and that each unit is installed correctly.

S 216-005-R00

(4) Do an inspection of the HP3 supply tube from the intermediate case to the HS external gearbox through the centrisep filter.

NOTE: Make sure the tube is not damaged and is installed correctly.

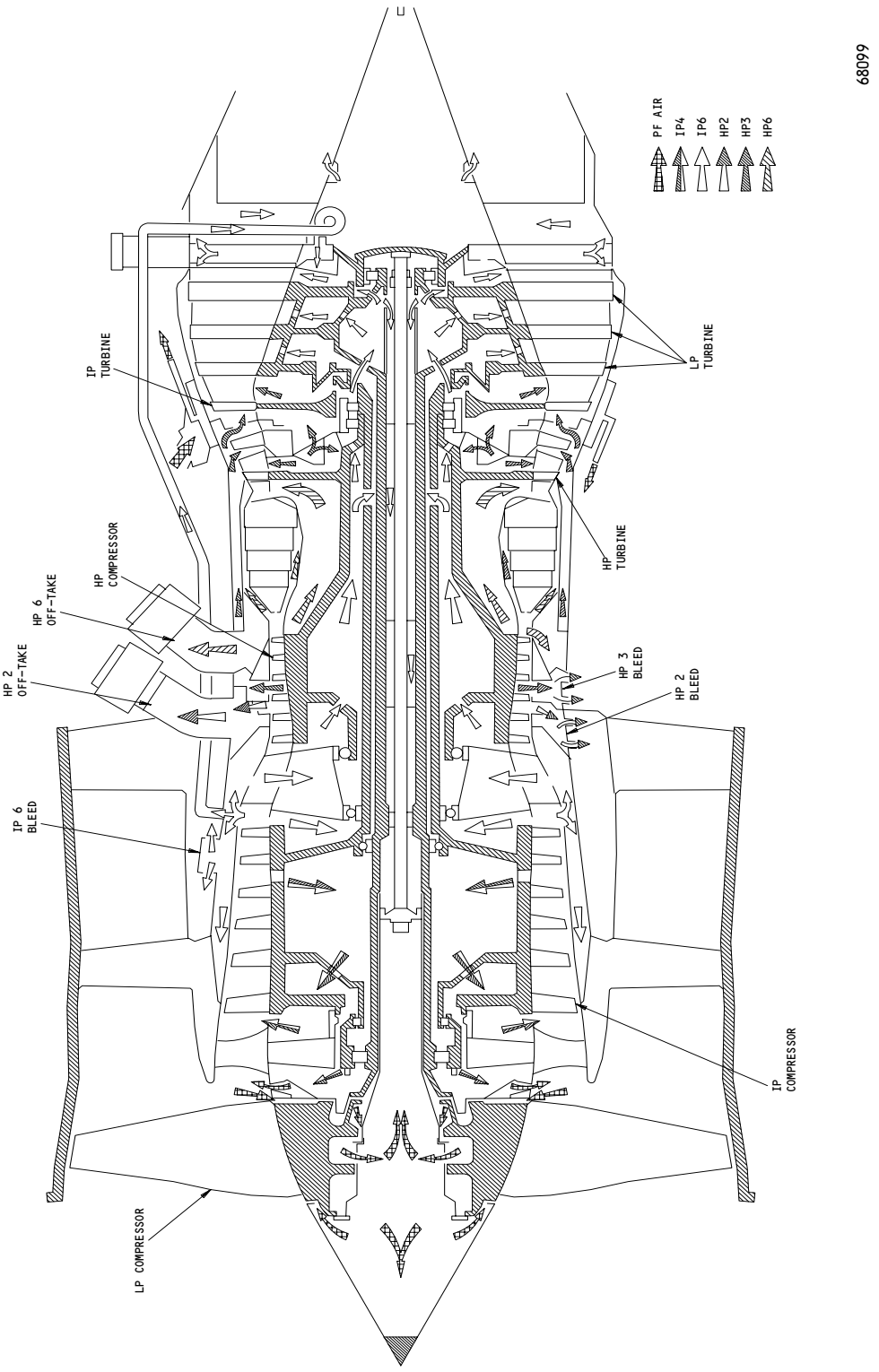
S 416-008-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(5) Close the fan cowl panels (AMM 71-11-04/201).

COOLING AND SEALING AIR SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The cooling and sealing air system protects the internal components of the engine from heat generated in the combustion section and under the control of air seals, prevents the inward flow of hot gas and pressurizes the various oil seals and gear chambers against leakage. The system also provides external cooling for the turbine outer case.
   B. The internal temperature of the engine is monitored by an overheat detection system (AMM 26-13-00).
   C. This system uses LP compressor air (PF), 4th and 6th-stage IP compressor air (IP4 and IP6), and 2nd, 3rd and 6th-stage HP compressor air (HP2, HP3 and HP6) for cooling engine internals and sealing oil seals from leakage.
2. Component Details
   A. LP Compressor Air (PF)
      (1) LP compressor air is utilized to cool the LP compressor disc and shaft and the IP turbine case.
      (2) PF air flows inward between the LP compressor disc and the LP disc rear seal panel. This air then flows through the LP curvic coupling between the fan retention shaft, and through holes in the fan retention drive cone to circulate and cool the LP compressor system before venting into the PF airstream, between the LP compressor disc and the rotating fairing.
      (3) PF air also enters the cooling air manifold through two ports located within the bore of the thrust reverser 'C' ducts (AMM 78-31-00), and circulates through the cooling manifold where inward facing holes direct jets of air onto the IP turbine case, before being dispersed rearward between the IP turbine case and cooling manifold. A percentage of air flows directly outward from the cooling manifold through rearward facing tubes to the top and forward facing tubes to the bottom to assist in Zone 3 cooling (AMM 75-21-00).
   B. IP Compressor Air (IP4)
      (1) IP4 air flows inward from the 4th stage of the IP compressor, circulates and pressurizes the LP and IP compressor bearing seals. This air then flows forward through holes in the 2nd stage rotor disc and vents into the PF airstream between the stiffener panel and the LP disc rear seal panel and the IP inlet guide vanes and the stage 1 IP rotor.



Cooling Air System
Figure 1

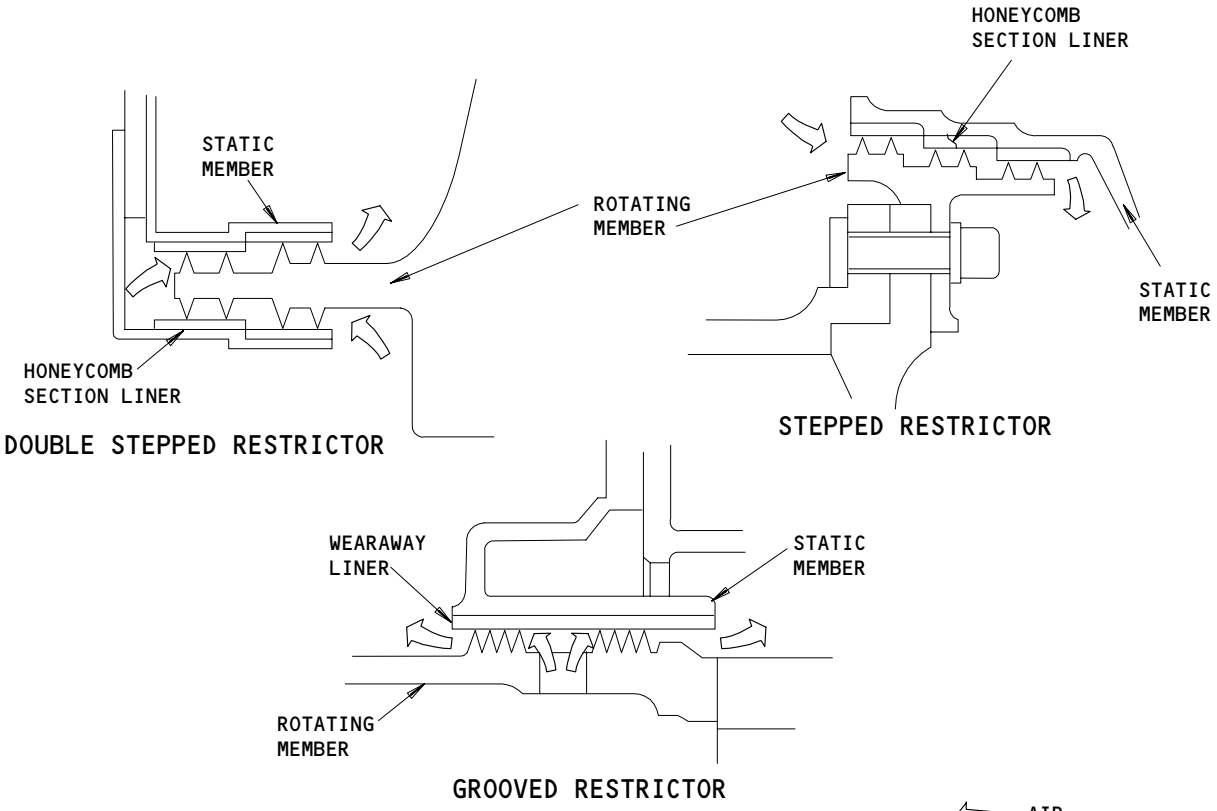
C. IP Compressor Air (IP6)
   (1) IP6 air is taken from the 6th stage of the IP compressor. Some of the air flows outboard between the 6th stage IP compressor stator vanes and the IP outlet guide vanes forward to cool the IP compressor externally and rearward through the IP outlet guide vanes, internally to combine with the inward flow of air.
   (2) The inward flow of air flows between the 6th stage IP rotor and stator vanes and combines with the in-flowing outboard stream to pressurize the HP and IP location bearing seals and the internal gearbox.
   (3) Holes within the intermediate case rear panel and the 3rd stage HP compressor disc allow the flow of air rearward to cool the HP compressor, pressurize the HP, IP and LP turbine roller bearing seals, circulate and cool the IP and LP turbine shaft, and through holes in the IP turbine shaft the air flows forward to pressurize the LP compressor location bearing seals. Further rearward flow of air cools stages 2 and 3 and the rear of stage 1 LP turbine discs. The air then vents into the gas stream between each LP turbine disc and their adjacent nozzle guide vanes, thus preventing an inward flow of hot gas.
   (4) A connection on the IP compressor case allows IP6 air rearward through external tubes to cool the LP turbine exhaust case and the turbine exhaust cone. This air then vents into the turbine gas stream through holes in the turbine exhaust cone.
   (5) To maintain a stable airflow through the IP compressor during certain transient and steady running conditions, a percentage of IP6 air is vented by the bleed valve control system (AMM 75-32-00).

D. HP Compressor Air (HP2)
   (1) HP2 air flows outboard from the 2nd stage of the HP compressor through holes within the 3rd stage stator case, and the lower cone where it is tapped-off from a port in the LP compressor inner case for aircraft services.
   (2) To maintain a stable airflow through the HP compressor during certain transient and steady running conditions, a percentage of HP2 air is vented by the bleed valve control system (AMM 75-32-00).

E. HP Compressor Air (HP3)
   (1) HP3 air flows outboard from the 3rd stage of the HP compressor through holes within the 4th stage stator case, and rearward between the combustion inner and outer casings to cool the combustion section.
   (2) The air continues to flow rearward where it passes through the IP turbine nozzle guide vanes where a percentage flows through holes in the IP nozzle guide vanes into the gas stream. The remaining air flows inboard and around the IP turbine bearing support structure to cool the rear face of the HP turbine disc, the IP turbine, and the front face of the 1st stage LP turbine.
   (3) The air then vents into the gas stream between the HP and IP turbines and their adjacent nozzle guide vanes, thus preventing the inward flow of hot gas.
   (4) To maintain a stable airflow through the HP compressor during certain transient and steady running conditions, a percentage of HP3 air is vented by the bleed valve control system (AMM 75-32-00).
   (5) A connection from the intermediate case allows a flow of air through tubes to the external gearbox to pressurize the seals on the integrated drive generator, hydraulic pump, pneumatic starter and the internal breather driveshafts.

F. HP Compressor Air (HP6)
   (1) HP6 air flows from the 6th stage of the HP compressor where an inward and rearward flow cools the HP compressor drum and the front face of the HP turbine. Holes within the HP turbine seal assembly direct the airflow through holes in the HP turbine disc and blade root to cool the blades. This air flows through the blades before being vented into the gas stream through holes.
   (2) A percentage of air flows around the front liner where at various stages holes allow part of this air to enter the combustion chamber. The remaining air flows rearward into the HP turbine nozzle guide vanes to be vented into the gas stream through holes.
   (3) A port within the combustion outer case allows some of this air to be tapped-off for aircraft service.

G. Air Seals (Fig. 2)



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Air Seals
Figure 2

(1) Air seals are used throughout the engine for controlled cooling, to prevent the inward flow of hot gases from the main gas stream and to control the flow of air necessary for effective operation of the bearing oil seals.
(2) Controlled cooling is effected by seals comprising of an inner member consisting of a number of fins which form a labyrinth, rotating within a static member incorporating a honeycomb bore. The close clearance of the assembly plus its labyrinth design permit a controlled leakage across the seals.
(3) To prevent the leakage of hot gas inward across the turbines, labyrinth type seals are provided between the discs. The seals permit a controlled leakage of cooling air from the inner side of the seal to flow across the disc and into the main gas stream.
(4) To contain oil within the bearing chambers, air enters the annular space between the oil and air seal, where the controlled leakage of air maintains the pressure at a volume greater than that in the bearing chamber. The consequent airflow through the oil seal opposes any escaping oil and carries it back to the bearing chamber, where any pressure build up is prevented by venting.

COOLING AND SEALING AIR SYSTEM TUBES - INSPECTION/CHECK

1. General
   A. This procedure does an inspection of the air tubes for the cooling and sealing systems on the engine.

TASK 72-02-01-206-001-R00

2. Do an Inspection of the Cooling and Sealing Air System Tubes
   A. Reference
      (1) AMM 72-02-01/801, Cooling and Sealing Air System Tubes
   B. Access
      (1) Location Zones
          411/421 Engine

   C. Examine the P3 Air Tube on the High Speed Gearbox

      S 226-007-R00
      (1) Examine the P3 air tube for cracks.
          (a) Cracks not wider than 0.025 inch (0.630 mm) with no material gone and no offset at the ends, repair (FRS.5910) the tube (AMM 72-02-01/801).
          (b) If the damage is more than the step above - Reject.
   D. Examine the Other Air Tubes for the Cooling and Sealing Systems

      S 216-002-R00
      (1) Examine the tubes for cracks.
          (a) Reject if cracks are found.

      S 216-003-R00
      (2) Examine the tubes for dents.
          (a) Accept smooth dents which have areas much larger than their depth if these conditions are also found:
              1) The dents do not decrease the diameter of the tube more than 10 percent at a point along the tube.
              2) The dents are not less than the larger of one diameter or 0.500 inch (12.725 mm) from the tube end fitting.
              3) The dents are not on the outer surface of a bend.
          (b) Accept smooth dents which have an area not more than 0.125 square-inches (80.60 sq. mm) if these conditions are also found:
              1) The dents have rounded bottoms.
              2) The depth of the dents is not more than 0.015 inch (0.381 mm) on the outer surface of a bend or 0.025 inch (0.635 mm) in other areas.
              3) The dents are not less than the larger of one diameter or 0.500 inch (12.725 mm) from the tube end fitting.

S 216-004-R00

(3) Examine the tubes for nicks.

(a) Accept nicks which have rounded bottoms and are not more than 0.004 inch (0.101 mm) in depth if all burrs are removed.

S 216-005-R00

(4) Examine the tubes for fretting.

(a) Accept fretting which is not more than 0.010 inch (0.254 mm) in depth.

S 216-006-R00

(5) Examine the tubes for scoring.

(a) Light scoring can be made smooth if the necessary removal of metal from the tube wall is not more than 0.005 inch (0.127 mm) in depth.

COOLING AND SEALING AIR SYSTEM TUBES - APPROVED REPAIRS

1. General
   A. This procedure contains the data to repair (FRS.5910) cracks in the P3 Air Tube on the High Speed Gearbox with sleeves and clamps.
   B. These repairs are contained in this procedure:

Paragraph Number	Repair Number	Title
2	FRS.5910	Repair the P3 Air Tube on the High Speed (HS) Gearbox with Sleeves and Clamps

TASK 72-02-01-368-007-R00

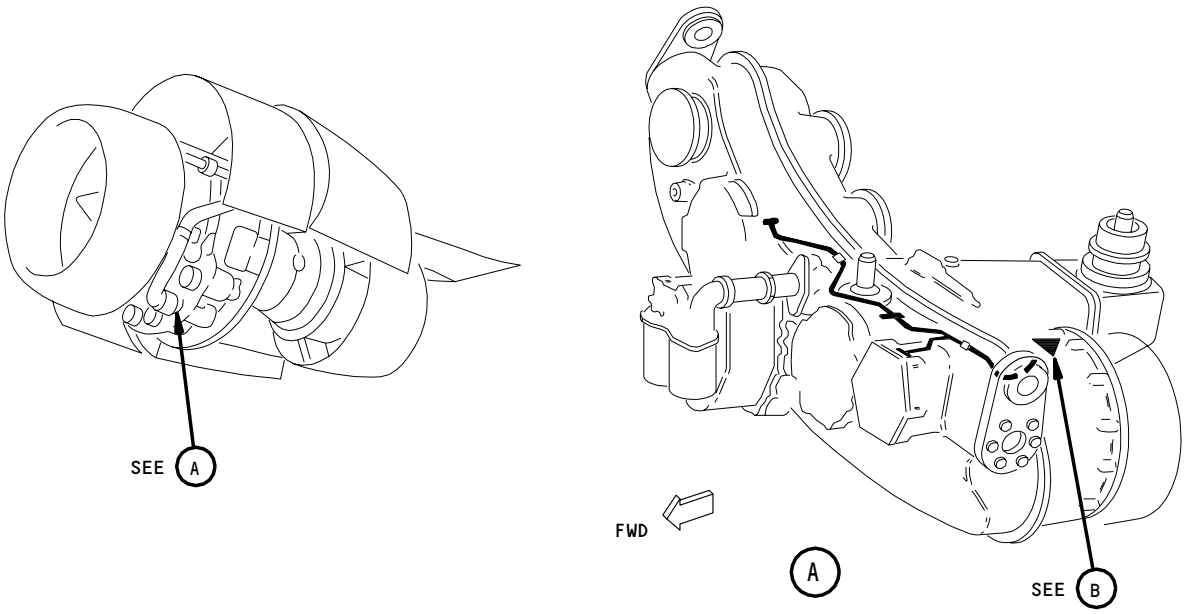
2. Repair the P3 Air Tube on the HS Gearbox With Sleeves and Clamps (FRS.5910)
   A. General
      (1) This is a temporary repair until a new tube can be installed on the HS gearbox the next time the 06 module is in the shop.
      (2) The deterioration of this repair can cause the oil consumption to increase.
      Use the fault isolation procedures to find an oil leak at the air blown seals.
      (3) This repair, FRS.5910, is applicable to P3 air tubes with these part numbers:
      (a) RB211-535E4: LK86042
      (4) Use the procedures in 70-51-00/201 to tighten the fasteners.
      Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is given in this procedure.
   B. Parts
      (1) Sleeve, Half, BACC10GT2-08 (RR 1014340)
      (2) Clamp, Worm Drive, SP144-019 (RR 1108623)
   C. Repair a Crack in the P3 Air Tube (Fig. 801)

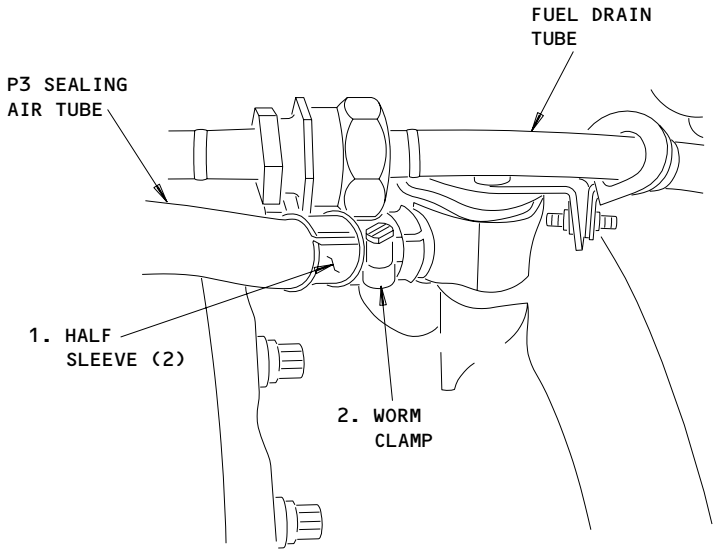
      S 438-008-R00

      CAUTION: MAKE SURE THE SLEEVES DO NOT SUDDENLY RELEASE AND GET CAUGHT IN THE ENGINE.

      (1) Install the half sleeves (2 locations) on the crack in the P3 tube with the sides of the sleeves locked together.

      NOTE: To get access to the P3 tube, you can release the swivel nut on the adjacent tube and move the nut to one side.





B

A0806

P3 Sealing Air Tube – Temporary Repair
Figure 801

S 438-002-R00
(2) Install the worm drive clamp on the half sleeves on the P3 tube.

S 438-003-R00
(3) Tighten the clamp with a screwdriver or a torque wrench.

NOTE: If you use a torque wrench, tighten the clamp to 20-30 pound-inches (2.3-3.4 Newton meters).

S 438-006-R00
(4) If you removed the swivel nut from the adjacent tube, install the swivel nut and attach lockwire.

S 218-009-R00
(5) Examine the repair for correct location of repair parts and installation of the fuel tube swivel nut.

S 978-010-R00
(6) Make a record of this repair (FRS.5910) in the engine log book.

NOTE: This is a temporary repair and the P3 air tube must be replaced the next time the 06 module is in the shop.

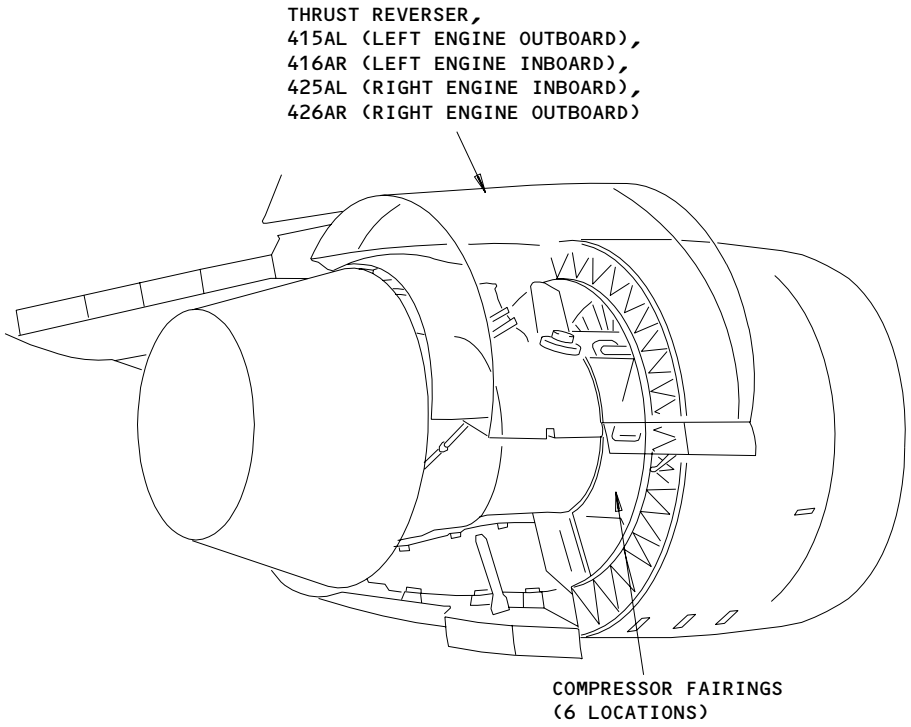
COMPRESSOR FAIRINGS - DESCRIPTION AND OPERATION

1. General
   A. The compressor fairings are utilized to give an even airflow over the core engine. These fairings span the low pressure (LP) compressor inner case, from the LP outlet guide vanes to the leading edge of the thrust reverser.
   B. Two interservices fairings one covering the HP2 off-take and the other the radial driveshaft, provide the same function as the compressor fairings.
2. Component Details
   A. Compressor Fairings
      (1) The compressor fairing is six panels made of carbon fiber in a honeycomb sandwich structure. The panels are installed with brackets to the LP compressor inner case.
      (2) The panels use acoustic material to help keep engine noise lower and ports to let the compressor bleed air (AMM 75-32-00) get out.
   B. Interservices Fairing
      (1) Pylon to Nose Splitter Fairing
         (a) The nose splitter fairing is a single fabricated fairing mounted between the upper two compressor fairings, around the HP2 bleed off-take.
         (b) Attached to the LP compressor inner case through brackets and to the HP2 off-take, the fairing extends outward to the LP compressor outer case.
         (c) Situated within the leading edge are ports providing cooling air to the thrust reverser hydraulic pipes (AMM 78-31-00) and rakes sensing PF air (AMM 77-11-00).
      (2) Radial Drive Fairing
         (a) The radial drive fairing comprises two fabricated half fairings mounted between the lower two compressor fairings, around the radial driveshaft.
         (b) Attached to the LP compressor inner case through brackets the fairing extends outward to the LP compressor outer case.

COMPRESSOR FAIRINGS

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
FAIRINGS - COMPRESSOR	---	12	415AL,425AL,416AR,426AR THRUST REVERSER	72-03-01

Compressor Fairings - Component Index
Figure 101



Compressor Fairings - Component Location
Figure 102

COMPRESSOR FAIRINGS - REMOVAL/INSTALLATION

1. General
   A. This procedure contains the tasks to remove and install the the gas generator compressor fairings (referred to as the compressor fairings), and the high speed gearbox radial drive shaft gas generator fairings (referred to as the drive shaft fairings).
   B. Use the procedures in AMM 70-51-00/201 to tighten the fasteners. Tighten the fasteners to the torque values in AMM 70-51-00/201 unless a torque value is specified in this procedure.

TASK 72-03-01-024-007-R00

2. Remove the Compressor Fairing
   A. References
      (1) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

   C. Procedure

S 044-002-R00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-003-R00

      (2) Open the thrust reversers (AMM 78-31-00/201).

S 024-004-R00

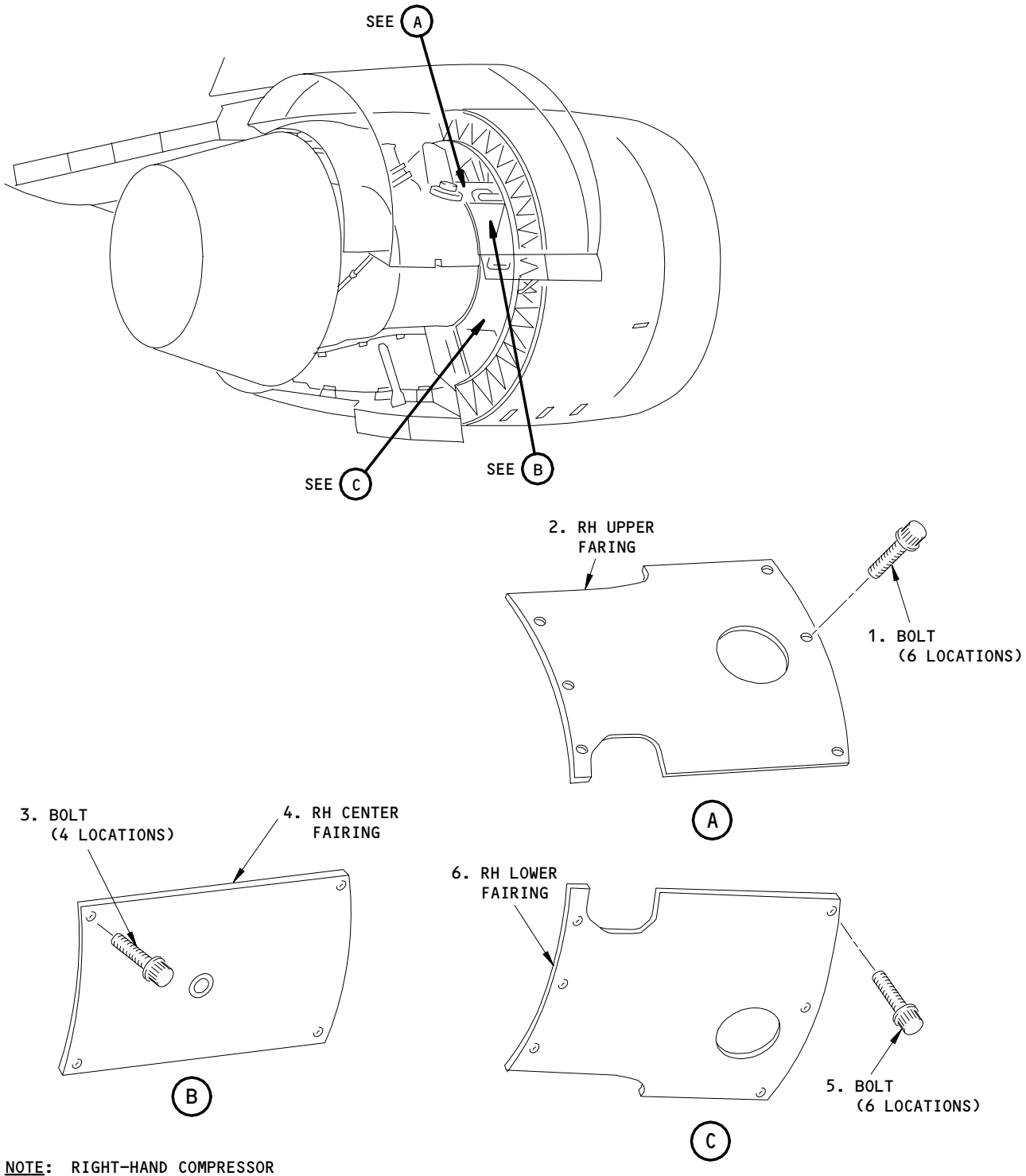
      (3) Remove the applicable bolts (1), (3) or (5) (Fig. 401).

S 024-005-R00

      (4) Remove the applicable fairing (2), (4) or (6).

TASK 72-03-01-424-006-R00

3. Install the Compressor Fairing
   A. References
      (1) AMM 78-31-00/201, Thrust Reverser System



NOTE: RIGHT-HAND COMPRESSOR FAIRINGS SHOWN, LEFT-HAND COMPRESSOR FAIRINGS SIMILAR.

68471

Compressor Fairing Installation
Figure 401

B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panels
415AL Thrust Reverser (Left)
416AR Thrust Reverser (Right)
425AL Thrust Reverser (Left)
426AR Thrust Reverser (Right)

C. Install the Compressor Fairing (Fig. 401)

S 424-009-R00
(1) Install the applicable fairing (2), (4) or (6).

S 424-010-R00
(2) Install the applicable bolt (1), (3) or (5) to the fairing.
(a) Tighten the bolts.

S 414-011-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Close the thrust reversers (AMM 78-31-00/201).

TASK 72-03-01-024-012-R00

4. Remove the High Speed Gearbox Radial Drive Shaft Gas Generator Fairings
A. References
(1) AMM 78-31-00/201, Thrust Reverser System
B. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
420 No. 2 Power Plant (Right)

(2) Access Panels
415AL Thrust Reverser (Left)
416AR Thrust Reverser (Right)
425AL Thrust Reverser (Left)
426AR Thrust Reverser (Right)

C. Prepare for the Removal

S 044-013-R00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-014-R00

(2) Open the thrust reversers (AMM 78-31-00/201).

S 024-015-R00

(3) Do the task to remove the left and right lower compressor fairings (6).

D. Remove the Drive Shaft Fairings (Fig. 402)

S 024-018-R00

(1) Disconnect the union nut (4) from pitot rake (5).

S 024-019-R00

(2) Release the nuts (3) and bolts (6) and remove pitot rake.

S 024-020-R00

(3) Remove the bolts (7), (8) and (9) from the drive shaft fairing.

S 024-021-R00

(4) Remove the drive shaft fairing.

TASK 72-03-01-424-022-R00

5. Install the High Speed Gearbox Radial Drive Shaft Gas Generator Fairings

A. References

(1) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

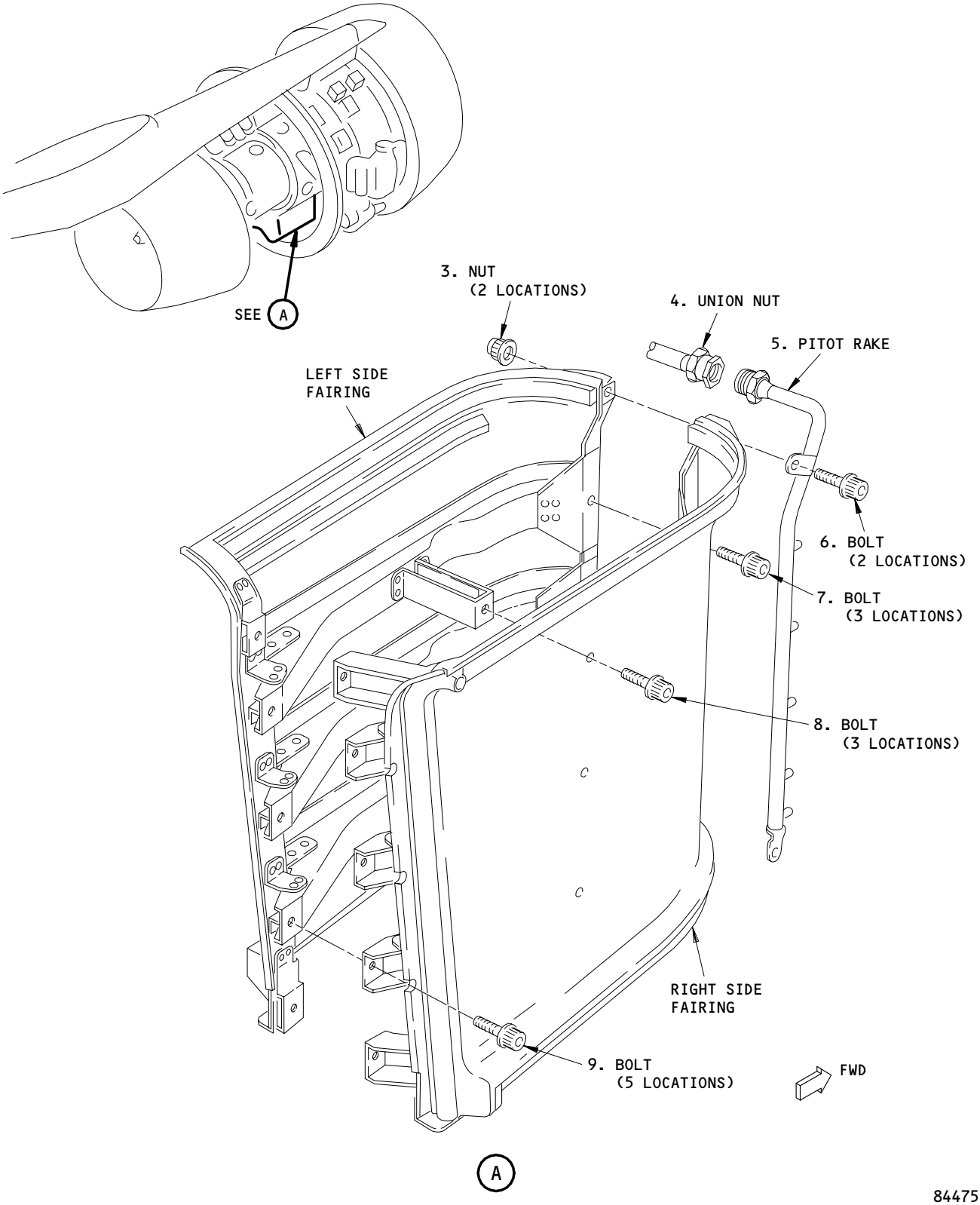
(2) Access Panels

415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

C. Procedure (Fig. 402)

S 424-033-R00

(1) Align the left and right halves of the drive shaft fairings.



High Speed Gearbox Radial Drive Shaft Gas Generator Fairings Installation
Figure 402

S 424-024-R00
(2) Install the bolts (7), (8) and (9) to the drive shaft fairing.
(a) Tighten the bolts (7).

S 424-027-R00
(3) Install the pitot rake (5) with the bolts (6) and nuts (3).
(a) Tighten the bolts (6).

S 434-028-R00
(4) Connect the union nut (4) to the pitot rake.
(a) Tighten the union nut (4).
(b) Install the lockwire on the union nut (4).

D. Put the Airplane Back to its Usual Condition

S 424-030-R00
(1) Do the task to install left and right lower compressor fairings (6).

S 414-031-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the thrust reversers (AMM 78-31-00/201).

S 444-032-R00
(3) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

COMPRESSOR FAIRINGS - INSPECTION/CHECK

1. General
   A. This procedure contains the inspection of the compressor fairings which are installed on the engine.

TASK 72-03-01-216-009-R00

2. Inspection of the Compressor Fairings
   A. References
      (1) AMM 70-42-11/201, Repair Surfaces Affected by Minor Damage
      (2) AMM 70-42-26/201, Acceptable Cracks, Stop Drilling (FRS.3255)
      (3) AMM 72-03-01/401, Compressor Fairings
      (4) AMM 72-03-01/801, Compressor Fairings
      (5) AMM 72-03-02/401, Compressor Section Fairing Support Panels
   B. Access
      (1) Location Zones
          410/420 Power Plant

   C. Do an Inspection of the Fairings

      S 216-010-R00
      (1) Examine the general structure for damage.
          (a) Replace the fairing if you see too much damage to the general structure (AMM 72-03-01/401).

      S 216-011-R00
      (2) Examine the bolt locations for loose or missing bushings.
          (a) Repair the fairing (FRS.5576) if the bushings at the bolt locations are loose or gone (AMM 72-03-01/801).

              NOTE: A limit of 50 hours maximum is permitted if the front bushings are tight and not less than one rear bushing is tight on each fairing.

      S 216-012-R00
      (3) Examine the fairing edges for cracks or missing filler.
          (a) Cracks or missing filler not more than 25% of the fairing edge is permitted.
          (b) Replace the fairing if the filler has cracks or is missing along more than 25% of the fairing edge (AMM 72-03-01/401).

      S 216-013-R00
      (4) Examine the fairing seals for deterioration or missing seals.
          (a) Deterioration or missing seals not more than 20% of each seal is permitted.
          (b) Replace the fairing if more than 20% of a fairing seal is damaged or gone (AMM 72-03-01/401).

S 216-014-R00

(5) Examine the flat black paint coating on the compressor fairings for deterioration.

(a) Deterioration or eroded paint is permitted in any amount if the underlying composite skin is not damaged.

NOTE: The paint is for cosmetic purposes only.

S 216-015-R00

(6) Examine for signs of skin separation.

(a) Replace the fairing if there is skin separation.

S 216-017-R00

(7) Examine the radial drive fairings for damage.

(a) Skin cracks - Accept up to 2.0 inch (50.8 mm) - Stop drill to FRS 3255 (AMM 70-42-26/201).

(b) Skin dents - Accept up to 0.25 inch (6.35 mm) deep.

(c) Rear seal damage:

1) Scuffed - Accept

2) Cut, torn or missing - Reject

CAUTION: WEAR OF THE REAR EDGE CAN CAUSE SHARP EDGES. SHARP EDGES ARE TO BE DRESSED TO PREVENT THE POSSIBILITY OF INJURY.

(d) Rear edge and axial wear limits:

1) Radially up to 5.0 inch (127 mm) - Accept

2) Axially up to 0.5 inch (12.7 mm) - Accept

3) Sharp edges are to be dressed to FRS 3253 (AMM 70-42-11/201).

(e) Rivets - up to 5 loose or missing - Accept.

(f) Wear of the stiffener:

1) Axially up to 2.0 inches (50 mm) - Accept

2) Radially up to 0.5 inches (12.7 mm) - Accept

3) Up to 0.01 inches (2.54 mm) deep - Accept

4) Dress sharp edges to FRS 3253 (AMM 70-42-11/201).

S 216-018-R00

(8) Examine the interservices/pylon fairing for damage.
(a) Skin cracks - Accept up to 2.0 inch (50.8 mm). Stop drill to FRS 3255 (AMM 70-42-26/201).
(b) Skin dents - Accept up to 0.25 inch (6.35 mm) deep.
(c) Rear seal damage:
1) Scuffed - Accept
2) Cut, torn or missing - Reject

CAUTION: WEAR OF THE REAR EDGE CAN CAUSE SHARP EDGES. SHARP EDGES ARE TO BE DRESSED TO PREVENT THE POSSIBILITY OF INJURY.

(d) Rear edge and axial wear:
1) Accept radially up to 5.0 inch (127 mm).
2) Accept axially up to 0.5 inch (12.7 mm).
3) Sharp edges are to be dressed to FRS 3253 (AMM 70-42-11/201).
(e) Rivets - Accept up to 5 loose or missing.
(f) Zone 3 ventilation air ducts:
1) Cracks - Accept
2) Material missing - Accept

D. Do an Inspection of the Fairing Rear Support Panels

S 216-016-R00

(1) Examine the rear mounting brackets, and support panels for brackets and panels, that have cracks or are broken.
(a) Repair the fairing (FRS.5515 or FRS.5516) if the rear mounting brackets or the support panels have cracks or are broken (AMM 72-03-01/801).

NOTE: A limit of 50 hours maximum is permitted with the above damage if the front mounting brackets, and not less than one rear mounting bracket, is correct on each fairing.

(b) If not repairable, replace the support panel (AMM 72-03-02/401).

COMPRESSOR FAIRINGS - APPROVED REPAIRS

1. General

A. The list of repairs contained in this procedure is summarized as follows:

Paragraph Number	Repair Number	Title
2	FRS.5576	Compressor gas generator fairings - Repair fairing mounting inserts
3	FRS.5307	Gas generator compressor fairing LH upper - Repair bonded rubber seals
4	FRS.5308	Gas generator compressor fairing RH upper - Repair bonded rubber seals
5	FRS.5309	Gas generator compressor fairing RH center - Repair bonded rubber seals
6	FRS.5310	Gas gnerator compressor fairing LH center - Repair bonded rubber seals
7	FRS.5311	Gas generator compressor fairing RH lower - Repair bonded rubber seals and drain tube
8	FRS.5312	Gas generator compressor fairing LH lower - Repair bonded rubber seals and drain tube
9	FRS.5515	Gas generator fairing support panel diaphragms - Repair cracks at the LH and RH center gas generator fairing rear mounting bracket positions
10	FRS.5516	Gas generator fairing support panels - Repair LH and RH gas generator fairing support panels at center fairing rear mounting bracket position

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

TASK 72-03-01-398-001-R00

2. Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

A. General

(1) This procedure, FRS.5576, gives the repair of the compressor gas generator fairings to install the replacement mounting inserts.

(a) The replacement of the insert feature is done when you turn a flanged bushing and a flanged sleeve together.

(b) You must use longer bolts when you install the fairing to the compressor casing.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) The interchangeability aspect of this repair is included in SB 72-8454.

(5) All inserts must be replaced on the fairings that you repair to prevent installation problems.

(6) This procedure refers to RB211-535E4 fairings with the part numbers that follow:

Part No.	Assy.
UL12640	A
UL12641	A
UL12642	B
UL12643	B
UL12644	A
UL12645	A
UL30317	RR SB 72-9460
UL30318	RR SB 72-9460

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

(7) These repairs are complementary to this repair and should be applied as required:

FRS.5307, Paragraph 4 (Gas Generator Compressor Fairing - LH Upper - Replace Bonded Rubber Seals).

FRS.5308, Paragraph 5 (Gas Generator Compressor Fairing - RH Upper - Replace Bonded Rubber Seals).

FRS.5309, Paragraph 6 (Gas Generator Compressor Fairing - RH Center - Replace Bonded Rubber Seals).

FRS.5310, Paragraph 7 (Gas Generator Compressor Fairing - LH Center - Replace Bonded Rubber Seals).

FRS.5311, Paragraph 8 (Gas Generator Compressor Fairing - RH Lower - Replace Seals and Drain Tube).

FRS.5312, Paragraph 9 (Gas Generator Compressor Fairing - LH Lower - Replace Seals and Drain Tube).

B. Equipment

(1)		Circular hole saw 0.787 inch (20 mm) dia	
(2)		Drilling equipment	
(3)		Approved workshop tools	
(4)		Explosion proof heater lamps	
(5)		Hand held pistol drill (Casals type)	
(6)		Paint spraying facility	
(7)		Vibro-engraving equipment	
(8)		Spatula or palette knife	
(9)	MH16479	Drill fixture (Assy A and B)	1 off
(10)	MH16480	Drill bracket (Assy A)	1 off
(11)	MH16481	Drill bracket (Assy B)	1 off
(12)	MH16482	Drill bracket (Assy B)	1 off
(13)	MH16289	Hole saw (Assy A and B)	1 off
(14)	MH16290	Plug gauge (Assy A and B)	1 off
(15)	MH16288	Drill adaptor (Assy A and B)	1 off

C. Consumable Materials

(1) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257

(2) Clean cotton cloth
OMat No. 2/101

(3) Clean cotton gloves

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

(4) Filler EC3524 A/B
OMat No. 874
(5) Abrasive paper (180 grit)
OMat No. 5/62
(6) Adhesive EA934NA
OMat No. 8/52
(7) Epoxy base, matt black SL5459
OMat No. 788
(8) Catalyst CSH6201A
(9) Masking tape
OMat No. 2/40
(10) Epoxy primer
OMat No. 766
(11) Abrasive paper
Omat No. 5/63

D. Parts
(1) Location bolt threaded flange (6 off), (Item 1) LK75203
(2) Threaded flange bushing (3 off), (Item 2) LK75204
(3) Threaded flange bushing (3 off), (Item 3) UL24419

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

F. Procedure

S 358-002-R00
(1) Prepare the repair area
(a) Remove the insert with a circular hole saw 0.787 inch (20 mm) diameter.
1) Put the saw in the center on the insert bolt hole.
(b) Remove the longitudinal edge seals with approved workshop tools.
(c) Remove all loose filler material from the insert location holes with approved workshop tools.

S 218-003-R00
(2) Visually examine the prepared area.
(a) Skin and (or) honeycomb joints that are not bonded is not permitted.

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

S 218-004-R00

(3) Examine the dimensions of the prepared area.
   (a) The diameter of the damaged hole must not be more than 1.181 inches (30.00 mm).

S 168-005-R00

(4) Clean the repair area

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

   (a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
      1) Clean the repair area on the fairing with the moist cloth.
      2) You must discard the dirty cloth.
      3) Use a clean cloth each time you clean a new area that you repair.
      4) Contamination of the bulk liquid is not permitted.
      5) Do not let the liquid touch the cloth and return to the bulk liquid container.
   (b) Let the repair area dry.

S 398-006-R00

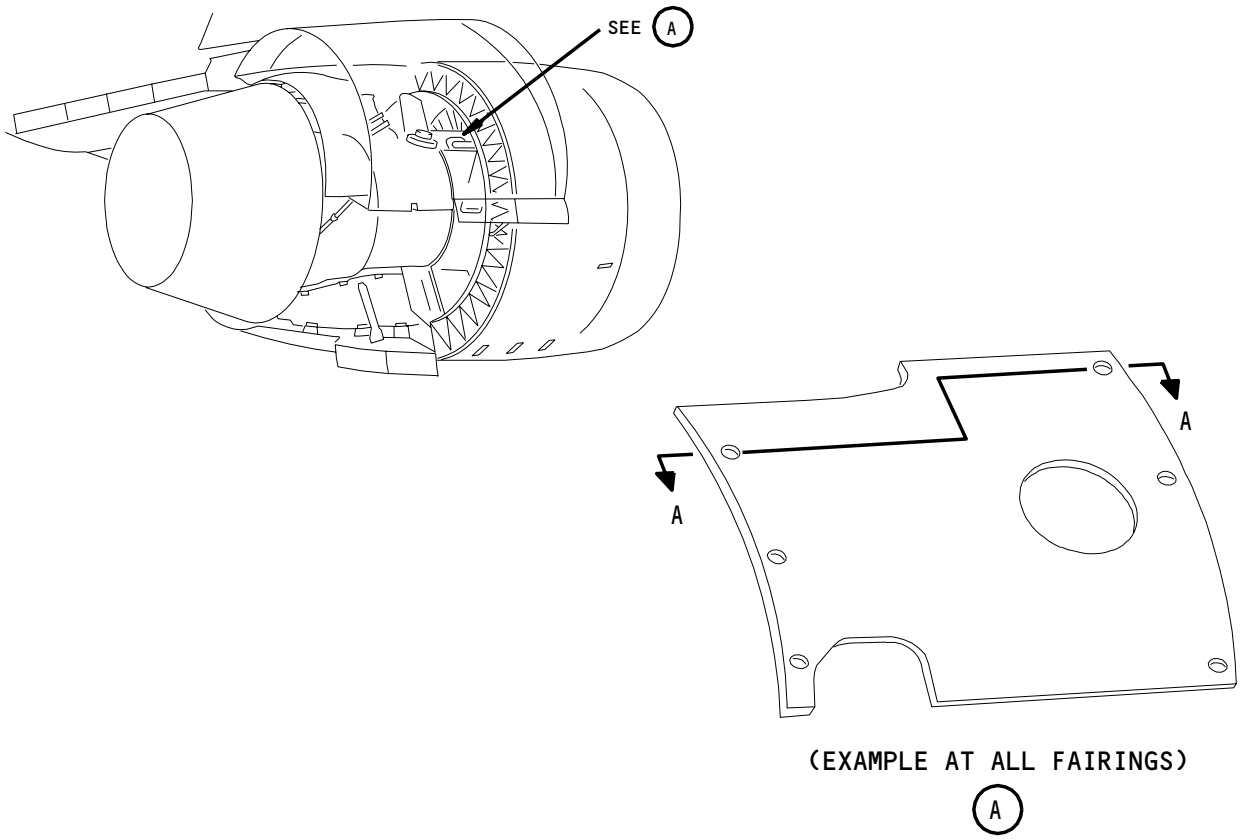
(5) Prepare and apply the filler material

WARNING: MAKE SURE THAT YOU PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. THIS FILLER CAN CAUSE SKIN IRRITATION.

   (a) Do these steps to prepare the blue filler.
      1) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until the same blue color is without streaks.

         NOTE: This gives a working life of approximately 1 hour at 22°C (72°F).

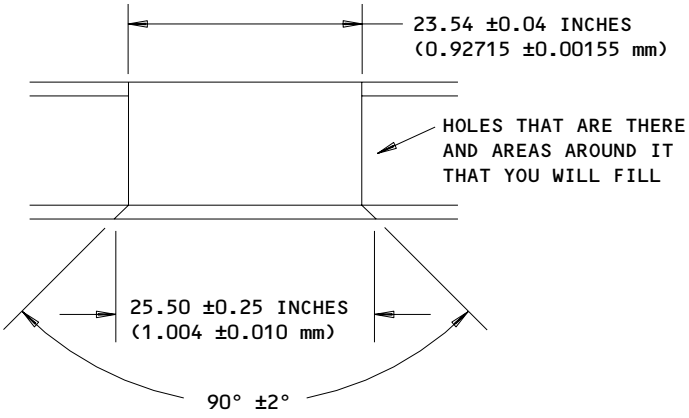
   (b) Apply the filler (Fig. 801).



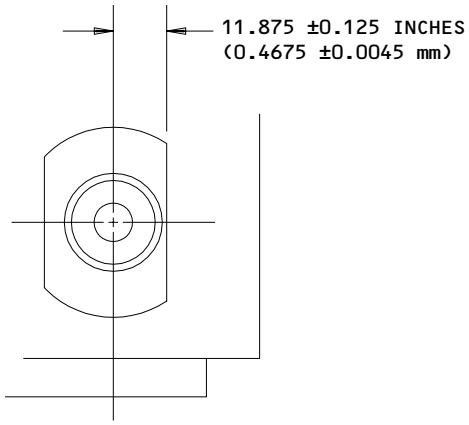
VIEW THROUGH THE GAS GENERATOR FAIRING
(EXAMPLE)
A-A

68471

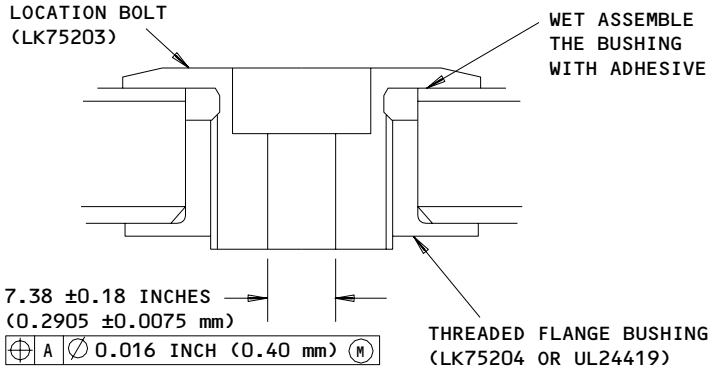
Gas Generator Fairing, Mounting Inserts - Replacement Details (FRS. 5576)
Figure 801 (Sheet 1)



VIEW OF HOLE WITHOUT THE BUSHING INSTALLED
(EXAMPLE)
B-B



BOTTOM VIEW OF HOLE WITH
THE BUSHING INSTALLED
(EXAMPLE)
C-C



VIEW OF HOLE WITH THE BUSHING INSTALLED
(EXAMPLE)
B-B

91660

Gas Generator Fairing, Mounting Inserts - Replacement Details (FRS. 5576)
Figure 801 (Sheet 2)

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

1) Apply the blue filler (OMat 874) all around the honeycomb.
   a) Install the mounting bore.
   b) Make sure you fill each honeycomb cell more than full.
2) Do not let the filler dry fully.
   a) Remove the unwanted filler with a clean spatula or palette knife.
   b) Make sure the filler has a smooth surface with the adjacent surface.
   c) Make sure you keep sufficient material to get a satisfactory finish.

S 358-007-R00

(6) Let the filler dry

(a) Let the filler dry with explosionproof heater lamps.

NOTE: The time for the filler to dry is dependent on temperature (Ref Table 1). The minimum time it gets for the filler to dry is 30 minutes. The filler will not dry at temperatures below 54°F (12°C). The maximum temperature you can apply to the filler is 302°F (150°C). If heat causes the filler to burn, hand abrade the burned filler to remove it. Ref Table 1 for the dry time/temp relationship.

Time - Hours	96	72	36	24	16	8	4	2	1	1/2
Temp.- Deg. F.	54	59	68	72	77	86	95	113	140	212
Deg. C.	12	15	20	22	25	30	35	45	60	100

Table 1

(b) Use abrasive paper (180 grit, OMat 5/62) to make the filler surface smooth aerodynamically with the adjacent area.

S 328-008-R00

(7) Drill the insert mounting bores

(a) Put the fairing in the drill fixture, MH16479.
   1) Install the clamps.

(b) Make sure you install the fairing correctly.

NOTE: Use the leading edge for the radiuses edge of the fairing.

(c) Drill the insert mounting holes out.
1) Install the chamfers.
2) Use a hand held, pistol drill (Casals type) set at low speed and a hole saw (MH16289) with its adaptor (MH16288).
3) The drill bracket, MH16480, is used for Assy A and drill brackets, MH16481 and MH16482, are used for Assy B.

S 218-009-R00

(8) Examine the insert mounting holes (Fig. 801)
(a) Examine the insert mounting holes with the plug gage, MH16290.
1) The filler is to be free of openings and must be aerodynamically strong.

S 168-010-R00

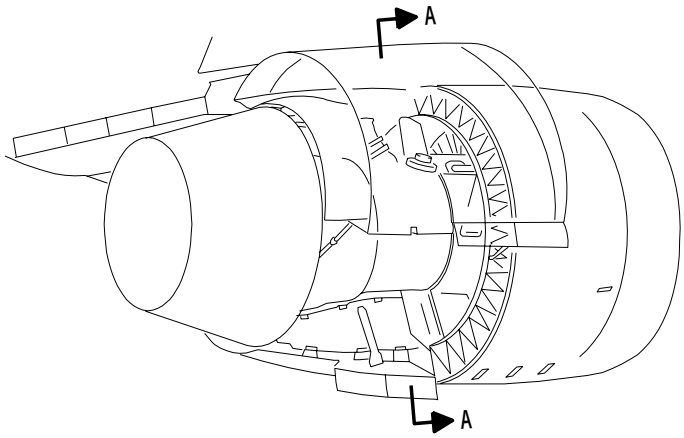
(9) Clean the repair and replacement parts (Fig. 801, 802, 803 and 804)
(a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing and the replacement parts that follow with the moist cloth:

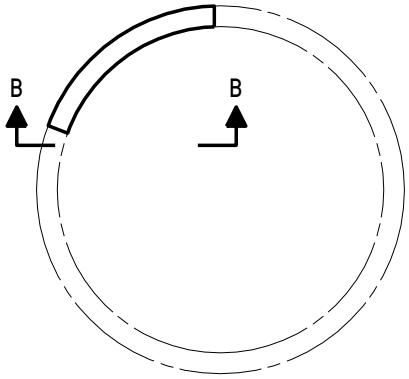
Location bolt for the threaded flange sleeve, LK75203 (6 locations)
Threaded flanged bushing, LK75204 (3 locations)

Threaded flanged bushing, UL24419 (3 locations)

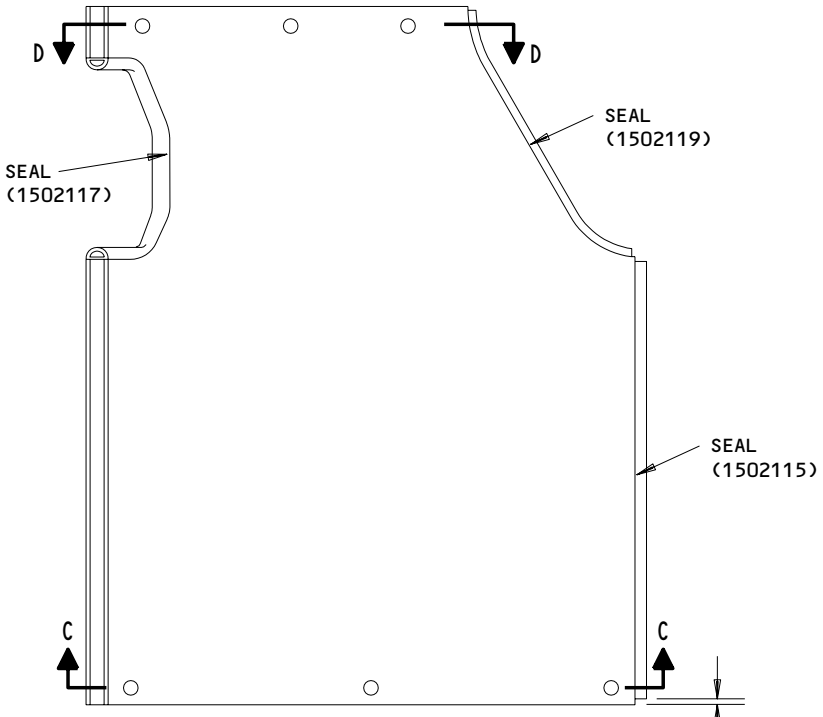
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

NOTE: The flanged bushings, UL24491, can be made from LK75024.





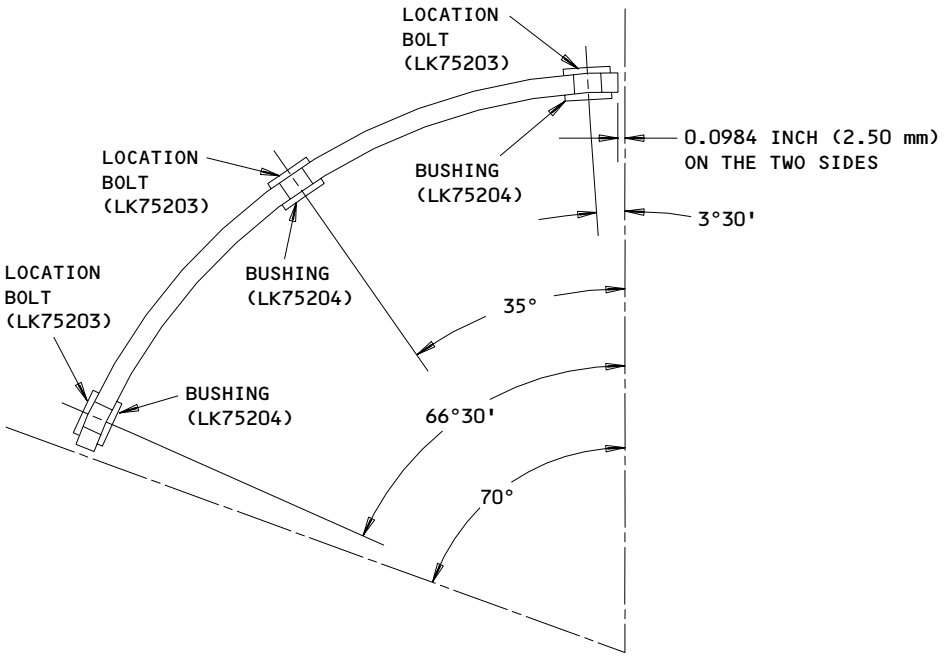
TOP LEFT FAIRING
A-A



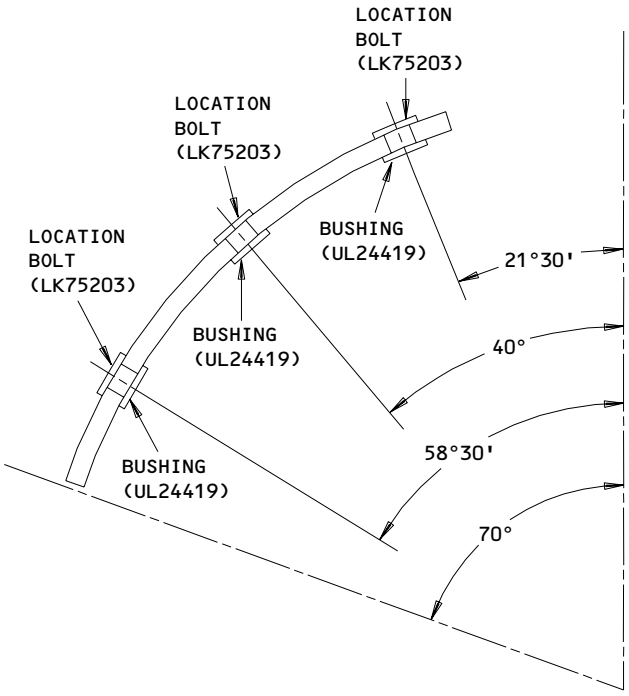
BOTTOM VIEW OF FAIRING
B-B

68471
66670

Top Gas Generator Fairing, Mounting Inserts - Replacement Details (FRS. 5576)
Figure 802 (Sheet 1)



FORWARD EDGE OF THE FAIRING
C–C

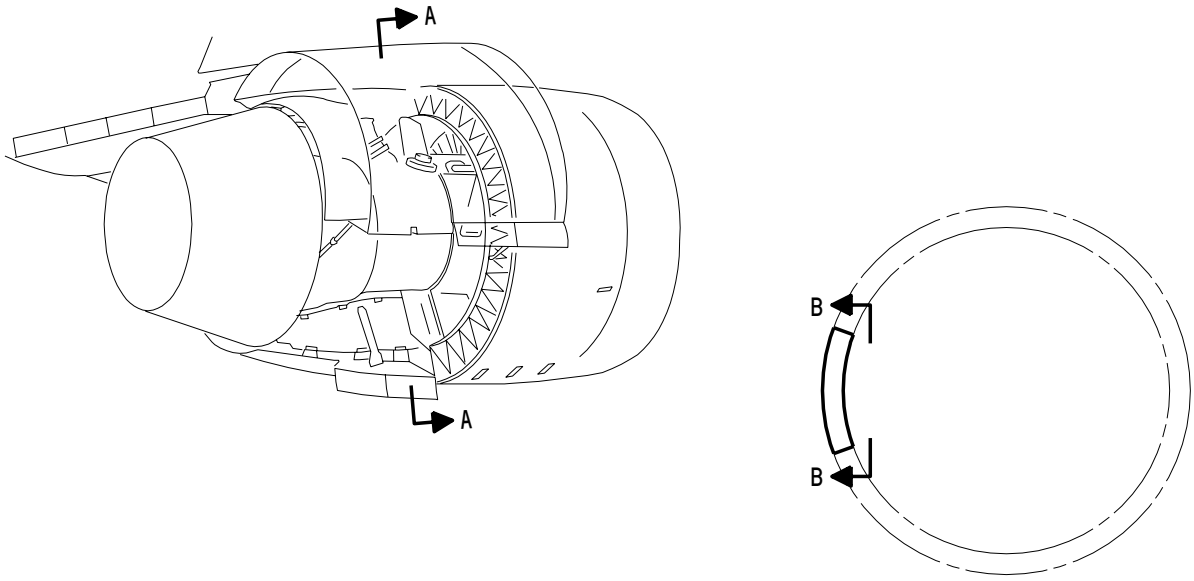


AFT EDGE OF THE FAIRING
D–D

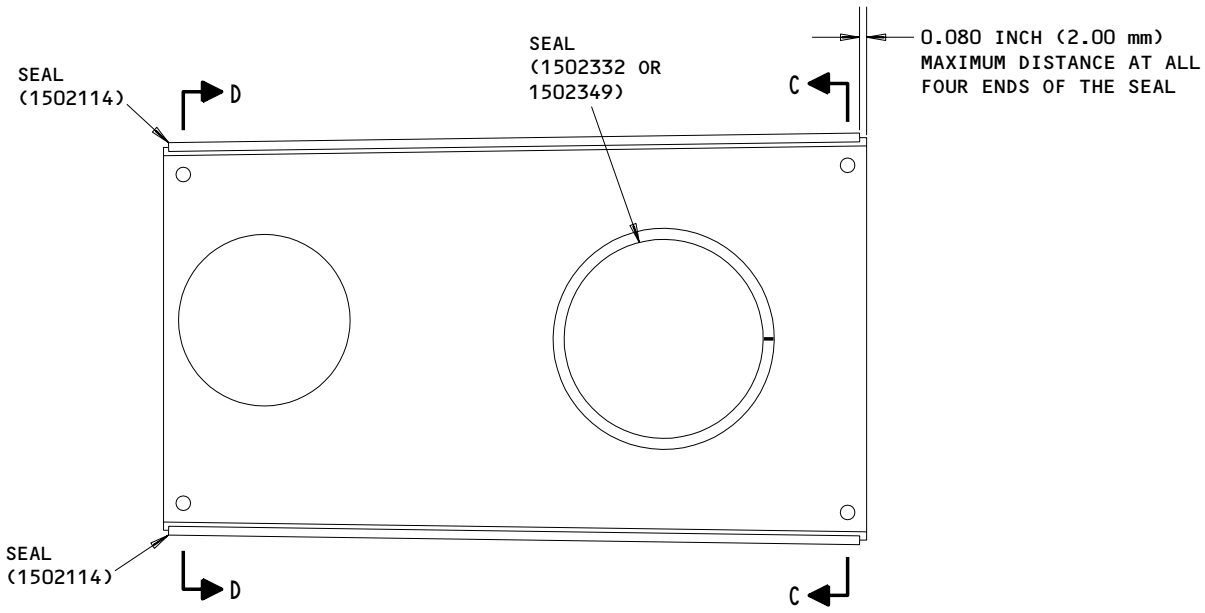
NOTE: TOP LEFT GAS GENERATOR FAIRING IS SHOWN,
TOP RIGHT GAS GENERATOR FAIRING IS OPPOSITE.

91661

Top Gas Generator Fairing, Mounting Inserts – Replacement Details (FRS. 5576)
Figure 802 (Sheet 2)



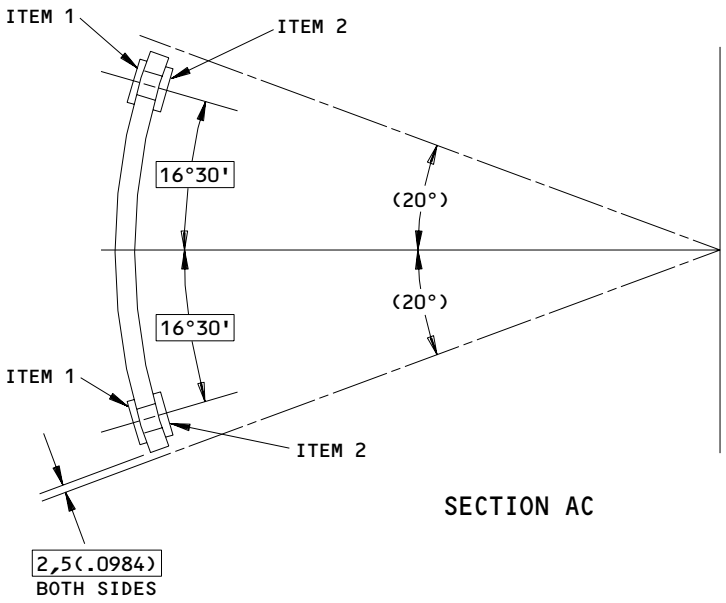
CENTER LEFT FAIRING
A-A



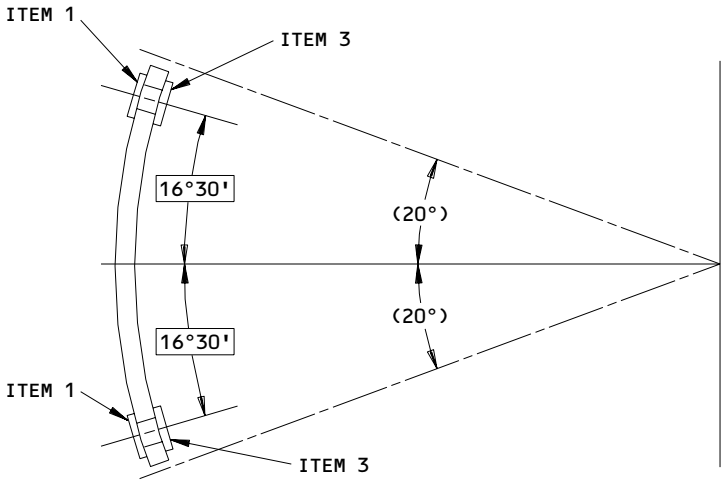
BOTTOM VIEW OF FAIRING
B-B

68471
82514

Center Gas Generator Fairing, Mounting Inserts - Replacement Details (FRS. 5576)
Figure 803 (Sheet 1)



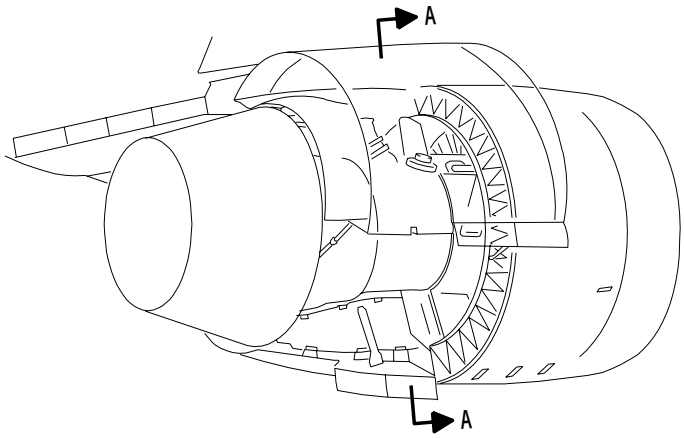
SECTION AC

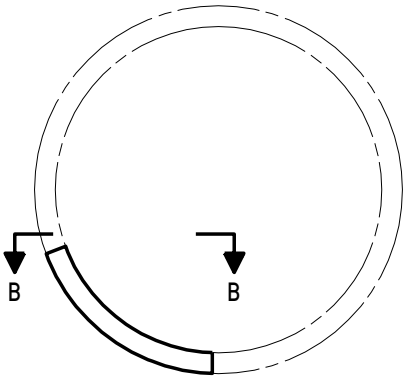


SECTION AB

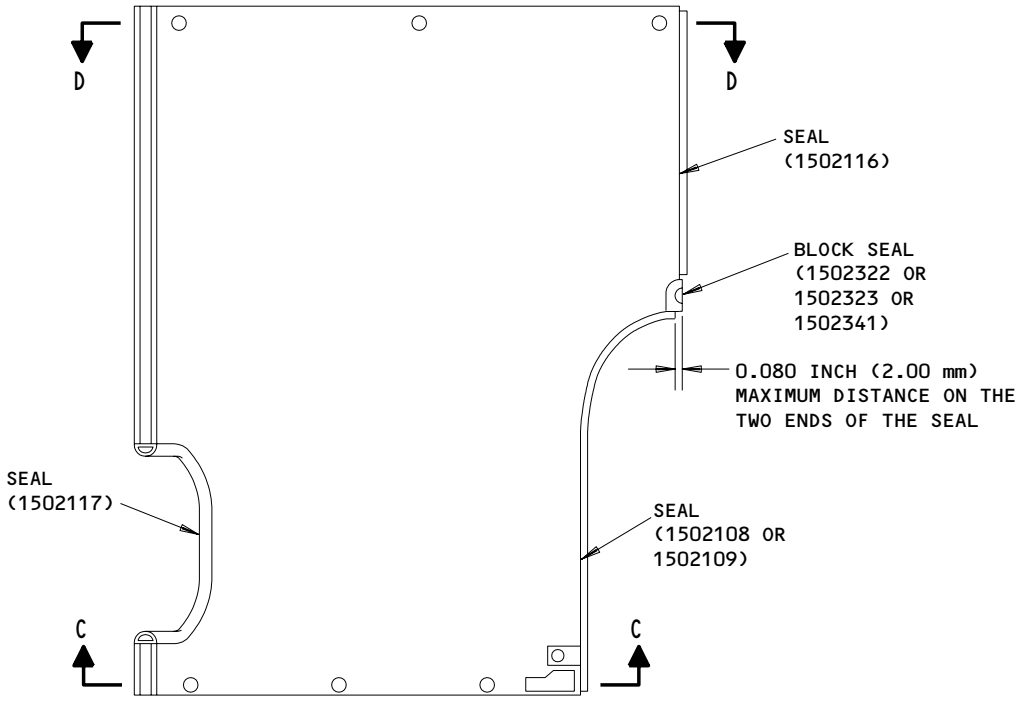
NOTE: CENTER LEFT GAS GENERATOR FAIRING IS SHOWN,
CENTER RIGHT GAS GENERATOR FAIRING IS OPPOSITE.

Gas Generator Fairings, Outer and Inner Skin - Repair Details
Figure 803 (Sheet 2)





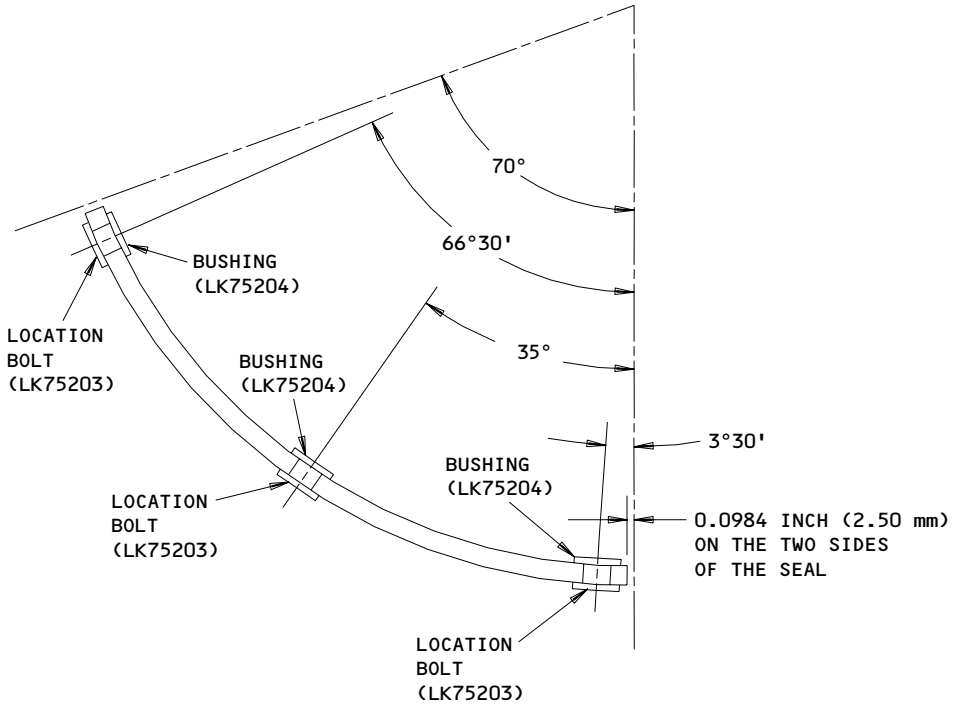
BOTTOM LEFT FAIRING
A-A



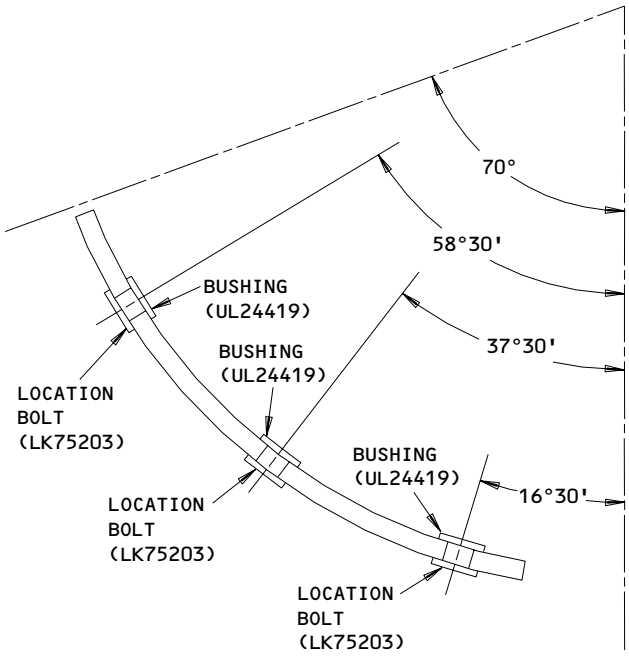
BOTTOM VIEW OF FAIRING
B-B

68471
82562

Bottom Gas Generator Fairing, Mounting Inserts - Replacement Details (FRS. 5576)
Figure 804 (Sheet 1)



FORWARD EDGE OF THE FAIRING
C–C



AFT EDGE OF THE FAIRING
D–D

NOTE: BOTTOM LEFT GAS GENERATOR FAIRING IS SHOWN,
BOTTOM RIGHT GAS GENERATOR FAIRING IS OPPOSITE.

91750

Bottom Gas Generator Fairing, Mounting Inserts – Replacement Details (FRS. 5576)
Figure 804 (Sheet 2)

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

S 428-011-R00

(10) Install the replacement sleeves and bushings (Fig. 801)

(a) Prepare the adhesive

WARNING: USE EPOXY COMPOUNDS IN THE WORK AREAS WHICH HAVE GOOD VENTILLATION. DO NOT LET THE EPOXY COMPOUNDS TOUCH YOUR SKIN. YOU CAN CAUSE INJURY TO PERSONS.

1) Hysol adhesive, EA934 NA, is a two part epoxy resin of:

Part A - A grey paste which must be stirred in its container before it is weighed out.
Part B - An amber liquid is used as supplied.

2) Mix, by weight, 100 parts of grey paste and 33 parts of amber liquid until it becomes a homogenous paste.

NOTE: The adhesive has a pot life of approximately 1 hour at a room temperature of 72°F (22°C).

(b) Apply the adhesive, thru 0.024 inch (0.61 mm) thick, with a spatula or palette knife to the items that follow:
1) The insert mounting bores, the insert flanges and threads

(c) Assemble the sleeves and bushings into the mounting bores with the approved workshop tools.
1) Torque the assembly to 20 pound-inches (2.26 Newton meters).

NOTE: Make sure you install the flanged sleeve, UL24419, correctly.

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

S 358-012-R00

(11) Let the adhesive dry

(a) Let the adhesive dry with an explosionproof heater lamp.

NOTE: The cure time must agree with the temperature at the bond line. The minimum cure time is one hour and will not cure at temperatures below 54°F (12°C). The temperature at the bond line must be monitored by thermocouples or convenient method when the cure time is faster with the use of heat. Refer to Table 2 for cure time/temp relationship.

Time - Hours	24	16	8	4	2	1
Temp - Deg. F.	72	77	86	96	113	140
Deg. C.	22	25	30	35	45	60

Table 2

S 378-013-R00

(12) Prepare to paint the fairing

(a) Use an abrasive paper (OMat 5/63) to remove the surface on the fairing that shines.

(b) Remove the grease from the fairing.

1) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
   a) Clean the repair area on the fairing with the moist cloth.
   b) You must discard the dirty cloth.
   c) Use a clean cloth each time you clean a new area that you repair.
   d) Contamination of the bulk liquid is not permitted.
   e) Do not let the liquid touch the cloth and return to the bulk liquid container.
2) Let the fairing dry.

(c) Apply the adhesive tape (OMat 2/40) on the insert flanges.

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

(d) Mix the epoxy primer.
1) Mix, by weight, equal volumes of the base and accelerator catalyst.

NOTE: If it is necessary, add the thinners thru 10 percent of the volume.

2) Let the mixture set for 30 minutes before you use it.
3) The pot life of the mixture is 8 hours.

NOTE: If you do not use all of the primer in this time, discard it. You must mix only sufficient primer for immediate use at one time.

(e) Apply the epoxy primer.
1) Apply one layer of the epoxy primer (OMat 766).
2) Let the primer dry for 4 to 16 hours at a minimum temperature of 16°C (61°F).
a) Alternatively, stove the epoxy primer for 30 minutes at 125 ±5°C (248 to 266°F).

S 348-014-R00

(13) Apply the epoxy finishing enamel to the fairing

WARNING: SOME OF THE ENAMELS HAVE FLASH POINTS BELOW 23°C (73°F) AND ARE HIGHLY FLAMMABLE. THESE ENAMELS ARE CLEARLY IDENTIFIED ON THE SUPPLIERS LABELS. MIX AND APPLY THE PAINTS IN AN AREA THAT IS WELL VENTILATED, WITH FUME EXTRACTION AVAILABLE. YOU MUST USE FLAMEPROOF EQUIPMENT OR INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Mix the two-pack epoxy enamel.
1) Mix, by weight, the volumes of base component and the catalyst component.
2) Add spray thinners when it is necessary.
3) Let the mixture set for 30 minutes before you use it.
4) The pot life of the mixture is 8 hours.

NOTE: If you do not use all of the enamel in this time, discard it. You must mix only sufficient enamel for immediate use at one time.

(b) Apply the epoxy finishing enamel.
1) Spray one layer of the enamel (OMat 788).

Compressor Gas Generator Fairing - Repair the Fairing Mounting Inserts

2) Let the epoxy enamel dry for a minimum of 1 hour at a minimum temperature of 16°C (61°F).
3) Spray a second layer of enamel, if it is necessary.
4) Let the last layer of epoxy enamel dry at a minimum temperature of 16°C (61°F) for a minimum of 4 hours.
a) Alternatively, stove the epoxy enamel for 30 minutes at 125 ±5°C (248 to 266°F).

S 428-015-R00

(14) Install the replacement seals
(a) Install the replacement longitudinal seals.
1) Refer to FRS.5307, 5308, 5309, 5310, 5311 and 5312 when it is necessary.

S 218-016-R00

(15) Examine the repair.
(a) Visually examine the mounting inserts for the fairing.

S 938-017-R00

(16) Identify the repair.
(a) Use a vibro-engraver to write the SB 72-8454 on the SB plate.

NOTE: Alternatively, FRS.5576 can be marked adjacent to the part number with permanent ink of a contrasting color.

TASK 72-03-01-398-018-R00

3. Gas Generator Compressor Fairing LH Upper - Repair the Bonded Rubber Seals

A. General

(1) This procedure, FRS.5307, gives the repair of the LH upper assembly on the gas generator compressor fairing to install the bonded rubber seals.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) This procedure refers to the fairings with this part number:

UL12640

B. Equipment

(1) Hand tools

(2) Corrugated scraper

(3) Soft hair brush

C. Consumable Materials

(1) Garnet paper, grade 60
Omat No. 5/98

(2) Garnet paper, grade 80
OMat No. 5/97

Gas Generator Compressor Fairing LH Upper - Repair the Bonded Rubber Seals

(3) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257
(4) Xylene
OMat No. 122
(5) Cold curing silicone compound (silcoset 152)
OMat No. 872
(6) B50009 - Acetone, OMat 150
(7) B50018 - Isopropyl alcohol, OMat 1/40
(8) B00713 - Degreaser, OMat NO. 1/257
(9) Silcoset primer
OMat No. 876
(10) Acetone
OMat No. 1/13
(11) Gloves, white cotton fiber - Local resources
(12) Distilled water - Local resources
(13) Lint-free cloth - Local resources

D. Parts
(1) Seal - VK1406 (1502115), (Item 1) ARM 690
(2) Seal - VK1406 (1502117), (Item 2) ARM 692
(3) Seal - VK1406 (1502119), (Item 3) ARM 714

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

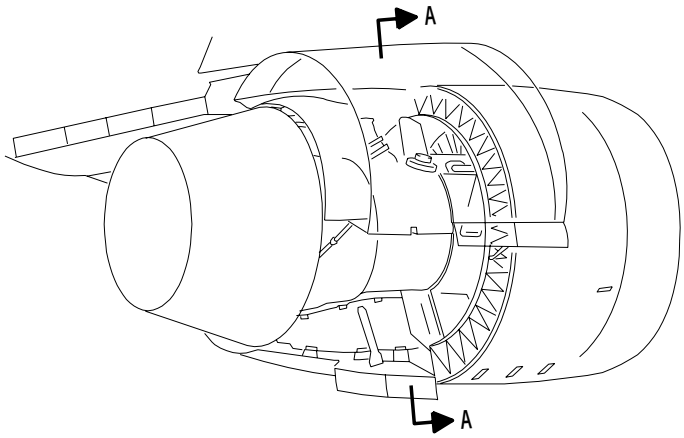
F. Procedure

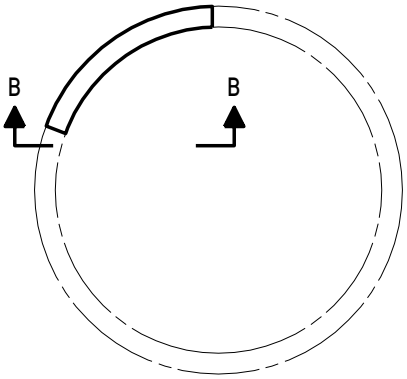
S 028-019-R00
(1) Remove the seals and bonding agent
(a) Remove the damaged seals with approved hand tools.
1) Be careful not to cause damage to the fairing.
(b) Remove all of the bonding agent that stays with approved hand tools.

S 168-020-R00
(2) Prepare to bond the surfaces of the fairing (Fig. 805)

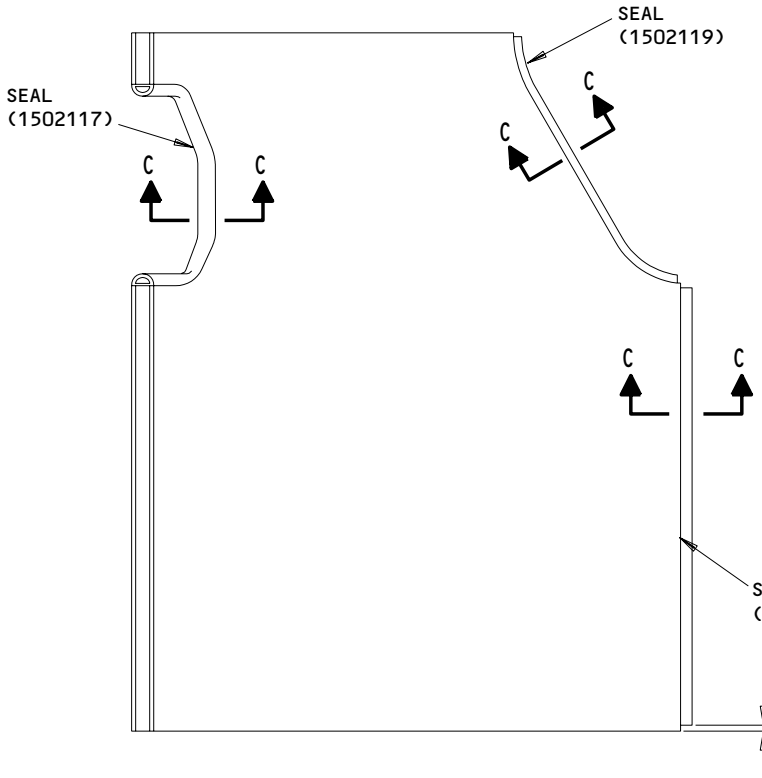
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.

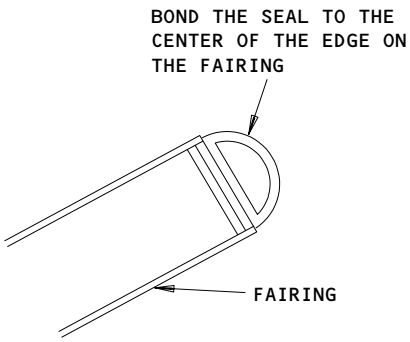




TOP LEFT FAIRING
A–A



BOTTOM VIEW OF FAIRING
B–B



C–C

NOTE: ALL THE BONDS ARE IN GROUP 3.

68471
66670

Top Left Compressor Fairing,
Bonded Rubber Seal – Replacement Details (FRS. 5307)
Figure 805

2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(b) Let the bonding surfaces dry fully before you continue.

(c) Use garnet paper, grade 60 or 80, to make the bonding surface of the fairing rough.

(d) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(e) Do these steps to make sure the surface that you bond is clean:
1) Use a hair brush that is soft and clean to apply a thin layer of distilled water along the area to be bonded.
2) Look at the layer of distilled water, immediately.
a) Look for breaks in the continuity of the layer.
3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
4) Use clean acetone to remove the distilled water.
a) Let the surface dry.

S 168-021-R00

(3) Prepare to bond the seals.
(a) Use 80 grade garnet paper to lightly roughen the bonding surfaces of the seals.
(b) Wipe the surface of the replacement seals with a lint free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.

S 358-022-R00

(4) Bond the seals into its position (Fig. 805).

Gas Generator Compressor Fairing LH Upper - Repair the Bonded Rubber Seals

WARNING: DO NOT GET THE PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the bonding surfaces.

NOTE: Let the primer air dry for 30 minutes.

WARNING: DO NOT GET THE SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE SEALANT. THE SEALANT IS POISONOUS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound (Silcoset 152) that is cold curing to the mating faces of the fairing and seals.
1) Smooth to the necessary thickness with a corrugated scraper or tool.

(c) Attach the seals to the fairing and apply sufficient pressure to make sure the seals touch the fairing.

NOTE: Install before a thin film has formed on the Silcoset 152 bonding agent.

(d) Remove the unwanted Silcoset 152 bonding agent from around the edges of the seals.

(e) Cure the Silcoset 152 bonding agent for 24 hours at room temperature.

S 218-023-R00

(5) Examine the repair (Fig. 805).
(a) Examine the seals for adhesion and position.

Gas Generator Compressor Fairing LH Upper - Repair the Bonded Rubber Seals

S 938-024-R00

(6) Identify the repair.

(a) Use a vibro-engraver to write the repair number FRS.5307 adjacent to the part number.

NOTE: Alternatively, FRS.5307 can be marked adjacent to the part number with permanent ink of a contrasting color.

TASK 72-03-01-398-025-R00

4. Gas Generator Compressor Fairing RH Upper - Repair the Bonded Rubber Seals

A. General

(1) This procedure, FRS.5308, gives the repair of the RH upper assembly on the gas generator compressor fairing to install the bonded rubber seals.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) This procedure refers to fairings with this part number:

UL12641

B. Equipment

(1) Hand tools

(2) Corrugated scraper

(3) Soft hair brush

C. Consumable Materials

(1) Garnet paper grade 60
OMat No. 5/98

(2) Garnet paper, grade 80
OMat No. 5/97

Gas Generator Compressor Fairing RH Upper - Repair the Bonded Rubber Seals

(3) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257
(4) Xylene
OMat No. 122
(5) Cold curing silicone compound (silcoset 152)
OMat No. 872
(6) Silcoset primer
OMat No. 876
(7) Acetone
OMat No. 1/13
(8) Gloves, white cotton fiber - Local resources
(9) Distilled water - Local resources
(10) Lint-free cloth - Local resources

D. Parts
(1) Seal - VK1406 (1502117), (Item 1) ARM 692
(2) Seal - VK1406 (1502119), (Item 2) ARM 714
(3) Seal - VK1406 (1502332), (Item 3) ARM 812 or
(4) Seal - VK6134 (1502349), (Item 3) WRS 1298

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

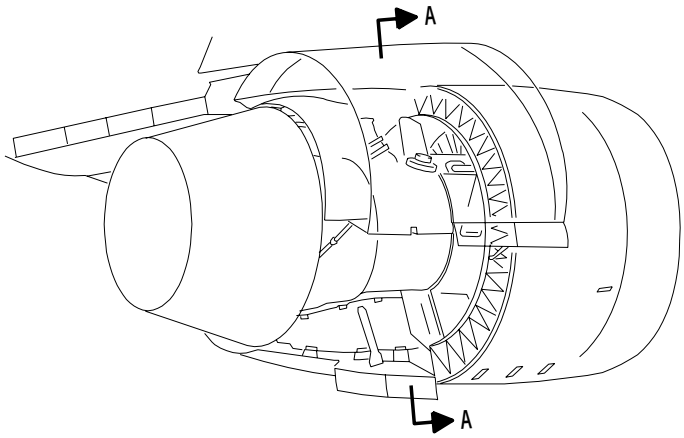
F. Procedure

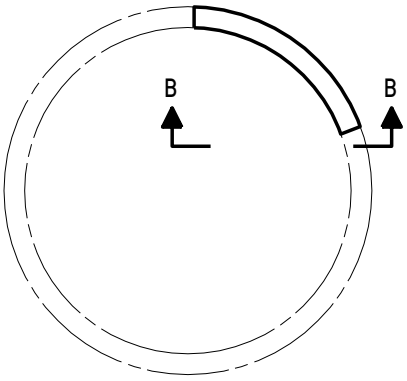
S 028-026-R00
(1) Remove the seals and bonding agent
(a) Remove the damaged seals with hand tools.
(b) Be careful not to cause damage to the fairing.
(c) Remove all of the bonding agent that stays with hand tools.

S 168-027-R00
(2) Prepare the surfaces of the fairing for bonding (Fig. 806).

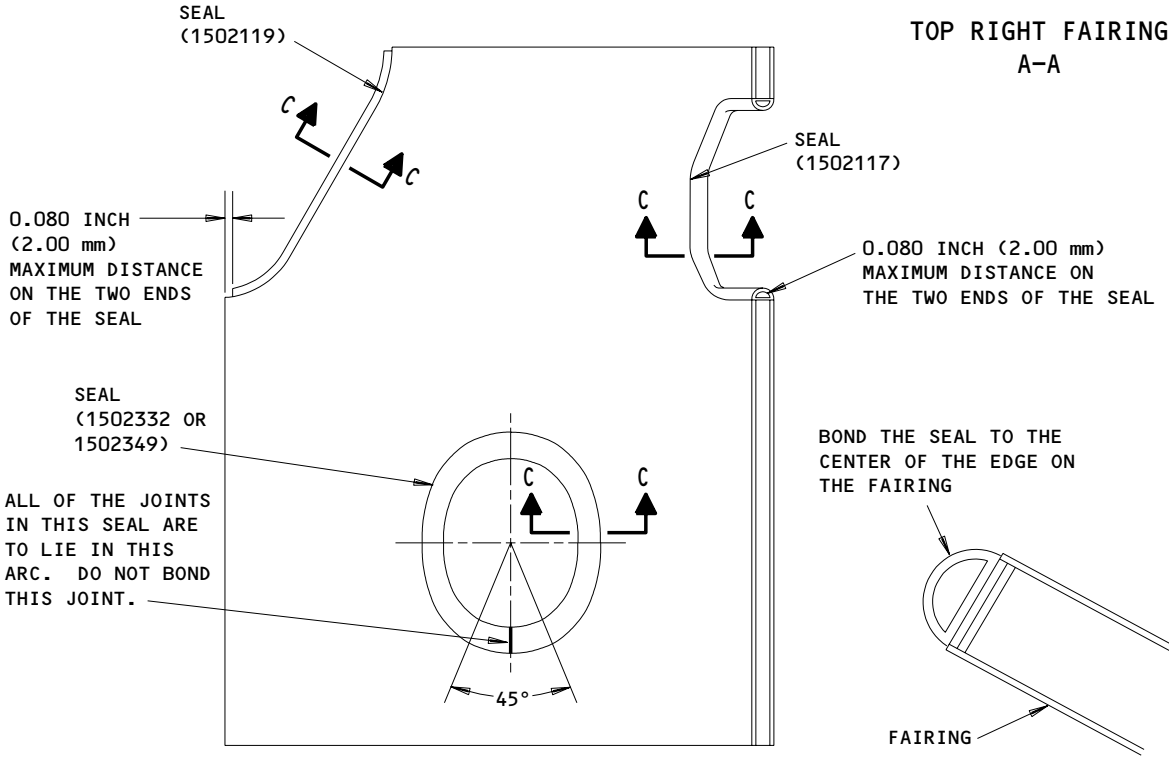
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.





TOP RIGHT FAIRING
A-A



BOTTOM VIEW OF FAIRING
B-B

(EXAMPLE)
C-C

NOTE: ALL THE BONDS ARE IN GROUP 3.

68471
66695

Top Right Compressor Fairing, Bonded Rubber Seal - Replacement Details (FRS. 5308)
Figure 806

Gas Generator Compressor Fairing RH Upper - Repair the Bonded Rubber Seals

3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(b) Use garnet paper, grade 60 or 80, to make the bonding surface of the fairing rough.

(c) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(d) Do these steps to make sure the surface that you bond is clean:
1) Use a hair brush that is soft and clean to apply a thin layer of distilled water along the area to be bonded.
2) Look at the layer of distilled water, immediately.
a) Look for breaks in the continuity of the layer.
3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
4) Use clean acetone to remove the distilled water.
a) Let the surface dry.

S 168-028-R00

(3) Prepare to bond the seals.
(a) Use 80 grade garnet paper to lightly roughen the bonding surfaces of the seals.
(b) Wipe the surface of the replacement seals with a lint free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.

S 358-029-R00

(4) Bond the seals into its position (Fig. 806).

WARNING: DO NOT GET THE PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the bonding surfaces,

NOTE: Let the primer air dry for 30 minutes.

Gas Generator Compressor Fairing RH Upper - Repair the Bonded Rubber Seals

WARNING: DO NOT GET THE SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE SEALANT. THE SEALANT IS POISONOUS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound (Silcoset 152) that is cold curing to the mating faces of the fairing and seals.
1) Smooth to the necessary thickness with a corrugated scraper or tool.
(c) Attach the seals to the fairing and apply sufficient pressure to make sure the seals touch the fairing.

NOTE: Install before a thin film has formed on the Silcoset 152 bonding agent.

(d) Remove all of the Silcoset 152 bonding agent that stays from around the edges of the seals.
(e) Cure the Silcoset 152 bonding agent for 24 hours at room temperature.

S 218-030-R00

(5) Examine the repair (Fig. 806).
(a) Examine the seals for adhesion and position.

S 938-031-R00

(6) Identify the repair.
(a) Use a vibro-engraver to write the repair number FRS.5308 adjacent to the part number.

NOTE: Alternatively, FRS.5308 can be marked adjacent to the part number with permanent ink of a contrasting color.

Gas Generator Compressor Fairing RH Center -
Repair the Bonded Rubber Seals

TASK 72-03-01-398-032-R00

5. Gas Generator Compressor Fairing RH Center -
Repair the Bonded Rubber Seals

A. General

(1) This procedure, FRS.5309, gives the repair of the RH center assembly on the gas generator compressor fairing to install the bonded rubber seals.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) This procedure refers to the fairings with this part number:

UL12643

B. Equipment

(1) Hand tools

(2) Corrugated scraper

(3) Soft hair brush

C. Consumable Materials

(1) Garnet paper, grade 60
OMat No. 5/98

(2) Garnet paper, grade 80
OMat No. 5/97

Gas Generator Compressor Fairing RH Center -
Repair the Bonded Rubber Seals

(3) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257
(4) Xylene
OMat No. 122
(5) Cold curing silicone compound (silcoset 152)
OMat No. 872
(6) Silcoset primer
OMat No. 876
(7) Gloves, white cotton fiber - Local resources
(8) Distilled water - Local resources
(9) Lint-free cloth - Local resources

D. Parts
(1) Seal - VK1406 (1502333), (Item 1) ARM 813 or
(2) Seal - VK6134 (1502350), (Item 1) WRS 1305
(3) Seal - VK1406 (1502114), (Item 2) ARM 689

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

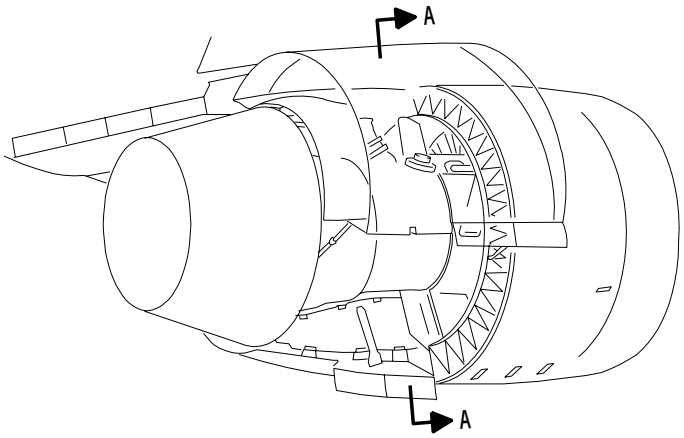
F. Procedure

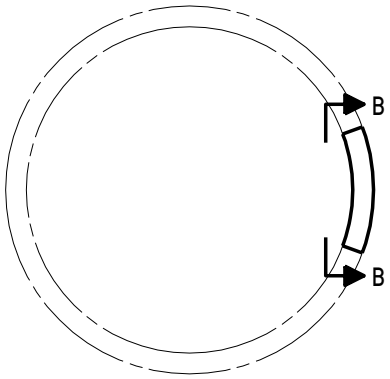
S 028-033-R00
(1) Remove the seals and bonding agent
(a) Remove the damaged seals with hand tools.
(b) Be careful not to cause damage to the fairing.
(c) Remove all of the bonding agent that stays with hand tools.

S 168-034-R00
(2) Prepare the surfaces of the fairing for bonding (Fig. 807).

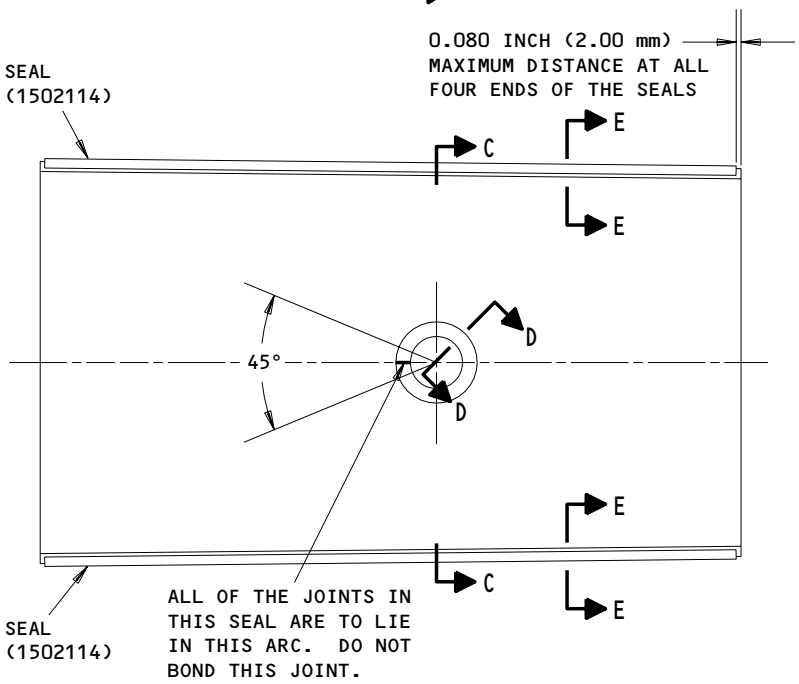
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.

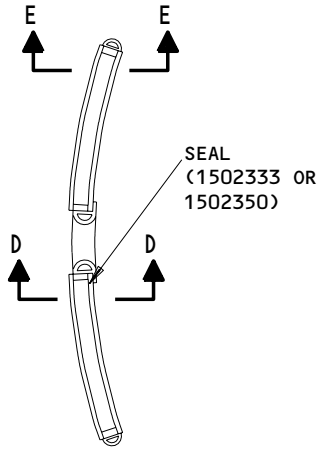




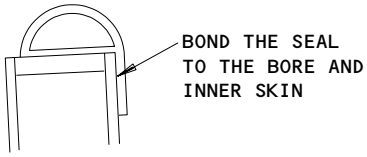
CENTER RIGHT FAIRING
A–A



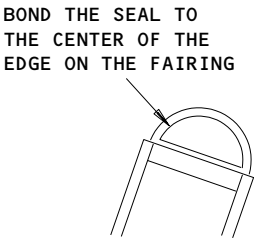
CENTER VIEW OF FAIRING
B–B



C–C



(EXAMPLE)
D–D



(EXAMPLE)
(2 LOCATIONS)
E–E

NOTE: ALL THE BONDS ARE IN GROUP 3.

68471
82508

Right Center Compressor Fairing,
Bonded Rubber Seal – Replacement Details (FRS. 5309)
Figure 807

EFFECTIVITY

ALL

A12627

Gas Generator Compressor Fairing RH Center -
Repair the Bonded Rubber Seals

3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(b) Use garnet paper, grade 60 or 80, to make the bonding surface of the fairing rough.

(c) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(d) Do these steps to make sure the surface that you bond is clean:
1) Use a hair brush that is soft and clean to apply a thin layer of distilled water along the area to be bonded.
2) Look at the layer of distilled water, immediately.
a) Look for breaks in the continuity of the layer.
3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
4) Use clean acetone to remove the distilled water.
a) Let the surface dry.

S 168-035-R00

(3) Prepare to bond the seals.
(a) Use 80 grade garnet paper to lightly roughen the bonding surfaces of the seals.
(b) Wipe the surface of the replacement seals with a lintfree cloth that is moist with Methyl Ethyl Ketone (MEK) or Xylene.

S 358-036-R00

(4) Bond the seals into its position (Fig. 807).

Gas Generator Compressor Fairing RH Center -
Repair the Bonded Rubber Seals

WARNING: DO NOT GET THE PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the bonding surfaces,

NOTE: Let the primer air dry for 30 minutes.

WARNING: DO NOT GET THE SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE SEALANT. THE SEALANT IS POISONOUS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound (Silcoset 152) that is cold curing to the mating faces of the fairing and seals.
1) Smooth to the necessary thickness with a corrugated scraper or tool.
(c) Attach the seals to the fairing and apply sufficient pressure to make sure the seals touch the fairing.

NOTE: Install before a thin film has formed on the Silcoset 152 bonding agent.

(d) Remove all of the Silcoset 152 bonding agent that stays from around the edges of the seals.
(e) Cure the Silcoset 152 bonding agent for 24 hours at room temperature.

S 218-037-R00
(5) Examine the repair (Fig. 807).
(a) Examine the seals for adhesion and position.

Gas Generator Compressor Fairing RH Center -
Repair the Bonded Rubber Seals

S 938-038-R00

(6) Identify the repair.

(a) Use a vibro-engraver to write the repair number FRS.5309 adjacent to the part number.

NOTE: Alternatively, FRS.5309 can be marked adjacent to the part number with permanent ink of a contrasting color.

Gas Generator Compressor Fairing LH Center -
Repair the Bonded Rubber Seals

TASK 72-03-01-398-039-R00

6. Gas Generator Compressor Fairing LH Center -
Repair the Bonded Rubber Seals

A. General

(1) This procedure, FRS.53100, gives the repair of the LH center assembly on the gas generator compressor fairing to install the bonded rubber seals.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) This procedure refers to the fairing with this part number:

UL12642

B. Equipment

(1) Hand tools

(2) Corrugated scraper

(3) Soft hair brush

C. Consumable Materials

(1) Garnet paper, grade 60
OMat No. 5/98

(2) Garnet paper, grade 80
OMat No. 5/97

Gas Generator Compressor Fairing LH Center - Repair the Bonded Rubber Seals

(3) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257
(4) Xylene
OMat No. 122
(5) Cold curing silicone compound (silcoset 152)
OMat No. 872
(6) Silcoset primer
OMat No. 876
(7) Gloves, white cotton fiber - Local resources
(8) Distilled water - Local resources
(9) Lint-free cloth - Local resources

D. Parts
(1) Seal - VK1406 (1502332), (Item 1) ARM 812 or
(2) Seal - VK6134 (1502349), (Item 1) WRS 1298
(3) Seal - VK1406 (1502114), (Item 2) ARM 689

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

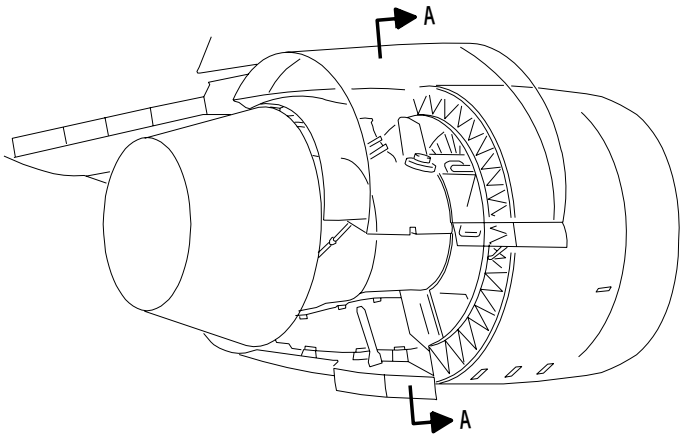
F. Procedure

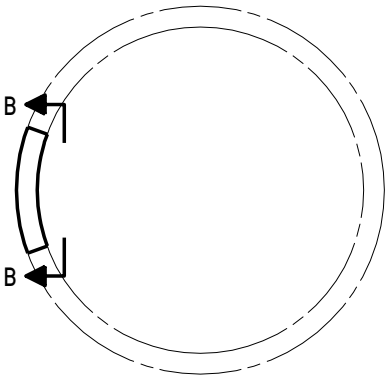
S 028-040-R00
(1) Remove the seals and bonding agent
(a) Remove the damaged seals with hand tools.
(b) Be careful not to cause damage to the fairing.
(c) Remove all of the bonding agent that stays with hand tools.

S 168-041-R00
(2) Prepare the surfaces of the fairing for bonding (Fig. 808).

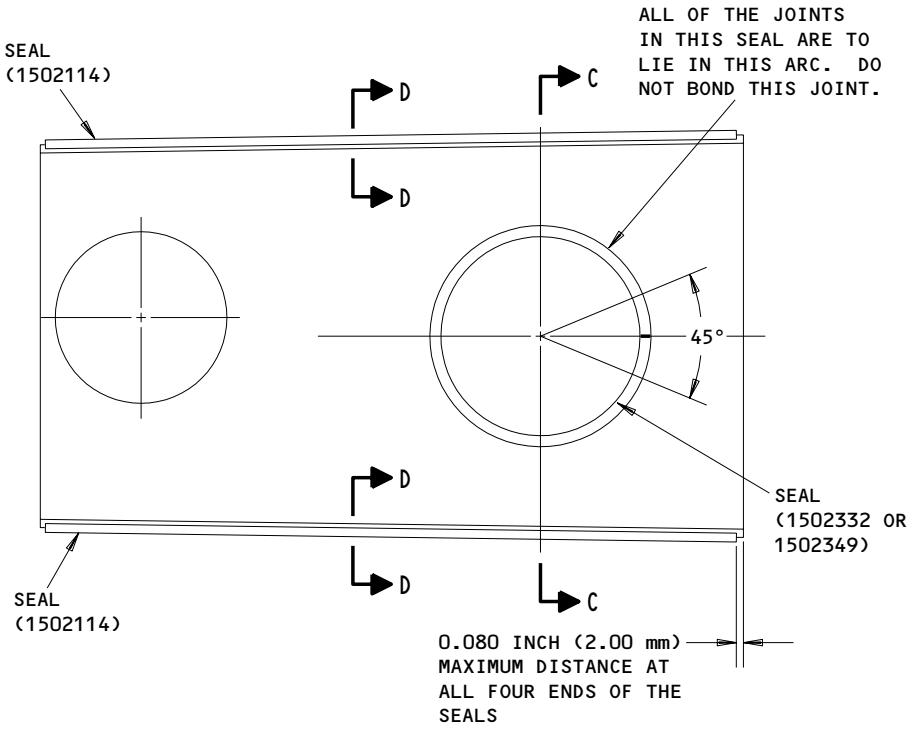
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.

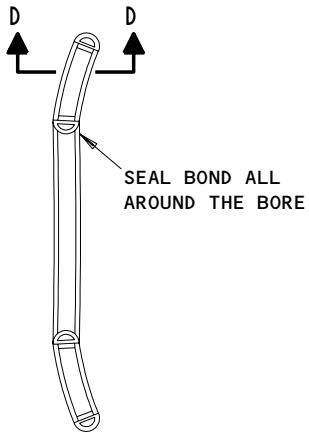




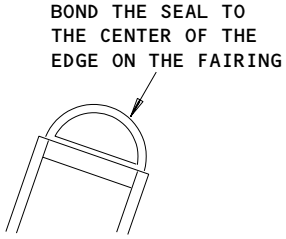
CENTER LEFT FAIRING
A-A



CENTER VIEW OF FAIRING
B-B



C-C



(EXAMPLE)
(2 LOCATIONS)
D-D

NOTE: ALL THE BONDS ARE IN GROUP 3.

68471
82514

Left Center Compressor Fairing, Bonded Rubber Seal - Replacement Details (FRS. 5310)
Figure 808

Gas Generator Compressor Fairing LH Center -
Repair the Bonded Rubber Seals

3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(b) Use garnet paper, grade 60 or 80, to make the bonding surface of the fairing rough.

(c) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
1) Clean the repair area on the fairing with the moist cloth.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(d) Do these steps to make sure the surface that you bond is clean:
1) Use a hair brush that is soft and clean to apply a thin layer of distilled water along the area to be bonded.
2) Look at the layer of distilled water, immediately.
a) Look for breaks in the continuity of the layer.
3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
4) Use clean acetone to remove the distilled water.
a) Let the surface dry.

S 168-042-R00

(3) Prepare to bond the seals.
(a) Use 80 grade garnet paper to lightly roughen the bonding surfaces of the seals.
(b) Wipe the surface of the replacement seals with a lint free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.

S 358-043-R00

(4) Bond the seals into position (Fig. 808).

Gas Generator Compressor Fairing LH Center -
Repair the Bonded Rubber Seals

WARNING: DO NOT GET THE PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the bonding surfaces.

NOTE: Let the primer air dry for 30 minutes.

WARNING: DO NOT GET THE SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE SEALANT. THE SEALANT IS POISONOUS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound (Silcoset 152) that is cold curing to the mating faces of the fairing and seals.
1) Smooth to the necessary thickness with a corrugated scraper or tool.

(c) Attach the seals to the fairing and apply sufficient pressure to make sure the seals touch the fairing.

NOTE: Install before a thin film has formed on the Silcoset 152 bonding agent.

(d) Remove all of the Silcoset 152 bonding agent that stays from around the edges of the seals.

(e) Cure the Silcoset 152 bonding agent for 24 hours at room temperature.

S 218-044-R00

(5) Examine the repair (Fig. 808).
(a) Examine the seals for adhesion and position.

Gas Generator Compressor Fairing LH Center - Repair the Bonded Rubber Seals

S 938-045-R00

(6) Identify the repair.

(a) Use a vibro-engraver to write the repair number FRS.5310 adjacent to the part number.

NOTE: Alternatively, FRS.5310 can be marked adjacent to the part number with permanent ink of a contrasting color.

Gas Generator Compressor Fairing RH Lower -
Repair the Bonded Rubber Seals and Drain Tube

TASK 72-03-01-398-046-R00

7. Gas Generator Compressor Fairing RH Lower -
Repair the Bonded Rubber Seals and Drain Tube

A. General

(1) This procedure, FRS.5311, gives the repair of the RH lower assembly on the gas generator compressor fairing to install the bonded rubber seals and drain tubes.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) This procedure refers to the fairings with this part number:
UL12644
UL30317

B. Equipment

(1) Hand tools

(2) Corrugated scraper

(3) Soft hair brush

C. Consumable Materials

(1) Garnet paper, grade 60
OMat No. 5/98

(2) Garnet paper, grade 80
OMat No. 5/97

Gas Generator Compressor Fairing RH Lower -
Repair the Bonded Rubber Seals and Drain Tube

(3) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257
(4) Surface inspection fluid (NML 21)
OMat No. 641
(5) Acetone
OMat No. 150
(6) B50018 - Isopropyl alcohol, OMat 1/40
(7) BOO713 - Degreaser, OMat No. 1/257
(8) Xylene
OMat No. 122
(9) Silcoset primer
OMat No. 876
(10) Cold curing silicone compound (silcoset 152)
OMat No. 872
(11) Two pack epoxy, white finish and catalyst
OMat No. 795
(12) Gloves, white cotton fiber - Local resources
(13) Lint-free cloth - Local resources

D. Parts
(1) Seal - (Item 1) 1502335 or
(2) Seal - (Item 1) 1502363
(3) Seal - (Item 2) 1502332 or
(4) Seal - (Item 2) 1502349
(5) Seal - (Item 3) 1502108 or
(6) Seal - (Item 3) 1502109
(7) Block seal - (Item 4) 1502112 or
(8) Block seal - (Item 4) 1502113
(9) Block seal - (Item 5) 1502324 or
(10) Block seal - (Item 5) 1502325 or
(11) Block seal - (Item 5) 1502342
(12) Drain tube - (Item 6) 1502302 or
(13) Drain tube - (Item 6) 1502308

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

F. Procedure

S 028-047-R00
(1) Remove the seals or drain tube.
(a) Remove the damaged seals or drain tubes with hand tools.
(b) Be careful not to cause damage to the fairing.
(c) Remove all unwanted bonding agent with hand tools.

Gas Generator Compressor Fairing RH Lower -
Repair the Bonded Rubber Seals and Drain Tube

S 168-048-R00

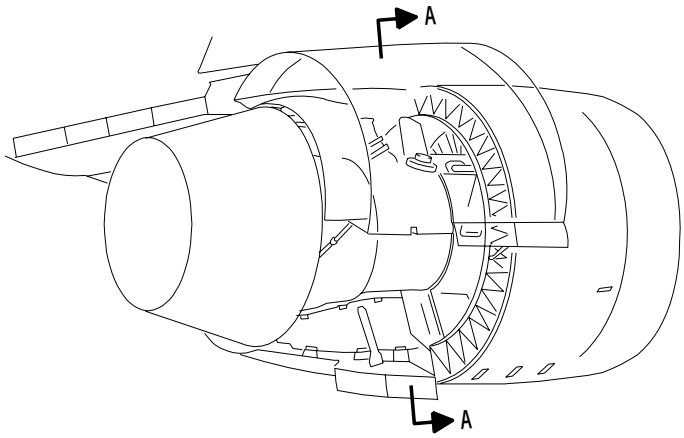
(2) Prepare the bonding surfaces on the fairing, seals and the drain tube (Fig. 809).

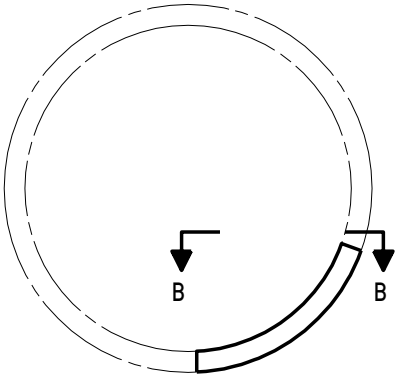
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
    1) Clean the repair area on the fairing with the moist cloth.
    2) You must discard the dirty cloth.
    3) Use a clean cloth each time you clean a new area that you repair.
    4) Contamination of the bulk liquid is not permitted.
    5) Do not let the liquid touch the cloth and return to the bulk liquid container.

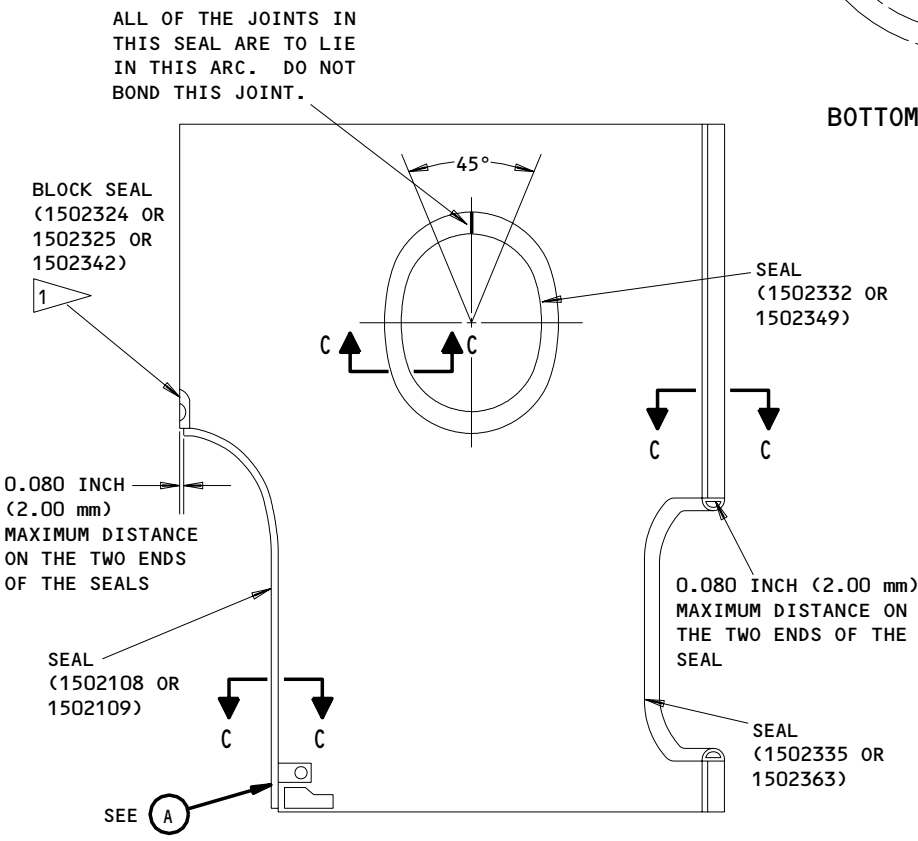
(b) Use garnet paper, grade 60 or 80, to make the bonding surface of the fairing rough.

(c) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
    1) Clean the repair area on the fairing with the moist cloth.
    2) You must discard the dirty cloth.
    3) Use a clean cloth each time you clean a new area that you repair.
    4) Contamination of the bulk liquid is not permitted.
    5) Do not let the liquid touch the cloth and return to the bulk liquid container.

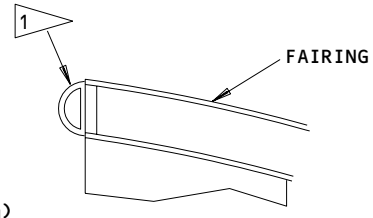




BOTTOM RIGHT FAIRING
A-A



BOTTOM VIEW OF THE FAIRING
B-B



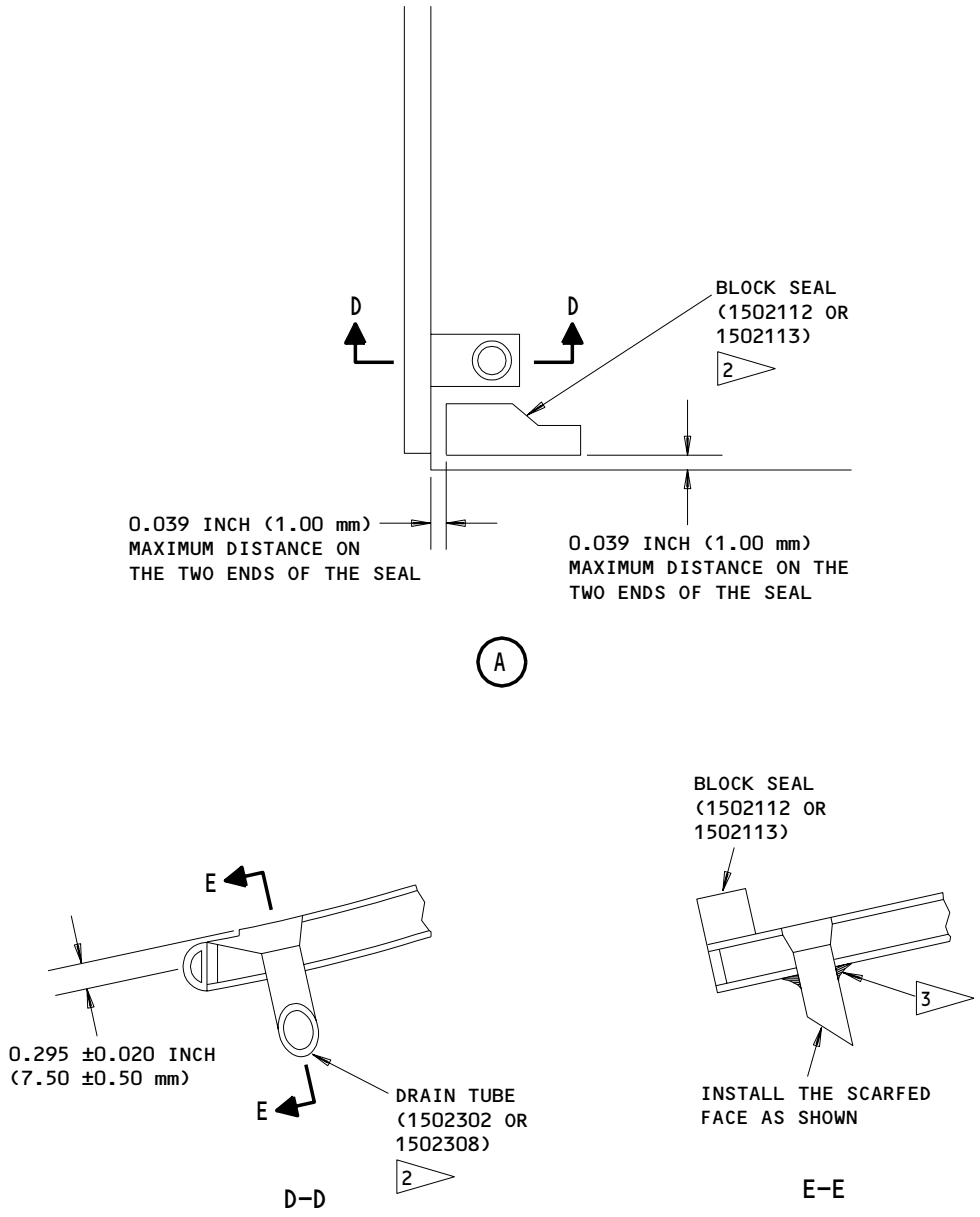
C-C

NOTE: ALL THE BONDS ARE IN GROUP 3.

1 BOND THE SEAL TO THE CENTER OF THE EDGE ON THE FAIRING.

68471
82547

Bottom Right Compressor Fairing,
Bonded Rubber Seal and Drain Tube - Replacement Details (FRS. 5312)
Figure 809 (Sheet 1)



2 BOND TO THE FAIRING
3 FILLET WITH THE COLD CORE RUBBER

82548

Bottom Right Compressor Fairing,
Bonded Rubber Seal and Drain Tube – Replacement Details (FRS. 5312)
Figure 809 (Sheet 2)

Gas Generator Compressor Fairing RH Lower -
Repair the Bonded Rubber Seals and Drain Tube

(d) Do these steps to make sure the surface that you bond is clean:
1) Use a hair brush that is soft and clean to apply a thin layer of surface inspection fluid (NML 21) along the area to be bonded.
2) Look at the layer of surface inspection fluid (NML 21), immediately.
3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
4) Use clean acetone to remove the surface inspection fluid (NML 21).
5) Let the surface dry.

S 968-049-R00

(3) Get the replacement seal or drain tube.
(a) Get the replacement seal or drain tube when it is necessary (refer to the repair parts).

S 168-050-R00

(4) Prepare to bond the seals or drain tube.
(a) Use 80 grade garnet paper to lightly roughen the bonding surfaces of the seals or drain tube.
(b) Wipe the surface of the replacement seals or drain tube with a lint free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.

S 358-051-R00

(5) Bond the seals or drain tube to the fairing (Fig. 809).

WARNING: DO NOT GET THE PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the bonding surfaces.

NOTE: Let the primer air dry for 30 minutes.

Gas Generator Compressor Fairing RH Lower -
Repair the Bonded Rubber Seals and Drain Tube

WARNING: DO NOT GET THE SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE SEALANT. THE SEALANT IS POISONOUS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound (Silcoset 152) that is cold curing to the mating faces of the fairing and seals.
  1) Smooth to the necessary thickness with a corrugated scraper or tool.
(c) Bond the seals or drain tube to the fairing and apply sufficient pressure to make sure the seals or drain tube touch the fairing.
(d) Apply a fillet of silcoset 152 bonding agent around the drain tube.

NOTE: Install before a thin film has formed on the Silcoset 152 bonding agent.

(e) Remove all of the Silcoset 152 bonding agent that stays from around the edges of the seals or drain tube.
(f) Cure the Silcoset 152 bonding agent for 48 hours at 22°C (71.6°F).

S 218-052-R00

(6) Examine the repair (Fig. 809).
  (a) Examine the seals and drain tube for adhesion and position.

NOTE: The seals or tube must not lift.

S 938-053-R00

(7) Make a record of the repair.

WARNING: SOME OF THE ENAMELS HAVE FLASH POINTS BELOW 23°C (73°F) AND ARE HIGHLY FLAMMABLE. THESE ENAMELS ARE CLEARLY IDENTIFIED ON THE SUPPLIERS LABELS. MIX AND APPLY THE PAINTS IN AN AREA THAT IS WELL VENTILATED, WITH FUME EXTRACTION AVAILABLE. YOU MUST USE FLAMEPROOF EQUIPMENT OR INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Mix the two-pack epoxy enamel.
  1) Mix, by weight, the volumes of base component and the catalyst component.
  2) Add brushing thinners when it is necessary.

Gas Generator Compressor Fairing RH Lower - Repair the Bonded Rubber Seals and Drain Tube

3) Let the mixture set for 30 minutes before you use it.

NOTE: The pot life of the mixture is 8 hours. If you do not use all of the enamel in this time, discard it. You must mix only sufficient enamel for immediate use at one time.

4) Mark with a brush FRS.5311 adjacent to the part number with the two-pack, white epoxy enamel.

Gas Generator Compressor Fairing LH Lower -
Repair the Bonded Rubber Seals and Drain Tube

TASK 72-03-01-398-054-R00

8. Gas Generator Compressor Fairing LH Lower -
Repair the Bonded Rubber Seals and Drain Tube

A. General

(1) This procedure, FRS.5312, gives the repair of the LH lower assembly on the gas generator compressor fairing to install the bonded rubber seals and drain tubes.

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(a) You must be careful during all operations to make sure that all bonds are free from contamination.

(b) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(c) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(3) For this procedure the compressor gas generator fairing will be referred to as the fairing.

(4) This procedure refers to the fairing with this part number:

UL12645
UL30318

B. Equipment

(1) Hand tools
(2) Corrugated scraper
(3) Soft hair brush

C. Consumable Materials

(1) Garnet paper, grade 60
OMat No. 5/98
(2) Garnet paper, grade 80
OMat No. 5/97

Gas Generator Compressor Fairing LH Lower - Repair the Bonded Rubber Seals and Drain Tube

(3) Acetone, OMat No. 150 or
Isopropyl alcohol, OMat No. 1/40 or
Cleaning solvent (Desoclean), OMat No. 1/257
(4) Surface inspection fluid (NML21)
OMat No. 641
(5) Acetone
OMat No. 150
(6) Xylene
OMat No. 122
(7) Silcoset primer
OMat No. 876
(8) Cold curing silicone compound (silcoset 152)
OMat No. 872
(9) Two pack epoxy, white finish and catalyst
OMat No. 795
(10) Gloves, white cotton fiber - Local resources
(11) Lint-free cloth - Local resources

D. Parts
(1) Seal - (Item 1) 1502116
(2) Seal - (Item 2) 1502117
(3) Block seal - (Item 3) 1502322 or
(4) Block seal - (Item 3) 1502323 or
(5) Block seal - (Item 3) 1502341
(6) Seal - (Item 4) 1502108 or
(7) Seal - (Item 4) 1502109
(8) Block seal - (Item 5) 1502110 or
(9) Block seal - (Item 5) 1502111
(10) Drain tube - (Item 6) 1502302 or
(11) Drain tube - (Item 6) 1502308

E. Access
(1) Location Zones
410 Left Power Plant
420 Right Power Plant

Gas Generator Compressor Fairing LH Lower -
Repair the Bonded Rubber Seals and Drain Tube

F. Procedure

S 028-055-R00

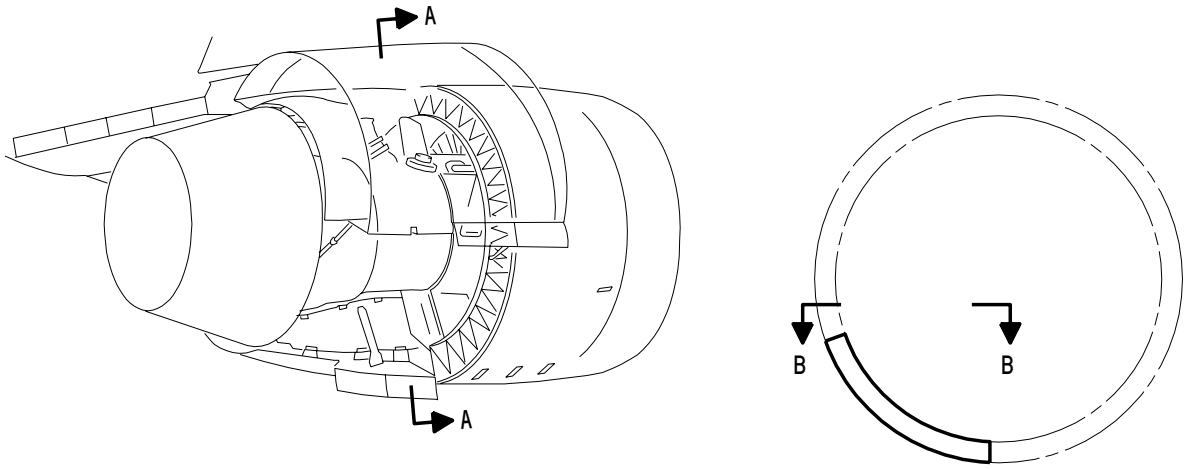
(1) Remove the seals or drain tube.
  (a) Remove the damaged seals or drain tubes with hand tools.
  (b) Be careful not to cause damage to the fairing.
  (c) Remove all of the bonding agent that stays with hand tools.

S 168-056-R00

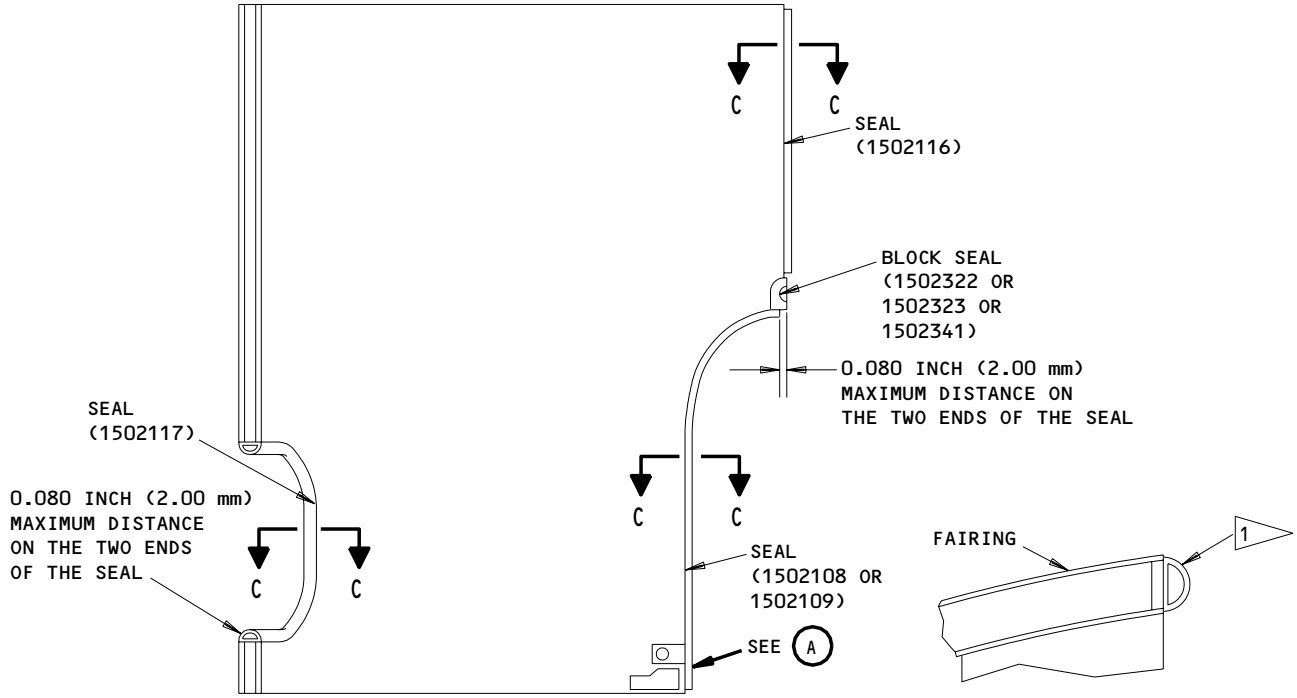
(2) Prepare the bonding surfaces on the fairing, seals and the drain tube (Fig. 810).

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

  (a) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
    1) Clean the repair area on the fairing with the moist cloth.
    2) You must discard the dirty cloth.
    3) Use a clean cloth each time you clean a new area that you repair.
    4) Contamination of the bulk liquid is not permitted.
    5) Do not let the liquid touch the cloth and return to the bulk liquid container.
  (b) Use garnet paper, grade 60 or 80, to make the bonding surface of the fairing rough.
  (c) Make a clean, dry, lint free cloth moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.
    1) Clean the repair area on the fairing with the moist cloth.



BOTTOM LEFT FAIRING
A-A



BOTTOM VIEW OF FAIRING
B-B

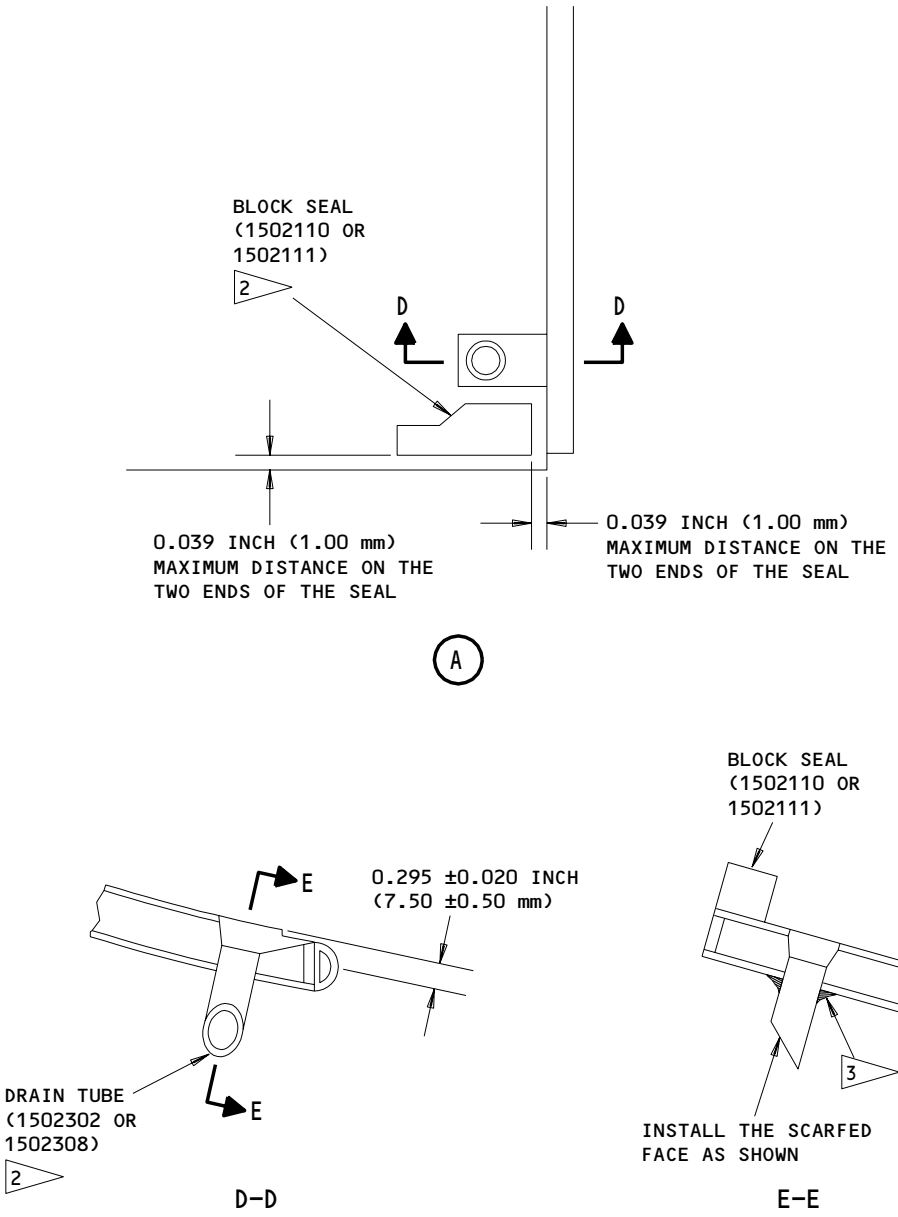
(EXAMPLE)
C-C

NOTE: ALL THE BONDS ARE IN GROUP 3.

1 BOND THE SEAL TO THE CENTER OF THE EDGE ON THE FAIRING.

68471
82562

Bottom Left Compressor Fairing,
Bonded Rubber Seal and Drain Tube - Replacement Details (FRS. 5311)
Figure 810 (Sheet 1)



2 BOND TO THE FAIRING
3 FILLET WITH THE COLD CORE RUBBER

82563

Bottom Left Compressor Fairing,
Bonded Rubber Seal and Drain Tube - Replacement Details (FRS. 5311)
Figure 810 (Sheet 2)

Gas Generator Compressor Fairing LH Lower -
Repair the Bonded Rubber Seals and Drain Tube

2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(d) Do these steps to make sure the surface that you bond is clean:
1) Use a hair brush that is soft and clean to apply a thin layer of surface inspection fluid (NML 21) along the area to be bonded.
2) Look at the layer of surface inspection fluid (NML 21), immediately.
3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
4) Use clean acetone to remove the surface inspection fluid (NML 21).
5) Let the surface dry.

S 968-057-R00

(3) Get the replacement seal or drain tube.
(a) Get the replacement seal or drain tube when it is necessary (refer to the repair parts).

S 168-058-R00

(4) Prepare to bond the seals or drain tube.
(a) Use 80 grade garnet paper to lightly roughen the bonding surfaces of the seals or drain tube.
(b) Wipe the surface of the replacement seals or drain tube with a lint free cloth that is moist with Acetone or Isopropyl alcohol or cleaning solvent Desoclean.

S 358-059-R00

(5) Bond the seals or drain tube to the fairing (Fig. 810).

Gas Generator Compressor Fairing LH Lower - Repair the Bonded Rubber Seals and Drain Tube

WARNING: DO NOT GET THE PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE PRIMER. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAMES AND HEAT. THE PRIMER IS FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the bonding surfaces.

NOTE: Let the primer air dry for 30 minutes.

WARNING: DO NOT GET THE SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE SEALANT. THE SEALANT IS POISONOUS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound (Silcoset 152) that is cold curing to the mating faces of the fairing and seals.
(c) Bond the seals or drain tube to the fairing and apply sufficient pressure to make sure the seals or drain tube touch the fairing.
(d) Apply a fillet of silcoset 152 bonding agent around the drain tube.

NOTE: Install before a thin film has formed on the Silcoset 152 bonding agent.

(e) Remove all of the Silcoset 152 bonding agent that stays from around the edges of the seals or drain tube.

Gas Generator Compressor Fairing LH Lower -
Repair the Bonded Rubber Seals and Drain Tube

(f) Cure the Silcoset 152 bonding agent for 48 hours at 22°C (71.6°F).

S 218-060-R00

(6) Examine the repair (Fig. 810)

(a) Examine the seals and drain tube for adhesion and position.

NOTE: The seals or tube must not lift.

S 938-061-R00

(7) Make a record of the repair.

WARNING: SOME OF THE ENAMELS HAVE FLASH POINTS BELOW 23°C (73°F) AND ARE HIGHLY FLAMMABLE. THESE ENAMELS ARE CLEARLY IDENTIFIED ON THE SUPPLIERS LABELS. MIX AND APPLY THE PAINTS IN AN AREA THAT IS WELL VENTILATED, WITH FUME EXTRACTION AVAILABLE. YOU MUST USE FLAMEPROOF EQUIPMENT OR INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Mix the two-pack epoxy enamel.

1) Mix, by weight, the volumes of base component and the catalyst component.
2) Add brushing thinners when it is necessary.
3) Let the mixture set for 30 minutes before you use it.

NOTE: The pot life of the mixture is 8 hours. If you do not use all of the enamel in this time, discard it. You must mix only sufficient enamel for immediate use at one time.

(b) Mark with a brush FRS.5312 adjacent to the part number with the two-pack, white epoxy enamel.

Gas Generator Fairing Support Panel Diaphragms - Repair the Cracks on the Rear Mounting Bracket Positions at the LH and RH Center Gas Generator Fairing

TASK 72-03-01-398-062-R00

9. Gas Generator Fairing Support Panel Diaphragms - Repair the Cracks on the Rear Mounting Bracket Positions at the LH and RH Center Gas Generator Fairing

A. General

(1) This procedure, FRS.5515, gives the repair for the cracked support panel diaphragms at the LH and RH center assembly on the gas generator compressor fairing at the rear mounting bracket positions, where the brackets are resistance spot welded to the diaphragms.

(2) For this procedure the gas generator fairing support panels will be referred to as the support panels.

(3) This procedure refers to support panels with these part numbers:

Left Hand Panel Gas Generator Fairing Assembly
UL16338
UL15357 RR SB 72-8264
UL30077 RR SB 72-9383
UL39712 RR SB 75-C796
UL39715 RR SB 75-C796
FW15725 RR SB 72-D352
Right Hand Panel Gas Generator Fairing Assembly
UL16339
UL15356 RR SB 72-8264
UL30076 RR SB 72-9383
FW15853 RR SB 72-D352

B. Equipment

(1) Bench drilling machine
(2) Portable power drill
(3) Pneumatic riveting equipment
(4) Sheetmetal work equipment
(5) Tungsten carbide twist drills

C. Consumable Materials

(1) Titanium (TAK) sheet doubler,
0.048 inch (1.22 mm) thick (18 SWG)
British Spec/Ref - MSRR 8608
American Spec/Ref - AMS 4900C
(Alternate to 18/8 stainless steel (EBM) sheet)

(2) 18/8 Stainless Steel (EBM) sheet doubler
0.048 inch (1.22 mm) thick (18 SWG)
British Spec/Ref - MSRR 6523
American Spec/Ref - AMS 5512C
(alternate to Titanium (TAK) sheet)

(3) Jointing compound, Hylomar PL32
OMat No. 4/47

Gas Generator Fairing Support Panel Diaphragms - Repair the Cracks on the Rear Mounting Bracket Positions at the LH and RH Center Gas Generator Fairing

D. Parts

(1) Bulbed Cherrylock universal head, monel, blind rivet

CR2539-4-2 (Item 1)	NAS1738M4-2
CR2539-4-3 (Item 2)	NAS1738M4-3

(2) Titanium (TAK) or 18/8 Stainless Steel (EBM) sheet doubler, 0.048 inch (1.22 mm) - Local resource

E. Access

(1) Location Zones

410 Left Power Plant
420 Right Power Plant

F. Procedure

S 168-063-R00

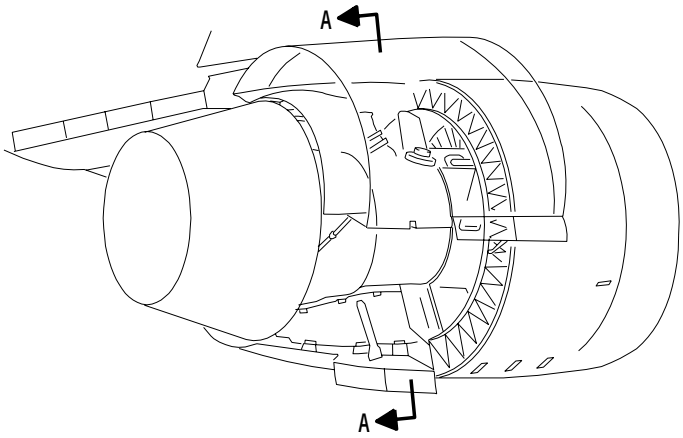
(1) Prepare for the repair.

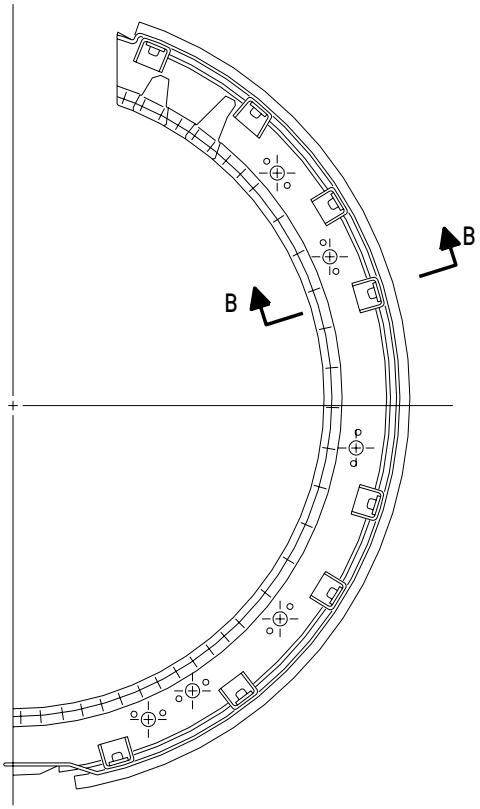
(a) Make a mark around all of the cracks and stop drill the ends with a 0.032 inch (0.80 mm) diameter drill.

S 358-064-R00

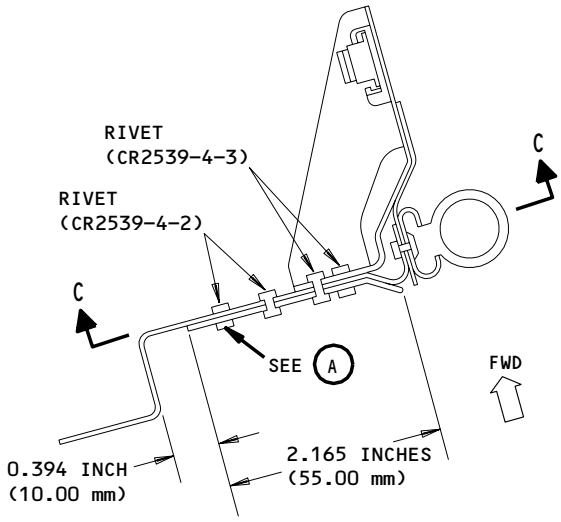
(2) Repair the cracked area (Fig 811).

(a) Make sure the doubler is on all the cracks that can extend from the bracket mounting area.
(b) Cut the doubler to prevent blockages and to connect with the contour of the diaphragm
(c) You must make the perspex template equivalent to the contour of the doubler (except for the angular face).
(d) Make sure the bracket is in the correct position.
(e) Assemble the template to the diaphragm.
(f) Make sure the rivet hole pattern is adjacent to the cracked area to get the best position for the rivets.
(g) Move the hole positions from the template to the doubler.
(h) Use the template to make a mark for all rivet hole positions.
(i) Drill 0.098 inch (2.5 mm) start holes in the doubler.
(j) Remove the burrs from the rivet holes.
(k) Assemble the doubler to the diaphragm.
1) Attach the doubler with a clamp into its position.





VIEW IN THE AFT DIRECTION
A–A

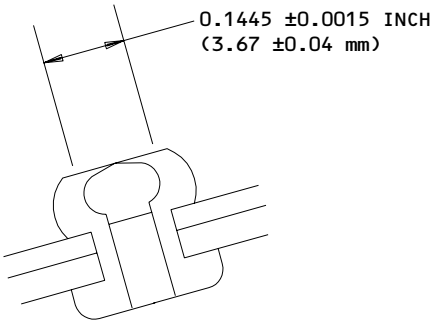


VIEW OF BOLT BRACKET
(EXAMPLE)
B–B

68471
91258
91259

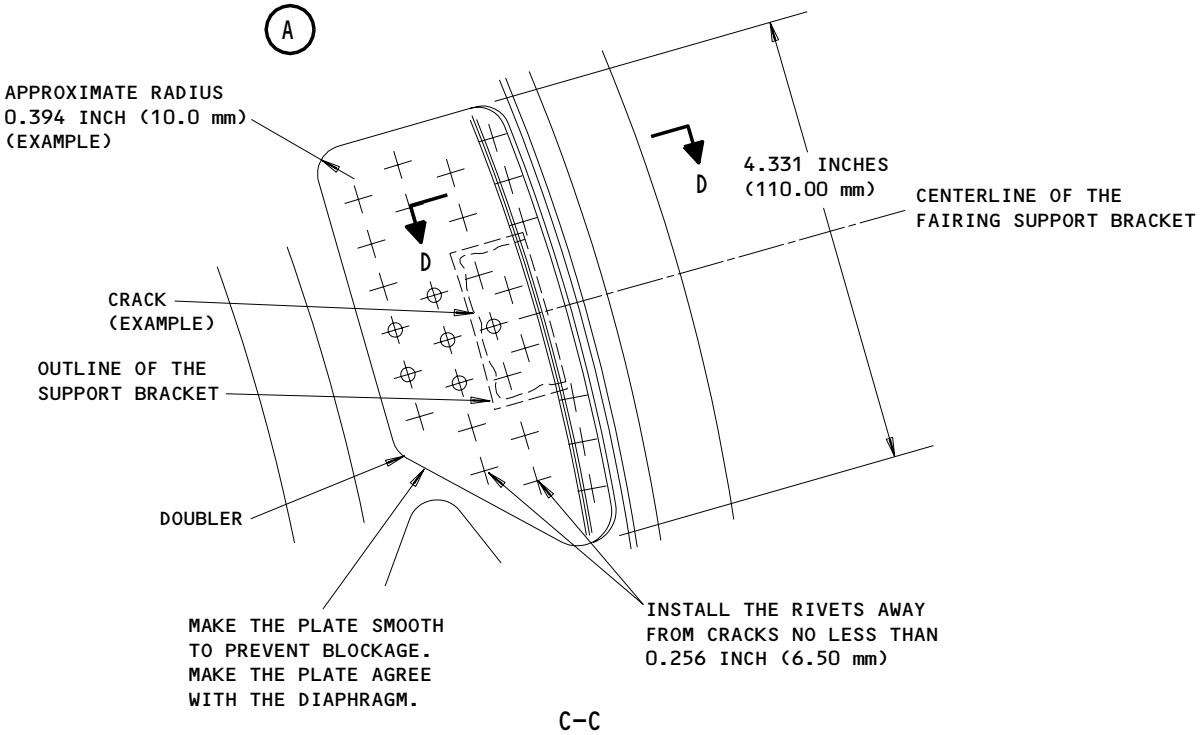
NOTE: USE THE COLD RIVET PROCEDURE TO INSTALL THE RIVETS.
LEFT SUPPORT PANEL IS SHOWN, RIGHT SUPPORT PANEL IS OPPOSITE.

Center Gas Generator Fairing,
Support Panel Diaphragm – Repair of Cracks (FRS. 5515)
Figure 811 (Sheet 1)

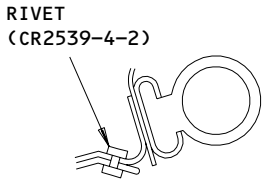


POSITION OF ALL RIVETS
(EXAMPLE)

A



C–C



VIEW OF RIVET AND SEAL
(EXAMPLE)
D–D

91258
91259

Center Gas Generator Fairing,
Support Panel Diaphragm – Repair of Cracks (FRS. 5515)
Figure 811 (Sheet 2)

Gas Generator Fairing Support Panel Diaphragms - Repair the Cracks on the Rear Mounting Bracket Positions at the LH and RH Center Gas Generator Fairing

(l) Make sure the bracket is in the correct position.
(m) Drill the rivet holes in the diaphragm and bracket with the holes in the doubler as a guide.
(n) Disassemble the diaphragm and bracket from the doubler.
1) Remove the burrs.
(o) Wet assemble the doubler to the diaphragm with jointing compound OMat 4/47 and rivet in position with Cherrylock blind rivets CR2539-4-2 and CR2539-4-3.

S 218-065-R00

(3) Examine the repair (Fig. 811).
(a) Visually examine the repair.
(b) Make sure there is a clearance between the doubler and blockages, that the doubler touches the diaphragm and there is no loose rivets.

G. Make a record of the repair.

S 968-066-R00

(1) Use a vibro-engraver to write FRS.5515 adjacent to the part number.

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

TASK 72-03-01-398-067-R00

10. Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

A. General

(1) This procedure, FRS.5516, gives the repair for restoring the support panels that are damaged at the LH and RH on the center gas generator fairing at the rear mounting bracket locations.

(2) The repair is for the support panels with a broken bracket fully gone with a piece of the diaphragm and outer shroud at the resistance spot welds.

(3) For this procedure the gas generator fairing support panels will be referred to as the support panels.

(4) For this procedure the gas generator fairing will be referred to as the fairing.

(5) This procedure refers to RB211-535E4 engine support panels with these part numbers:

Left Hand Panel Gas Generator Fairing Assembly
UL16338

UL15357	RR SB 72-8264
UL30077	RR SB 72-9383
UL39712	RR SB 75-C796
UL39715	RR SB 72-C796
FW15725	RR SB 72-D352

Right Hand Panel Gas Generator Fairing Assembly
UL16339

UL15356	RR SB 72-8264
UL30076	RR SB 72-9383
FW15853	RR SB 72-D352

B. Equipment

(1) Bench drilling machine
(2) Portable power drill
(3) Tungsten carbide twist drills and countersink bit
(4) Tungsten carbide rotary burs
(5) Portable grinding equipment
(6) Pneumatic riveting equipment
(7) Sheetmetal work equipment
(8) Heat treat oven
(9) Hand tools

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

C. Consumable Materials
   (1) Titanium (TAK) Sheet Doubler
       0.048 inch (18 SWG) thick (Item 4),
       0.036 inch (20 SWG) thick (Item 5),
       0.028 inch (22 SWG) thick (Item 6)
       British Spec/Ref - MSRR 8608
       American Spec/Ref - AMS 4900C
       (alternate to 18/8 stainless steel (EBM) sheet)
   (2) 18/8 Stainless Steel (EBM) Sheet Doubler
       0.048 inch (18 SWG) thick (Item 4),
       0.036 inch (20 SWG) thick (Item 5),
       0.028 inch (22 SWG) thick (Item 6)
       British Spec/Ref - MSRR 6523
       American Spec/Ref - AMS 5512C
       (alternate to Titanium (TAK) sheet)
   (3) Titanium (TAK) sheet packer,
       0.064 inch (16 SWG) thick (item 7)
   (4) Jointing compound, Hylomar PL32
       OMat No. 4/47
   (5) Engineers marking out blue
   (6) Methylated spirits
       OMat No. 155

D. Parts
   (1) Center gas generator fairing rear mounting bracket
       UL24360, (Item 1)
   (2) Bulbed Cherrylock universal head, monel,
       blind rivets,
       CR2539-4-1 (NAS1738M4-1) (Item 8) and
       CR2539-4-2 (NAS1738M4-2) (Item 2)
   (3) Bulbed Cherrylock 156 degrees countersink head,
       monel, blind rivets, CR2540-4-2 (Item 9)
   (4) Solid rivet, stainless steel, universal head,
       AS16088 (AN123186) (Item 3)

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

E. Access

(1) Location Zones

410 Left Power Plant
420 Right Power Plant

F. Procedure

S 168-068-R00

(1) Prepare for the repair

(a) Make a mark around all of the cracks that extend from the damaged area and stop drill the ends with a 0.032 inch (0.80 mm) diameter drill.

NOTE: Titanium work hardens quickly thus drilling must have a continuous feed. Drill dwell will cause work hardening and will not be easy to drill.

S 358-069-R00

(2) Repair the damaged diaphragm and replace the rear mounting bracket on the fairing (Fig. 812 and 813, sheets 1 to 4)

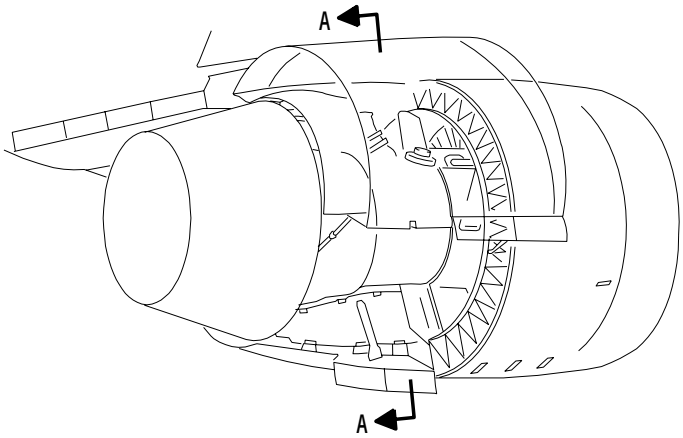
(a) If it is necessary, hit the diaphragm lightly with a hammer to remove the distortion.

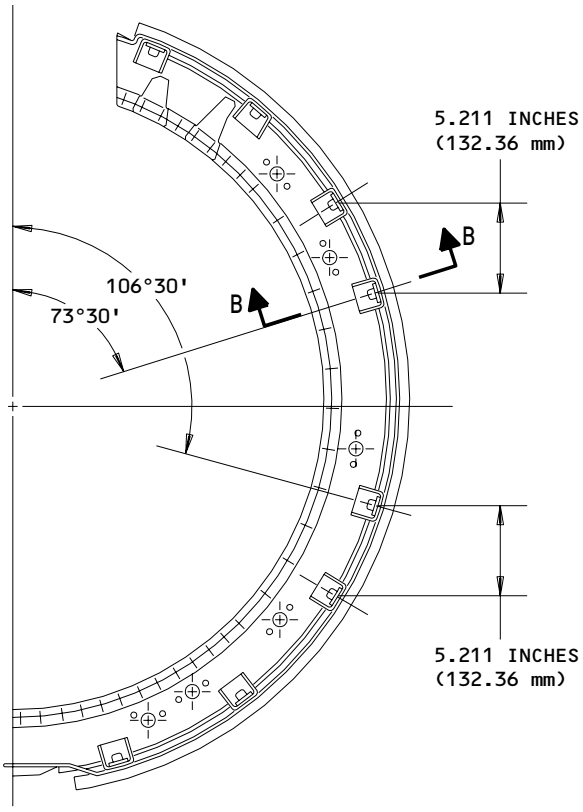
(b) Do the steps that follow with the replacement bracket (UL24360) as a guide:

1) Make the damaged hole larger in the support panel diaphragm.
2) Remove the burrs to clean the damaged area.
3) Make sure there is a clearance to install the replacement bracket correctly through the hole.

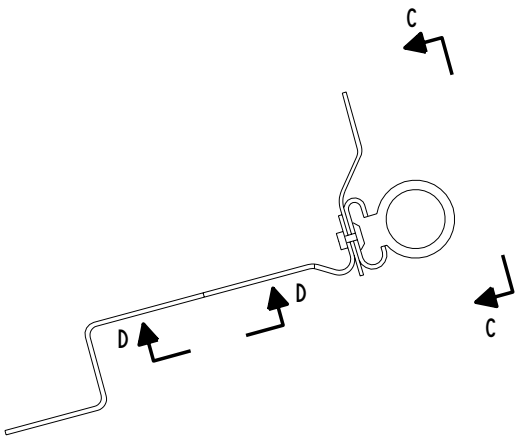
(c) Do the steps that follow for the outer shroud:

1) Remove all the burrs and clean the damaged material at the outer shroud location.





VIEW IN THE AFT DIRECTION
A–A

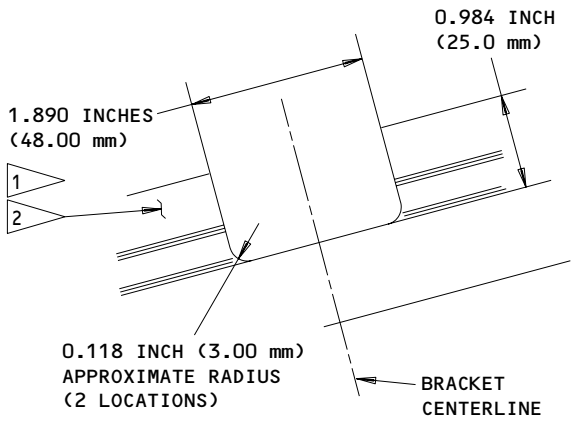


VIEW OF BRACKET
(EXAMPLE)
B–B

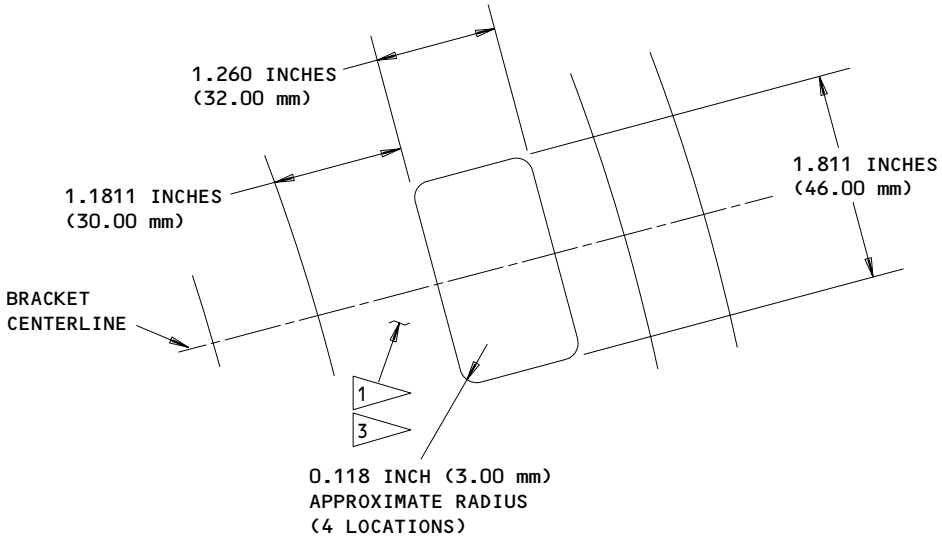
NOTE: USE THE COLD RIVET PROCEDURE TO INSTALL THE RIVETS.
REMOVE THE BURRS AND SHARP EDGES.
LEFT SUPPORT PANEL IS SHOWN,
RIGHT SUPPORT PANEL IS OPPOSITE.

91266

Gas Generator Fairing, Support Panel – Repair Details (FRS. 5516)
Figure 812 (Sheet 1)



VIEW OF SEAL
C-C



VIEW OF BRACKET
D-D

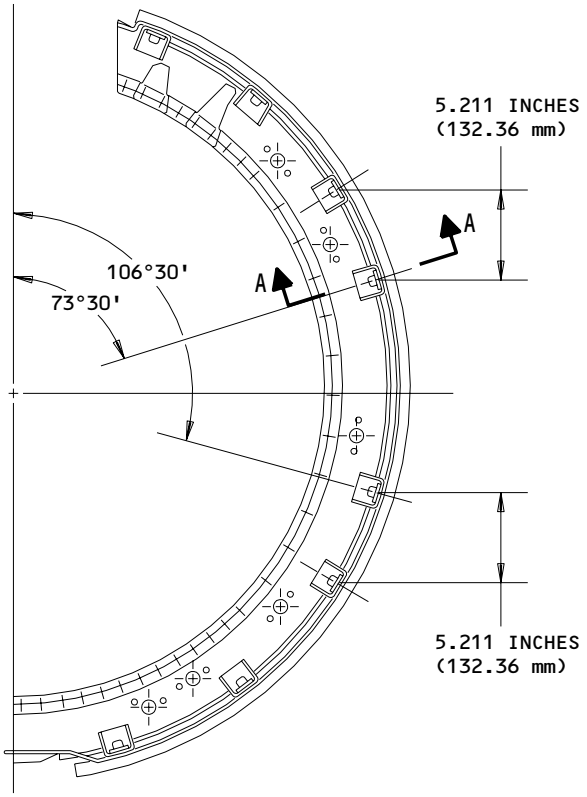
1 MAKE A SLOT IN THE DAMAGED AREA

2 MAKE THE OUTER SHROUD SMOOTH
IF IT IS NECESSARY TO PREVENT AN INTERFERENCE
WITH THE GAS GENERATOR FAIRING

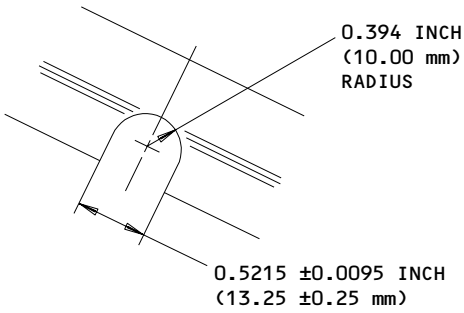
3 MAKE THIS FACE SMOOTH IF IT IS NECESSARY TO REMOVE THE DISTORTION.

68471
91258
91266

Gas Generator Fairing, Support Panel - Repair Details (FRS. 5516)
Figure 812 (Sheet 2)

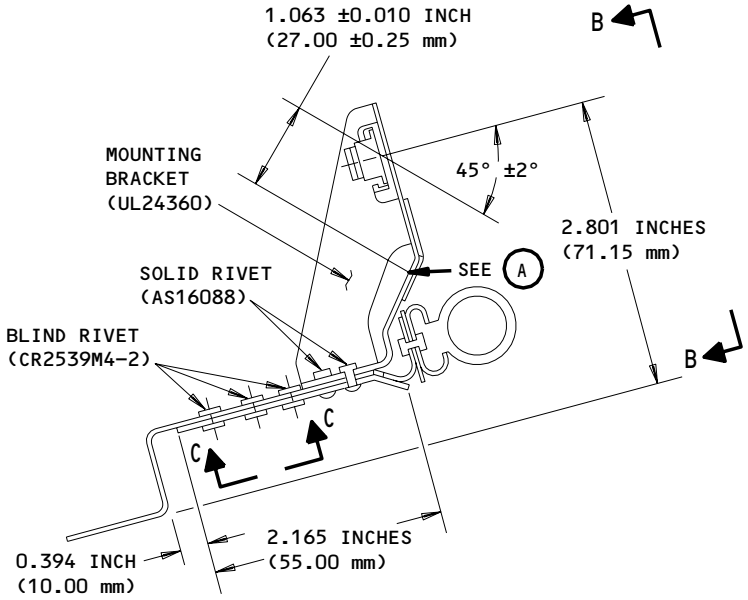


VIEW IN THE AFT DIRECTION



VIEW OF TITANIUM OR
STAINLESS STEEL (22 SWG) SHEET
(EXAMPLE)

(A)



VIEW OF BOLT BRACKET WITH
THE RIVETED BRACKET ASSEMBLY
A-A

NOTE: USE THE COLD RIVET PROCEDURE TO INSTALL THE RIVETS.
REMOVE THE BURRS AND SHARP EDGES.
LEFT SUPPORT PANEL IS SHOWN, RIGHT SUPPORT PANEL IS OPPOSITE.

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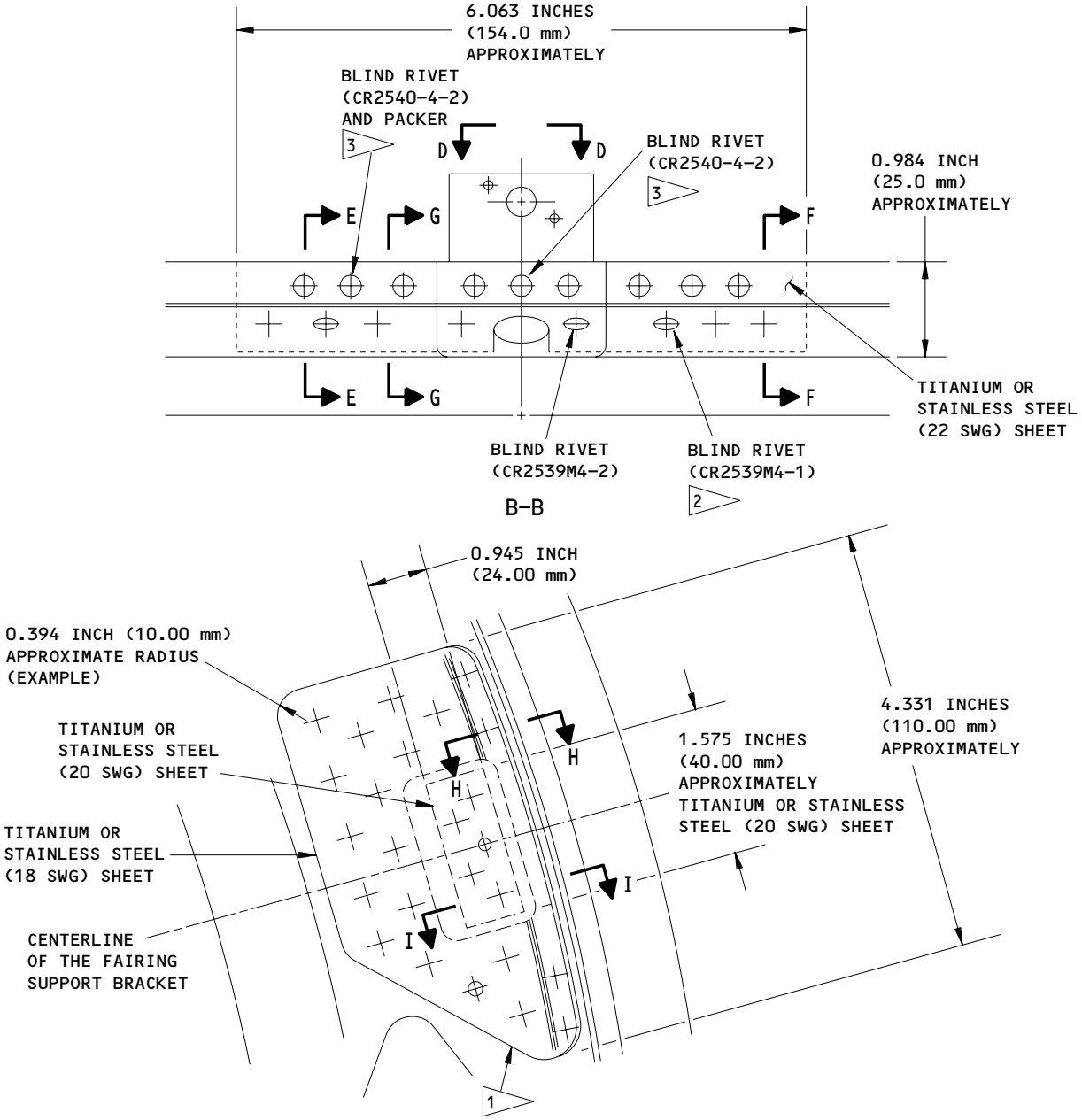
91267

Gas Generator Fairing, Support Panel - Repair Details (FRS. 5516)
Figure 813 (Sheet 1)



VIEW OF THE DOUBLER BRACKET AND SPACER
RIVETED INTO POSITION
C-C

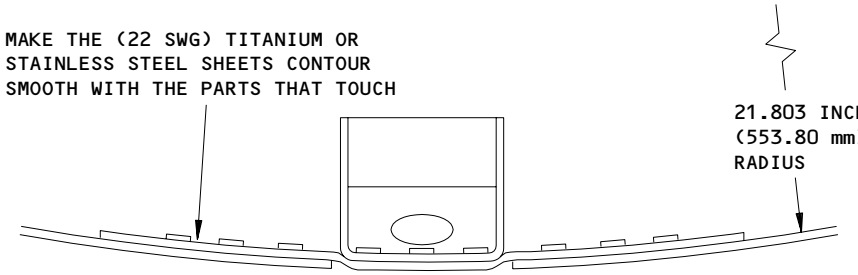
1 MAKE THE PLATE SMOOTH TO PREVENT BLOCKAGE.
THE PLATES CONTOUR MUST AGREE WITH THE DIAPHRAGM

2 DRILL AND RIVET THE (22 SWG) SHEET AFTER THE SEAL IS REMOVED.

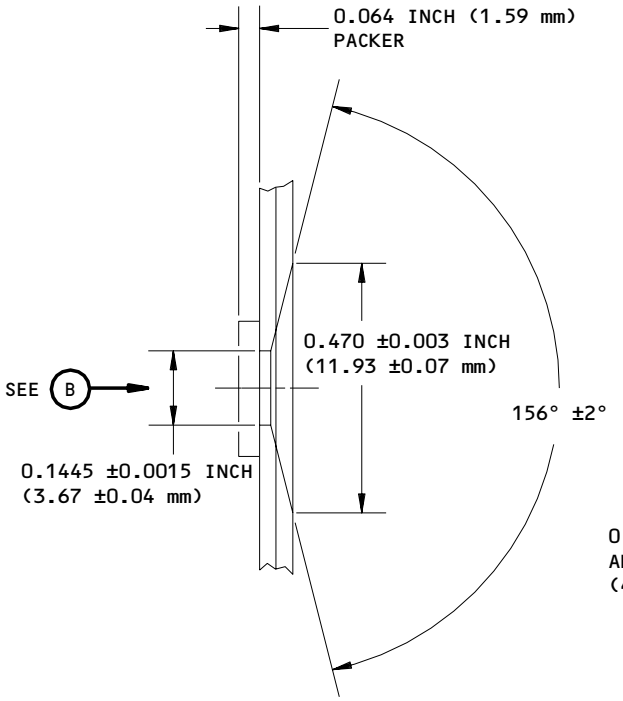
3 INSTALL THE BLIND RIVETS SMOOTH TO 0.005 INCH (0.130 mm)
MORE THAN THE SMOOTH SURFACE.

DEE0006590

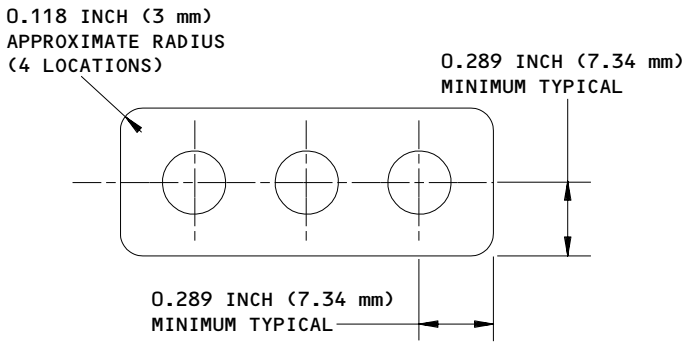
Gas Generator Fairing, Support Panel - Repair Details (FRS. 5516)
Figure 813 (Sheet 2)



VIEW WITH THE ANCHOR NUT REMOVED
D–D



VIEW OF BLIND RIVETS
(CR2540–4–2) WITH PACKER
E–E



PACKER
B

NOTE: D IS THE NOMINAL DIAMETER OF THE RIVET.
INSTALL ALL OF THE RIVETS A MINIMUM OF
2D FROM THE CRACKS AND EDGES,
3D BETWEEN THE ROWS OF RIVETS AND
4D BETWEEN THE RIVETS IN A ROW.

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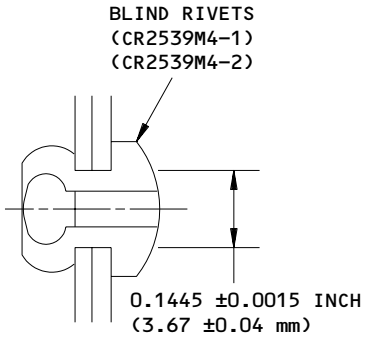
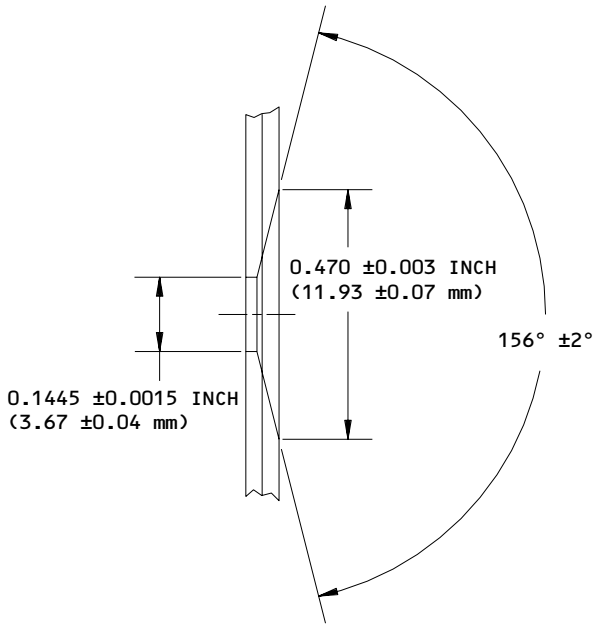
Gas Generator Fairing, Support Panel – Repair Details (FRS. 5516)
Figure 813 (Sheet 3)



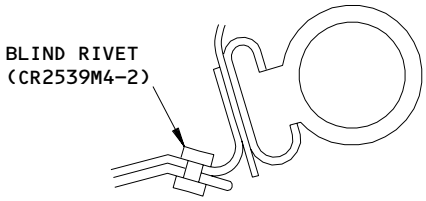
F-F



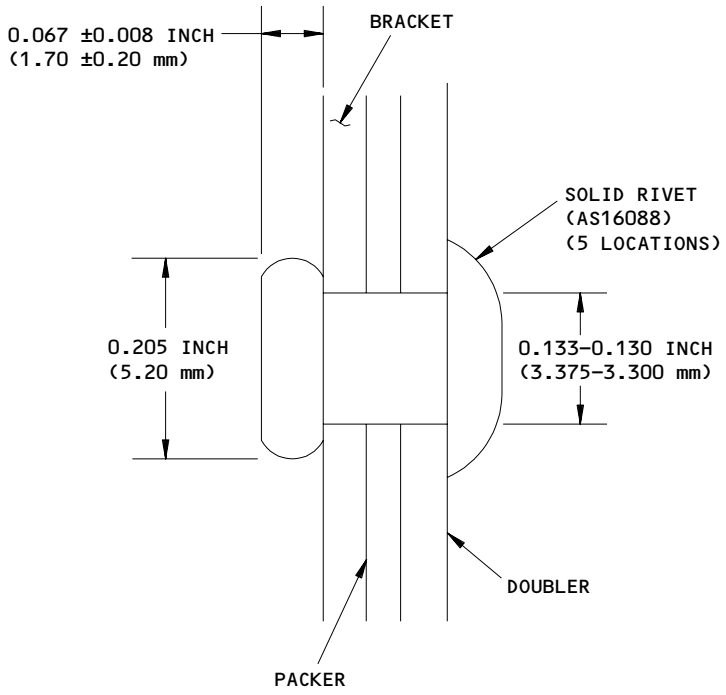
VIEW OF BLIND RIVETS
(CR2540-4-2) WITHOUT PACKER
G-G

DEE0004859

Gas Generator Fairing, Support Panel - Repair Details (FRS. 5516)
Figure 813 (Sheet 4)



H-H



I-I

91270

Gas Generator Fairing, Support Panel - Repair Details (FRS. 5516)
Figure 813 (Sheet 5)

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

2) If it is necessary, hit the shroud lightly with a hammer to prevent a blockage with the fairing.

(d) Remove the burrs and sharp edges to make a correct slot to install the support strip correctly for the outer shroud.

(e) Do these steps to install the doubler:

1) Make a doubler of Titanium (TAK) or 18/8 Stainless Steel (EBM) sheet that is 0.048 inch (1.22 mm) thick.

2) Make sure the doubler is more than the edges of the access holes on the replacement bracket with a minimum of two rows of rivets, but not the area above the hole.

3) Make sure it is on all the cracks that can be in the diaphragm adjacent to the hole.

4) Cut the doubler to prevent a blockage and connect with the contour of the diaphragm.

(f) Apply mark out blue to the doubler and to the diaphragm adjacent to the access hole.

(g) Connect the doubler to the diaphragm.

(h) If you will position the doubler again, make a mark for the location of the doubler on the diaphragm.

(i) Attach the fairing to the brackets that is not damaged, align the fairing and bolt into its position.

(j) Attach the replacement bracket (UL24360) to the fairing with bolts in its correct position.

1) Make sure the bracket to the diaphragm mounting face is parallel to the diaphragm.

(k) Make a perspex template equivalent to the contour of the doubler, (but not for the angular face).

(l) Assemble the template at the identified position on the diaphragm.

1) Make a mark on the template for the location of the bracket mounting face and all cracks in the diaphragm.

(m) Move the location of the bracket mounting face and all cracks from the template to the doubler.

1) Mark out all the rivet hole positions.

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

(n) Drill 0.098 inch (2.50 mm) pilot holes in the doubler at the identified rivet hole positions.
(o) Remove the burrs from the pilot holes on the doubler.
(p) Assemble the doubler to the diaphragm at the identified position.
(q) Attach the doubler and diaphragm with a clamp into its position.
    1) With the holes in the doubler as a pilot, make a mark for the rivet hole positions on the mounting face of the replacement bracket with a 0.098 inch (2.50 mm) pilot drill.
(r) Remove the bolt and replacement bracket from the fairing.
(s) Remove the doubler.
(t) Assemble the doubler to the replacement bracket and align the identified hole positions with the pilot holes.
(u) Attach the doubler and bracket with a clamp into its position and drill the rivet holes.
(v) Remove the burrs from the rivet holes on the doubler.
(w) Make a Titanium (TAK) or 18/8 Stainless Steel (EBM) sheet packer 0.036 inch (0.91 mm) thick to install correctly between the replacement bracket and the doubler.
(x) Move the rivet hole pattern from the bracket to the packer.
(y) Drill the rivet holes.
(z) Remove the burrs from the rivet holes on the packer.
(aa) Wet assemble the replacement bracket, the packer and the doubler with the jointing compound and then rivet them together to get a bracket and (or) doubler assembly, with a solid, stainless steel, universal head rivets AS16088.
(ab) Install the riveted bracket and (or) doubler assembly correctly to the diaphragm, use the access hole.
(ac) Attach the bracket to the fairing with bolts, attach the doubler to the diaphragm with a clamp and drill the rivet holes in the diaphragm, with the holes in the doubler as a pilot.
(ad) Remove the fairing and the bracket and (or) the doubler assembly.
(ae) Remove the burrs from the rivet holes in the diaphragm.
(af) Wet assemble the bracket and (or) the doubler assembly to the diaphragm with the jointing compound and then rivet in its position, with a bulbed Cherrylock, universal head, blind rivets CR2539-4-2.

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

(ag) Remove the mark out blue from the diaphragm and the doubler with the methylated spirits.

S 358-070-R00

(3) Repair the area around the bracket outer shroud (Fig. 812 and 813, sheets 1 to 4).
- (a) Use a lever to divide the seal from the seal carrier in the repair area, and move them to the side, to get access for the repair.
- (b) Make a support strip from Titanium (TAK) or 18/8 Stainless Steel (EBM) sheet that is 0.028 inch (0.71 mm) thick, to fit in the section of the outer shroud that is gone.
- (c) The strip is to fit on the top of the bracket in the normal attitude and moved back and forth to fit under the outer shroud on one side or the other of the bracket.
- (d) You must heat-treat the formed Titanium (TAK) support strip at 525 ±5°C for 30 minutes and then let it air cool.
- (e) This procedure will remove the work hardening.

  NOTE: Heat-treatment is not necessary when you use stainless steel (EBM) material.

- (f) Apply the mark out blue to the support strip you made and the outer shroud area.
- (g) Assemble the support strip to the outer shroud area.
- (h) Make a mark for the position of the air hole and rivet holes on the support strip and rivet holes on the outer shroud on each side of the bracket.
- (i) Disassemble the support strip and drill the air hole and rivet holes, countersink where it is necessary.
- (j) Where an air hole is adjacent to the side edge of the support strip, cut away the air hole to make a slot.
- (k) Remove the burrs from the support strip.
- (l) Drill the rivet holes and countersink where it is necessary at the identified positions on the outer shroud.
- (m) Remove the burrs from the rivet holes on the outer shroud.
- (n) Assemble the support strip to the outer shroud area and attach it with a clamp into its position.
- (o) Drill the rivet holes in the bracket with the holes in the support strip as a pilot.
- (p) Drill the rivet holes in the support strip on each side that is adjacent to the bracket with holes in the outer shroud as a pilot.
- (q) Remove the unwanted material in the countersunk holes in the two skins.
- (r) Disassemble the support strip and remove the burrs.
- (s) Wet assemble the support strip to the outer shroud area with the jointing compound and then rivet them into position.

Gas Generator Fairing Support Panels - Repair the LH and RH Support Panels on the Center Gas Generator Fairing at the Rear Mounting Bracket Locations

(t) Use universal head bulbed Cherrylock blind rivets, CR2539-4-1 and -2, and 156 degree countersink head, bulbed Cherrylock blind rivets, CR2540-4-2. Include 0.064 inch (1.59 mm) packer where necessary (Fig. 813, View B-B).

S 218-071-R00

(4) Examine the repair.
  (a) Visually examine the repair.
  (b) Make sure there is a clearance between the doubler and blockages.
  (c) Make sure the doubler touches the diaphragm.
  (d) Make sure the support strip on the outer shroud or rivet heads do not hit the fairing.
  (e) Make sure there are no rivets that are loose.

S 428-072-R00

(5) Attach the seal correctly again.
  (a) Remove the mark out blue with the methylated spirits.
  (b) Attach the seal correctly in the seal carrier again.

S 968-073-R00

(6) Identify the repair.
  (a) Use a vibro-engraver to write FRS.5516 adjacent to the part number.

COMPRESSOR SECTION FAIRING SUPPORT PANELS - REMOVAL/INSTALLATION

1. General
   A. This procedure contains the tasks to remove and install the R.H. and L.H. compressor section fairing support panels (referred to as support panels).
   B. Use the procedures in AMM 70-51-00/201 to tighten the fasteners. Tighten the fasteners to the torque values in AMM 70-51-00/201 unless a torque value is specified in this procedure.

TASK 72-03-02-014-055-R00

2. Remove the Compressor Section Fairing Support Panel
   A. Equipment
      (1) HU35249 - Ring Spanner
   B. References
      (1) AMM 78-31-00/201, Thrust Reverser System
   C. Access
      (1) Location Zones
          410 No. 1 Power Plant (Left)
          420 No. 2 Power Plant (Right)

      (2) Access Panels
          415AL Thrust Reverser (Left)
          416AR Thrust Reverser (Right)
          425AL Thrust Reverser (Left)
          426AR Thrust Reverser (Right)

   D. Prepare for the Removal

      S 044-046-R00

      WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

      S 014-032-R00
      (2) Open the thrust reversers (AMM 78-31-00/201).

E. Remove the Support Panel (Fig. 401 and 402).

NOTE: Remove only one support panel at a time with this procedure.

S 024-034-R00
(1) Disconnect and remove tubes so that the support panel can be removed.

S 024-035-R00
(2) Remove tubes on R.H. side of support panel (Fig. 401).
  (a) Disconnect tubes (1), (3), (5), (6), and (9) at the fairing support panel.
  (b) Disconnect tube (5) from tube (25) and remove tube (5).
  (c) Disconnect tube (6) from the outer combustion case at position A and remove the tube.

S 024-036-R00
(3) Remove tubes (11), (12), (13), and (14) at fairing support panel (Fig. 401)
  (a) Disconnect tubes (11), (12), (13), and (14) at the fairing support panel.
  (b) Remove the support clips from the mounting points and leave the clips on the tubes.

S 024-037-R00
(4) Remove the IP bleed valve solenoid from the support panel.

S 864-038-R00
(5) Make sure you give protection to the tubes and units to prevent contamination.

S 014-039-R00
(6) If you remove the R.H. support panel:
  (a) Remove the TGT thermocouple lead aft of the support panel.
  (b) Disconnect the lead from the thermocouples.
  (c) Disconnect the lead fire seal from the panel.

S 024-040-R00
(7) Remove the bolts starting at the middle span point and then from alternate sides.

NOTE: Only remove the bolts necessary to remove the support panel.

S 864-041-R00
(8) Keep the middle span bolt and the bolts that are in hollow headed pins in position to give support.

S 024-042-R00
(9) Remove applicable RDS fairing to get access to the bottom bolts of the panel.

S 024-043-R00
(10) Use HU35249 ring spanner or equivalent to remove the flange bolts and their brackets.
(a) ENGINES PRE-RR-SB 72-C230 AND PRE-RR-SB 72-9516;
Use HU35249 ring spanner to remove nuts, bolts, pins and their brackets from the forward flange of the module.
(b) ENGINES POST-RR-SB 72-9516;
Use HU35249 ring spanner to remove nuts, bolts, pins and their brackets from the forward flange of the module.
(c) ENGINES POST-RR-SB 72-C230;
Use HU35249 ring spanner to remove nuts, bolts, pins and their brackets from the forward flange of the module.
(d) Remove the support panel.

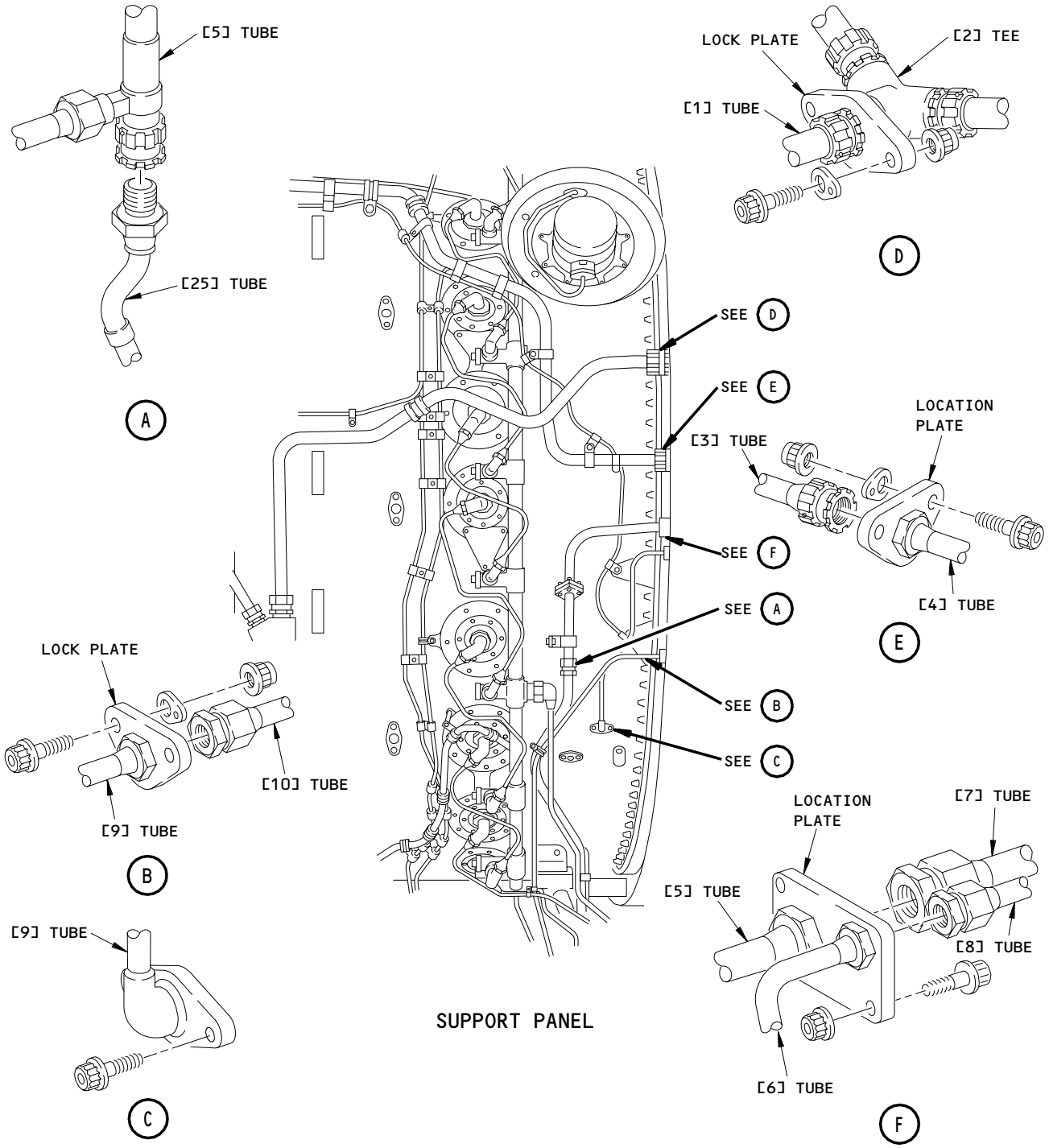
TASK 72-03-02-414-056-R00

3. Install the Compresor Section Fairing Support Panel

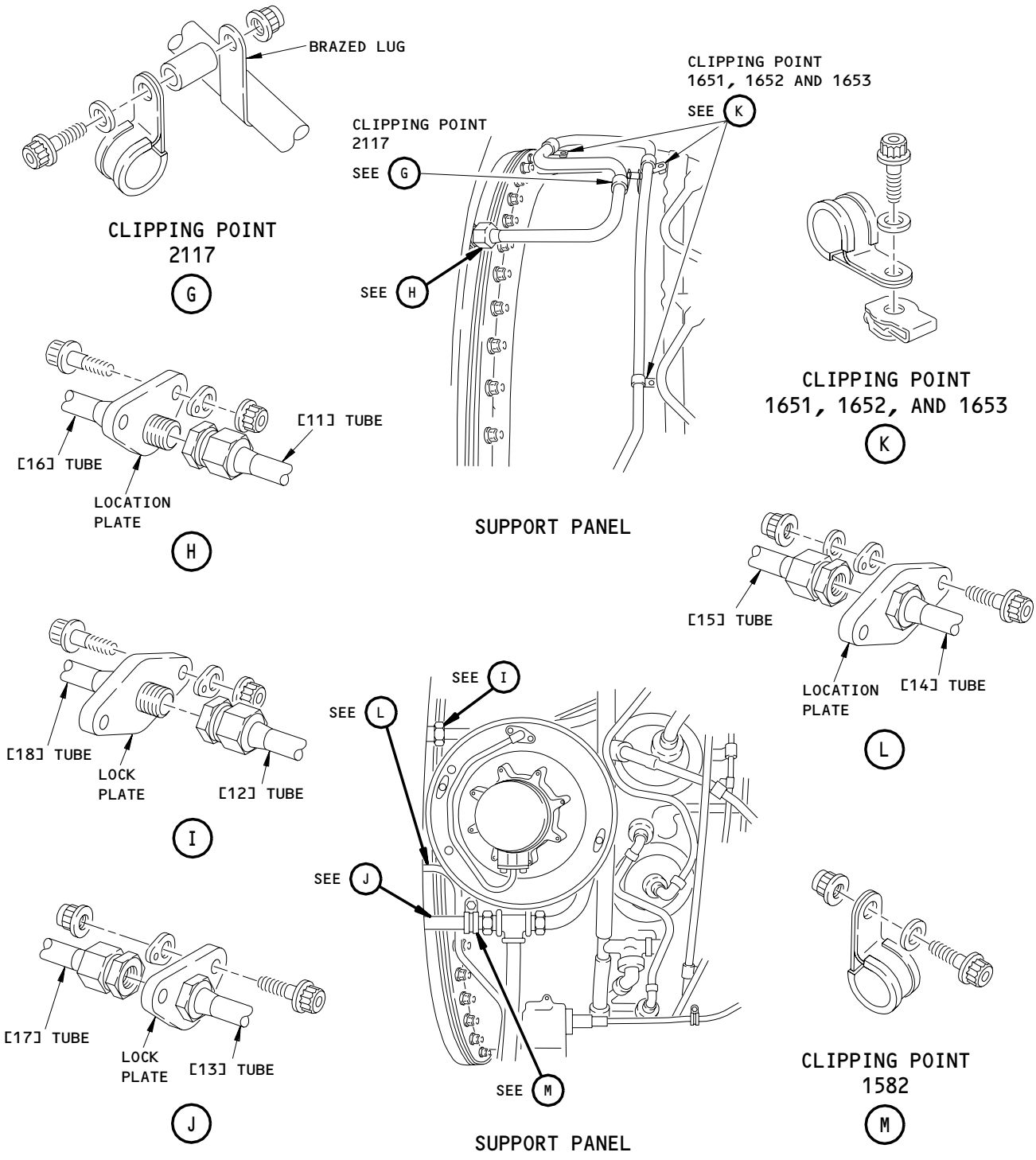
A. Equipment
(1) HU35249 - Ring Spanner
B. References
(1) AMM 70-51-00/201, Torque Tightening Technique
(2) AMM 78-31-00/201, Thrust Reverser System
C. Consumable Materials
(1) Anti Seize Compound - OMAT 4/62
(2) Lockwire - Standard
D. Procedure

S 424-044-R00
(1) Put the new support panel in position.

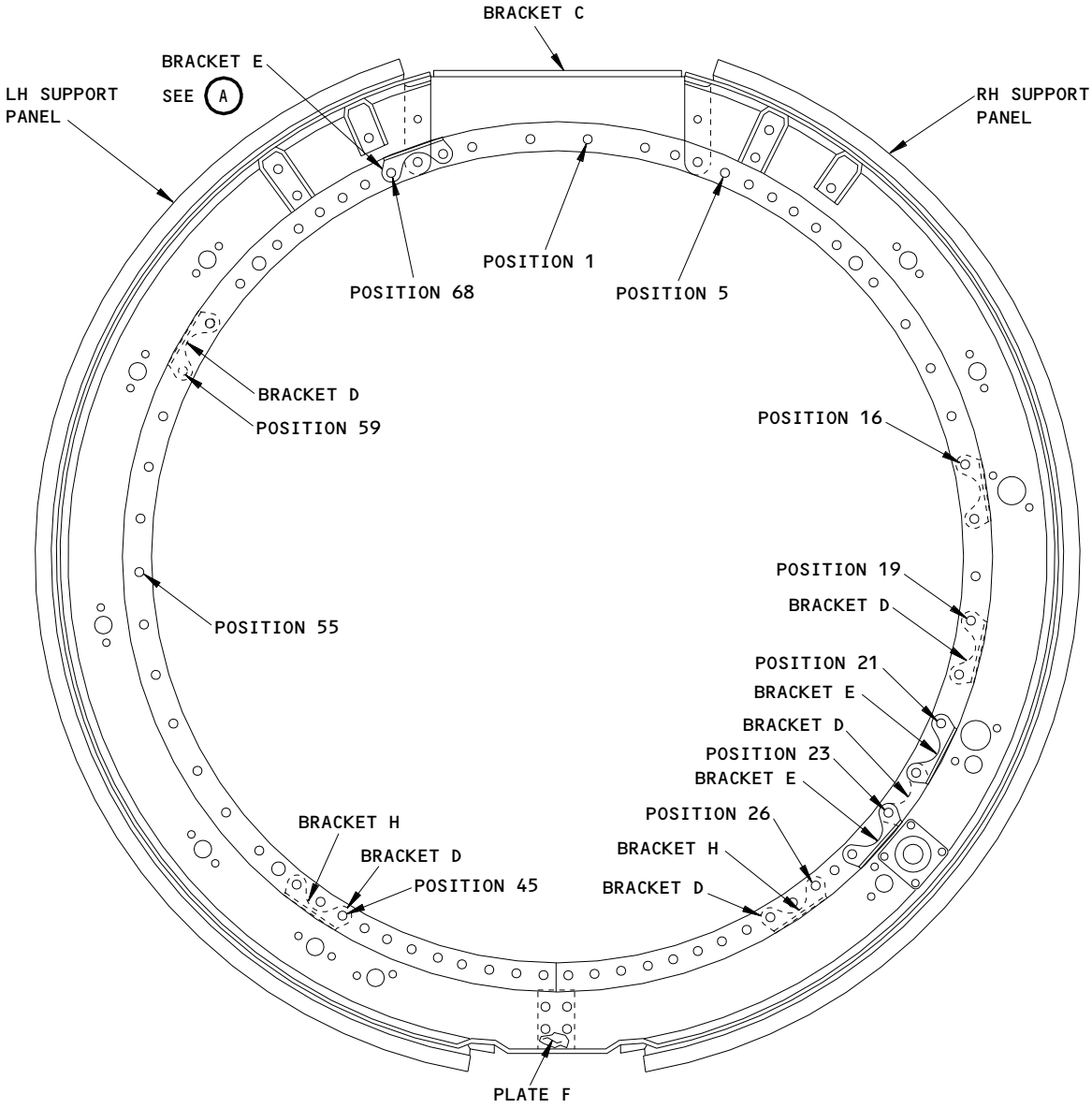
S 424-045-R00
(2) Use HU35249 ring spanner or equivalent to install nuts, bolts and brackets (Fig. 401 and 402).
(a) ENGINES PRE-RR-SB 72-C230 AND PRE-RR-SB 72-9516;
Use HU35249 ring spanner to install nuts, bolts, pins and their brackets from the forward flange of the module.



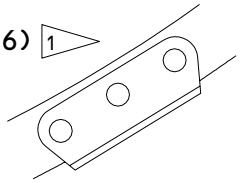
Side Compressor Section Fairing Support Panel Installation
Figure 401 (Sheet 1)



Side Compressor Section Fairing Support Panel Installation
Figure 401 (Sheet 2)



HP SYSTEM FRONT JOINT FLANGE
(VIEW IN THE FWD DIRECTION)
(ENGINES PRE-RR-SB 72-C230 AND PRE-RR-SB 72-9516) 1

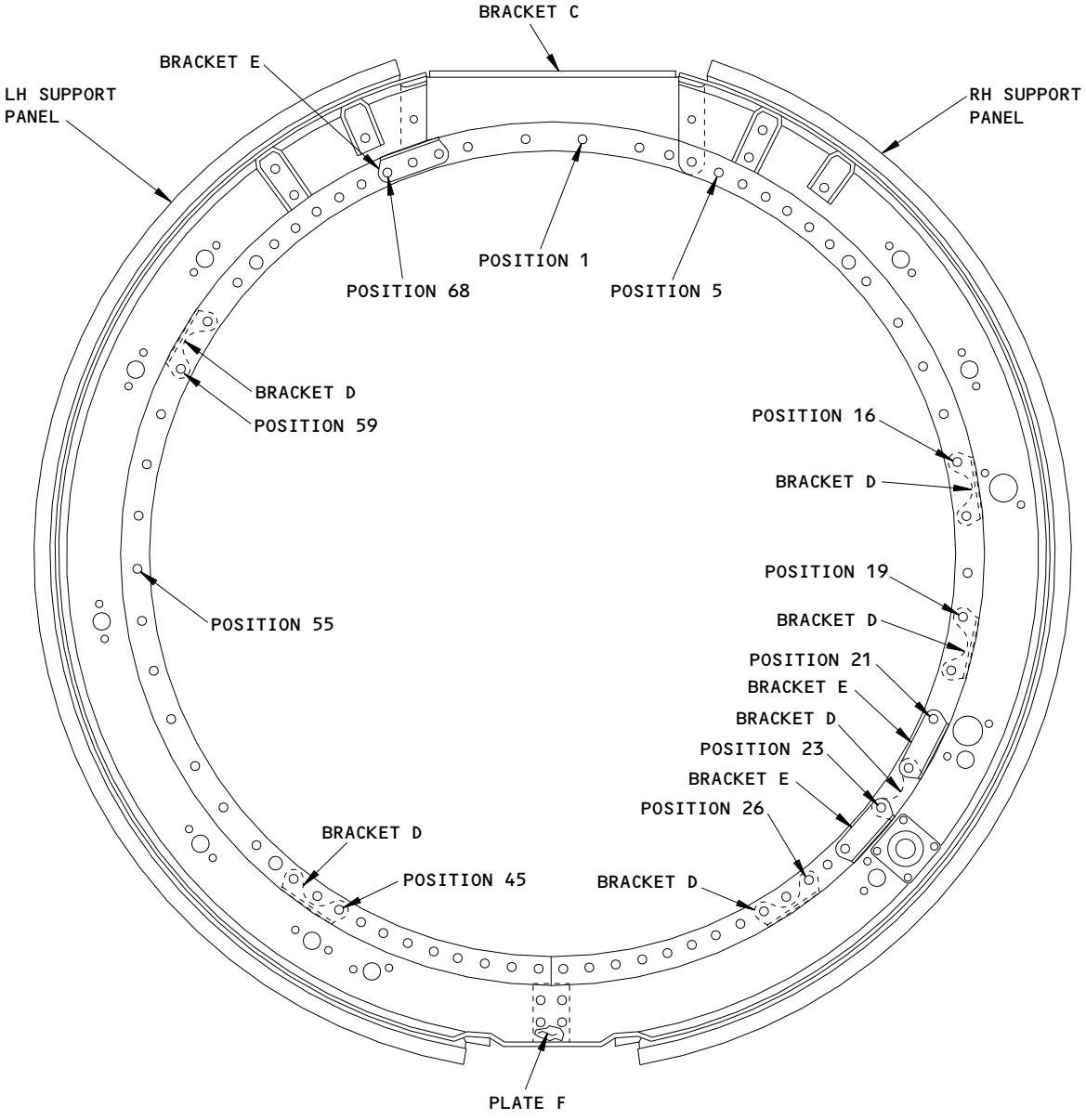


BRACKET E
(ENGINE RR-SB 72-9089)
A

1 SEE FLANGE ATTACHMENT DETAIL SHEET 4

DEE0006542

H.P. System Flange
Figure 402 (Sheet 1)

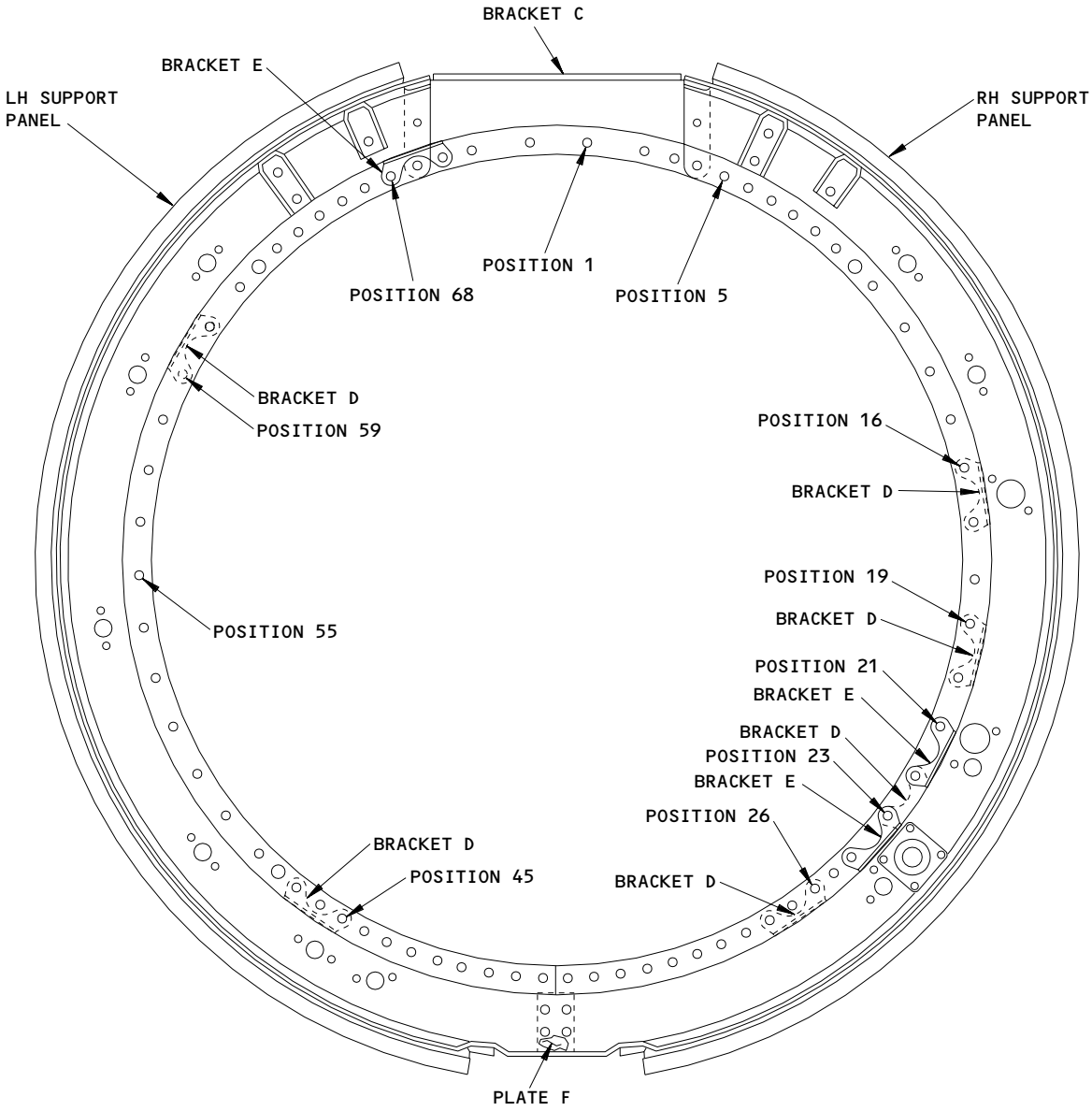


HP SYSTEM FRONT JOINT FLANGE
(VIEW IN THE FWD DIRECTION)
(ENGINES PRE-RR-SB 72-C230 AND POST-RR-SB 72-9516) 2

2 SEE FLANGE ATTACHMENT DETAIL SHEET 5 AND 6

DEE0006544

H.P. System Flange
Figure 402 (Sheet 2)

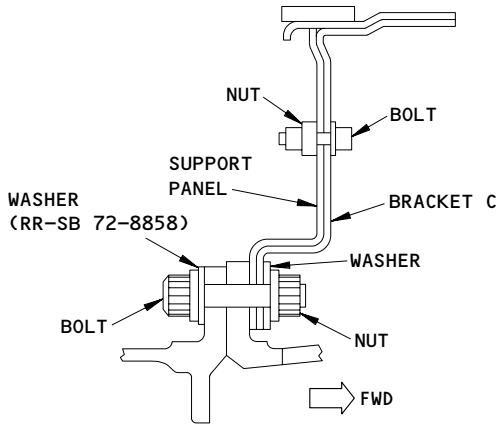


HP SYSTEM FRONT JOINT FLANGE
(VIEW IN THE FWD DIRECTION)
(ENGINES POST-RR-SB 72-C230) 3

3 SEE FLANGE ATTACHMENT DETAIL SHEET 7

DEE0006547

H.P. System Flange
Figure 402 (Sheet 3)



POSITIONS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 18, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 61, 63, 64, 65, 66, 69 (PRE-RR-SB72-9089 ONLY), 71 AND 72

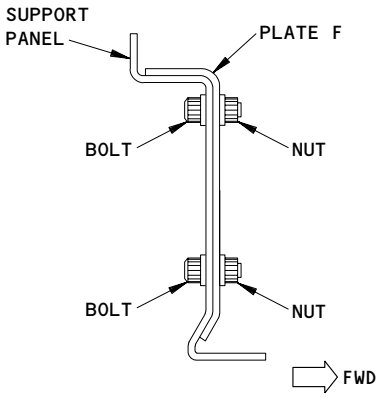
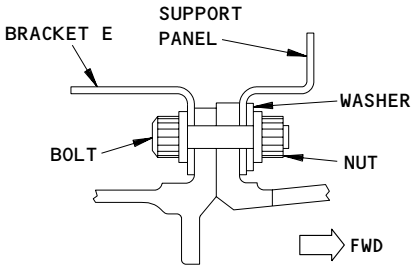
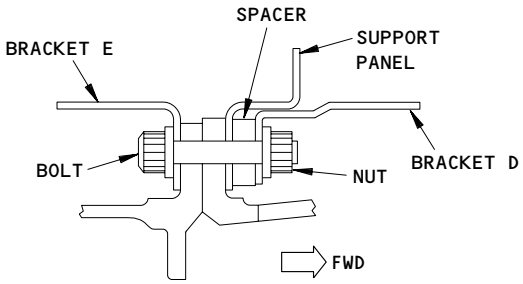


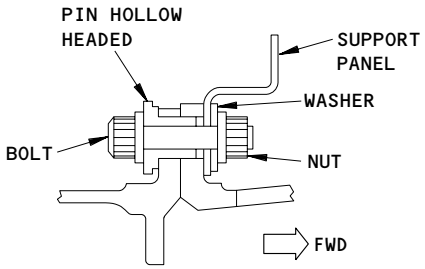
PLATE F



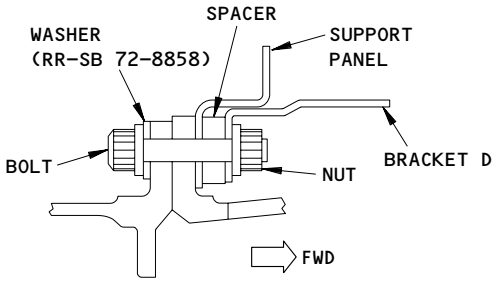
POSITIONS 21, 24, 68, 89 (RR-SB72-9089 ONLY) AND 70



POSITIONS 22, AND 23



POSITIONS 11, 25, 48 AND 62

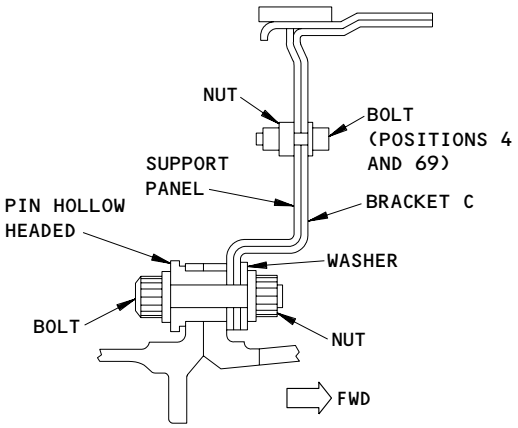


POSITIONS 16, 17, 19, 20, 26, 27, 45, 46, 59 AND 62

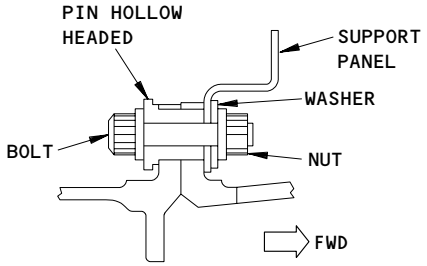
HP SYSTEM FRONT JOINT FLANGE ATTACHMENTS
(ENGINES PRE-RR-SB 72-C230 AND PRE-RR-SB 72-9516)

DEE0006543

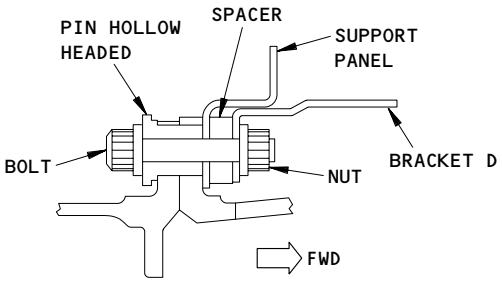
H.P. System Flange
Figure 402 (Sheet 4)



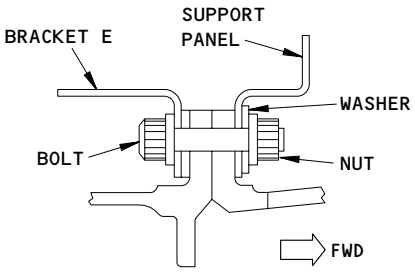
POSITIONS 1, 4 AND 71



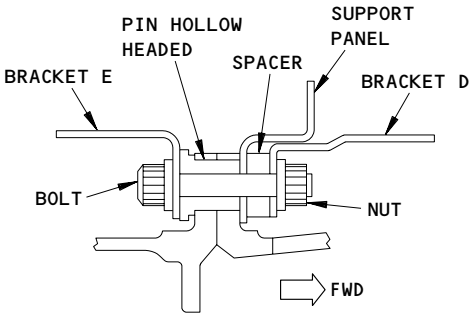
POSITIONS 8, 11, 14, 18, 25, 29, 33, 37, 41, 48, 51, 53, 55, 57, 62 AND 67



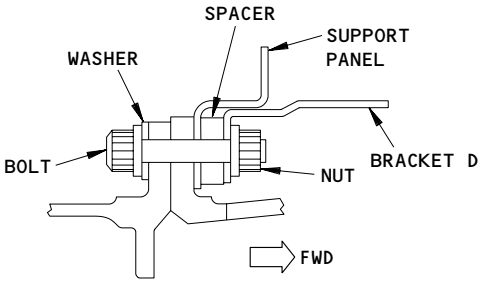
POSITIONS 16, 20, 45 AND 59



POSITIONS 21



POSITIONS 22

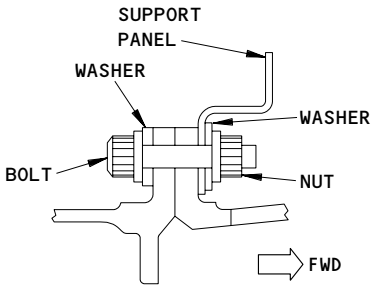


POSITIONS 17, 19, 26, 28, 42 AND 62

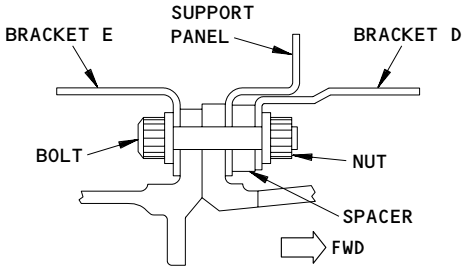
HP SYSTEM FRONT JOINT FLANGE ATTACHMENTS
(ENGINES PRE-RR-SB 72-C230 AND POST-RR-SB 72-9516)

DEE0006545

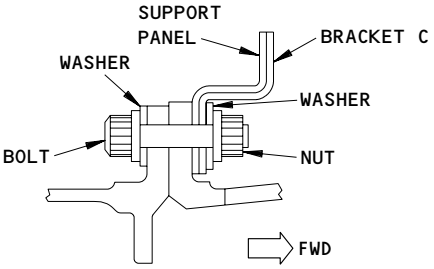
H.P. System Flange
Figure 402 (Sheet 5)



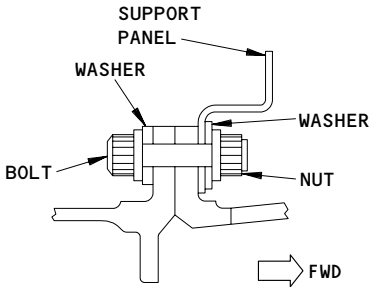
POSITIONS 27 AND 46



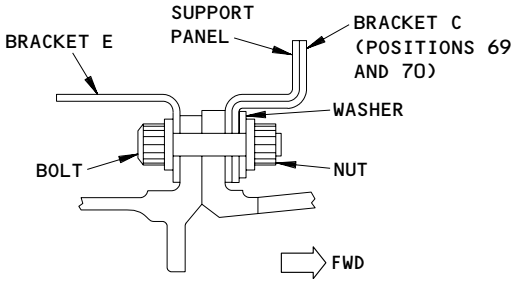
POSITIONS 23



POSITIONS 2, 3 AND 72



POSITIONS 5, 6, 7, 8, 9, 10, 12, 13, 15, 30, 31, 32, 34, 35, 36, 38, 39, 40, 42, 43, 44, 49, 50, 52, 54, 56, 59, 61, 63, 64, 65 AND 66

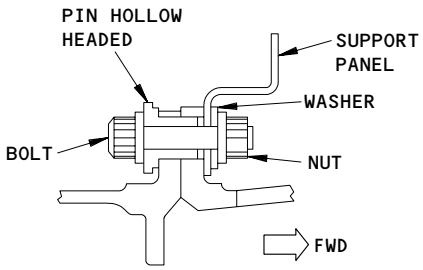


POSITIONS 24, 68, 69 AND 70

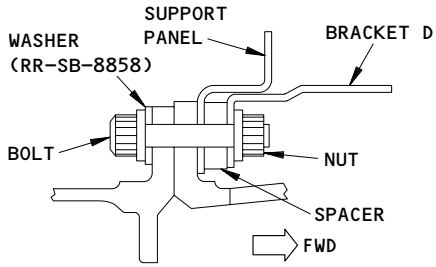
HP SYSTEM FRONT JOINT FLANGE ATTACHMENTS
(ENGINES PRE-RR-SB 72-C230 AND POST-RR-SB 72-9516)

DEE0006546

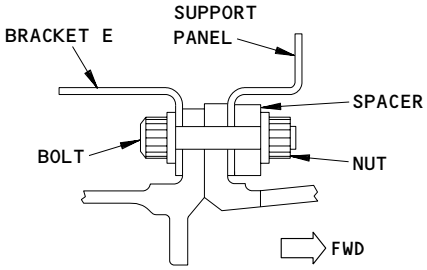
H.P. System Flange
Figure 402 (Sheet 6)



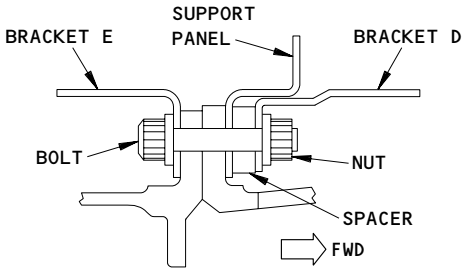
POSITIONS 11, 25, 48 AND 62



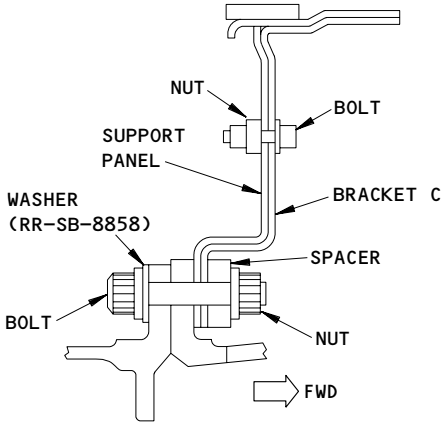
POSITIONS 16, 17, 19, 20, 26, 28, 45, 47, 59 AND 60



POSITIONS 21, 24, 68, 69 AND 70



POSITIONS 22 AND 23



ALL REMAINING POSITIONS

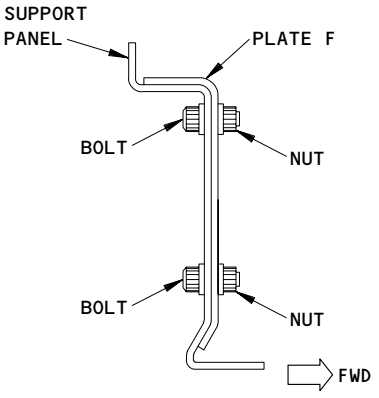


PLATE F

HP SYSTEM FRONT JOINT FLANGE ATTACHMENTS
(ENGINES POST-RR-SB 72-C230)

DEE0006548

H.P. System Flange
Figure 402 (Sheet 7)

(b) ENGINES POST-RR-SB 72-9516;
Use HU35249 ring spanner to install nuts, bolts, pins and their brackets from the forward flange of the module.
(c) ENGINES POST-RR-SB 72-C230;
Use HU35249 ring spanner to install nuts, bolts, pins and their brackets from the forward flange of the module.

S 864-047-R00
(3) Torque the bolts starting at the middle span point and then from alternate sides.

S 864-048-R00
(4) Torque the bolts to standard loading (AMM 70-51-00/201).

S 424-049-R00
(5) Install IP Bleed valve Solenoid.
(a) Torque load bolts to standard loading (AMM 70-51-00/201).

S 424-050-R00
(6) Install tubes on support panel.
(a) Install tubes and fittings on R.H. side of compressor section fairing support panel (Fig. 401).
1) Put tube 1 in position and install lock plate with nuts, bolts and locking washer (AMM 70-51-00/201).
2) Connect tube (1) to tube (2) and install lockwire (AMM 70-51-00/201).
3) Put tube (3) in position and install location plate with nuts, bolts and locking washer (AMM 70-51-00/201).
4) Connect tube (3) to tube (4) and install lockwire (AMM 70-51-00/201).
5) Put tube (5) and (6) in position and install location plate with nuts and bolts (AMM 70-51-00/201).
6) Connect tubes (7) and (8) and install lockwire (AMM 70-51-00/201).
7) Connect tube (5) to tube (25) and install lockwire (AMM 70-51-00/201).
8) Apply OMat 4/62 anti-seize compound to mating faces and threads of combustion case, tube (6) and their bolts.
9) Connect tube (6) at position A on combustion case (AMM 70-51-00/201).
10) Put tube (9) in position and install lock plate with nuts, bolts and locking washer (AMM 70-51-00/201).
11) Connect tube 10 to tube 9 at the rear of the support fairing and install lockwire (AMM 70-51-00/201).

(b) Install tube and fittings on L.H. side of compressor section fairing support panel (Fig. 401).
1) Put tube (11) in position and install location plate with nuts, bolts and locking washer (AMM 70-51-00/201).
2) Connect tube (16) to tube (11) at the rear of the compressor section fairing support and install lockwire (AMM 70-51-00/201).
3) Install tube (11) at clipping points (1651), (1652), (1653), and (2117) (AMM 70-51-00/201).
4) Put tube (18) in position and install lock plate with nuts, bolts and locking washer (AMM 70-51-00/201).
5) Connect tube (12) to tube (18) at the front of the compressor section fairing support (AMM 70-51-00/201).
6) Put tube (14) in position and install location plate with nuts, bolts and locking washer (AMM 70-51-00/201).
7) Connect tube (15) to tube (14) at rear of the compressor section fairing support and install lockwire (AMM 70-51-00/201).
8) Put tube (13) in position and install lock plate with nuts, bolts and locking washer (AMM 70-51-00/201).
9) Connect tube (17) to tube (13) at rear of the compressor section fairing support and install lockwire (AMM 70-51-00/201).
10) Install tube (13) at clipping point (1582) (AMM 70-51-00/201).

S 964-051-R00

(7) If R.H. support panel has been replaced, do one of these steps:
(a) Connect lead fireseal to panel.
(b) Connect lead to thermocouples.
(c) Install TGT thermocouple lead aft of support panel.

S 424-052-R00

(8) Torque load all connections and bolts to standard loading (AMM 70-51-00/201).
(a) Install lockwire where necessary.

E. Put the Airplane Back to its Usual Condition

S 414-053-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

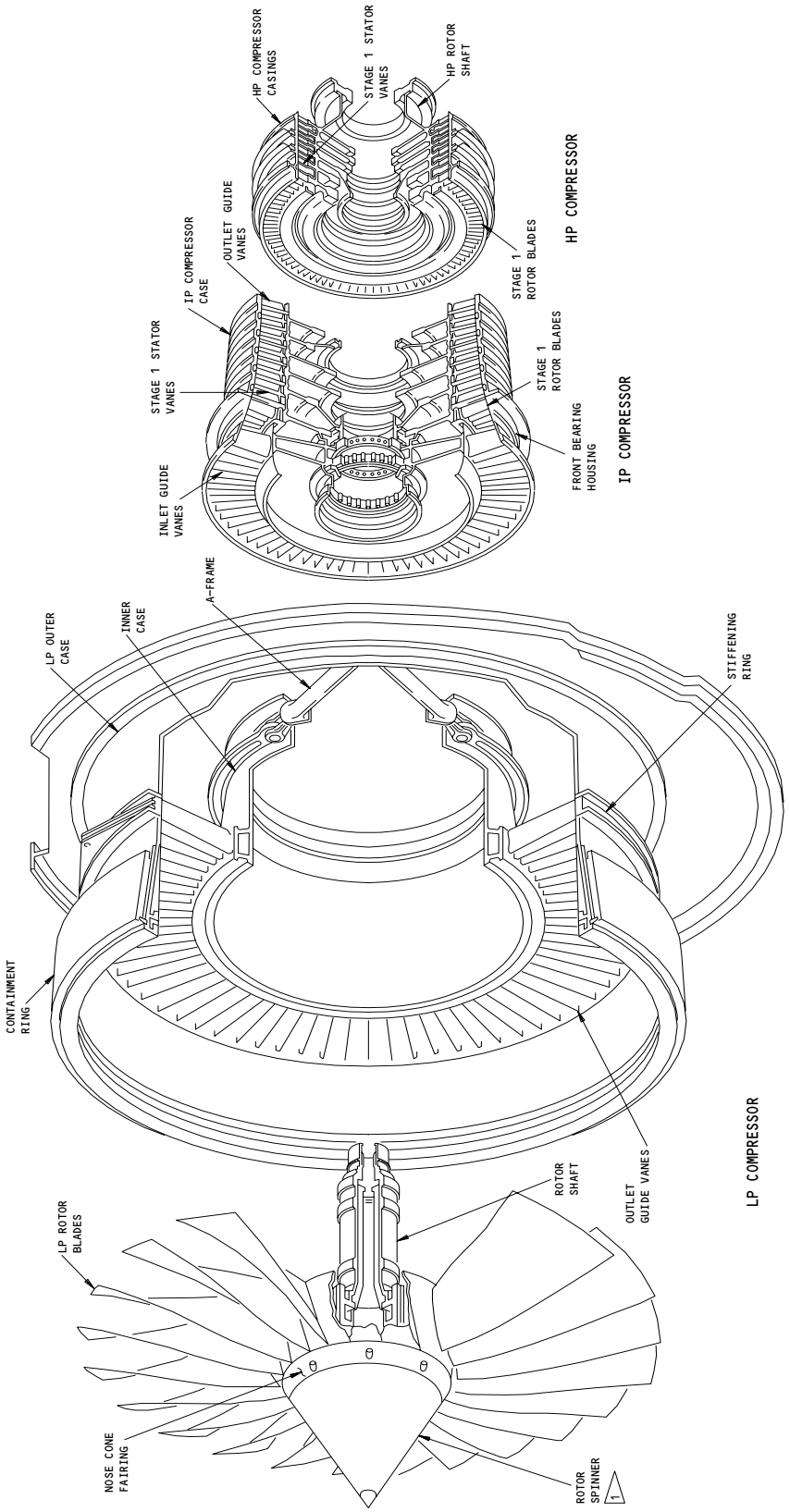
(1) Close the thrust reversers (AMM 78-31-00/201).

S 444-054-R00

(2) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

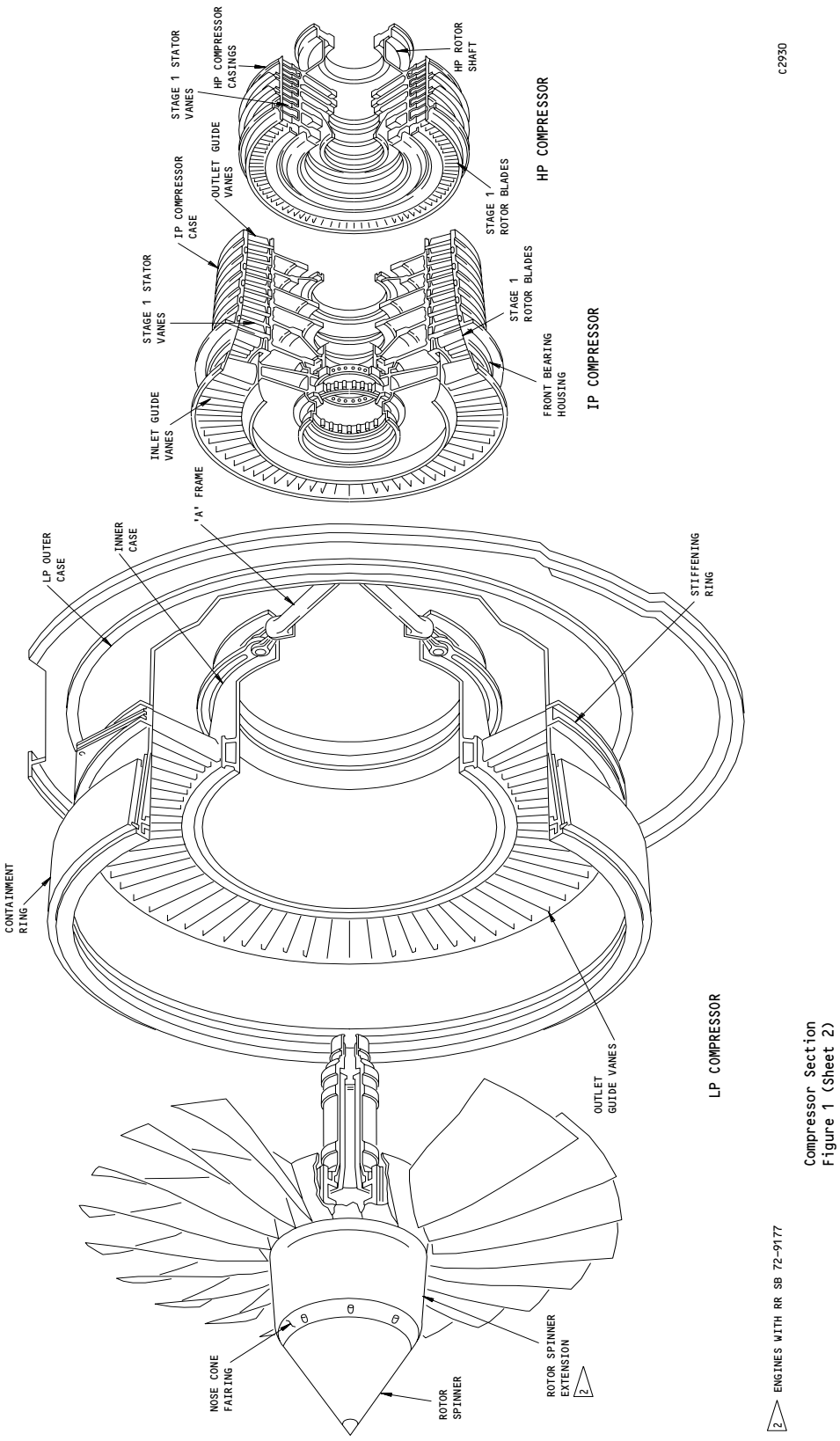
COMPRESSOR SECTION - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The compressor section provides air at high pressure for all engine power requirements and in addition provides air for engine and aircraft systems operation. To achieve the required compression ratios, a three axial flow compressor arrangement is used. The three compressors are driven by separate turbines through coaxial shafts.
   B. The compressor section consists of the following assemblies:
      (1) Low pressure (LP) compressor rotor
      (2) Low pressure (LP) compressor case
      (3) Intermediate case
      (4) Intermediate pressure (IP) compressor
      (5) High pressure (HP) compressor
2. Component Details
   A. LP Compressor Rotor (Fan)
      (1) The LP compressor rotor comprises a single stage rotor, blades and shaft supported on a roller bearing in the IP compressor front bearing housing and located by a ball bearing in the intermediate case.
      (2) The rotor disc is secured to the shaft through a curvic coupling and the drive for the rotor is from the LP turbine through a helical spline.
      (3) A fail-safe shaft fitted in the bore of the rotor shaft provides for disc retention in the event of a rotor shaft failure.
      (4) The rotor blades are located in the disc by axial dovetail roots which provide radial retention, axial retention is provided by the nose cone support ring and a lip to the blade root.
      (5) Interposed between each rotor blade are annulus fillers which provide for an even airflow across the compressor disc.
      (6) The annulus fillers are located and retained by the nose cone support ring and the rear seal panel.
      (7) The nose cone support ring is attached to the compressor disc and provides location and retention for the rotating fairing, the rotor spinner and the nose cone fairing, dependant on which SB s have been incorporated.
      (8) ENGINES PRE-RR-SB 72-9177;
      The rotor spinner and nose cone fairing are attached to the nose cone support ring.



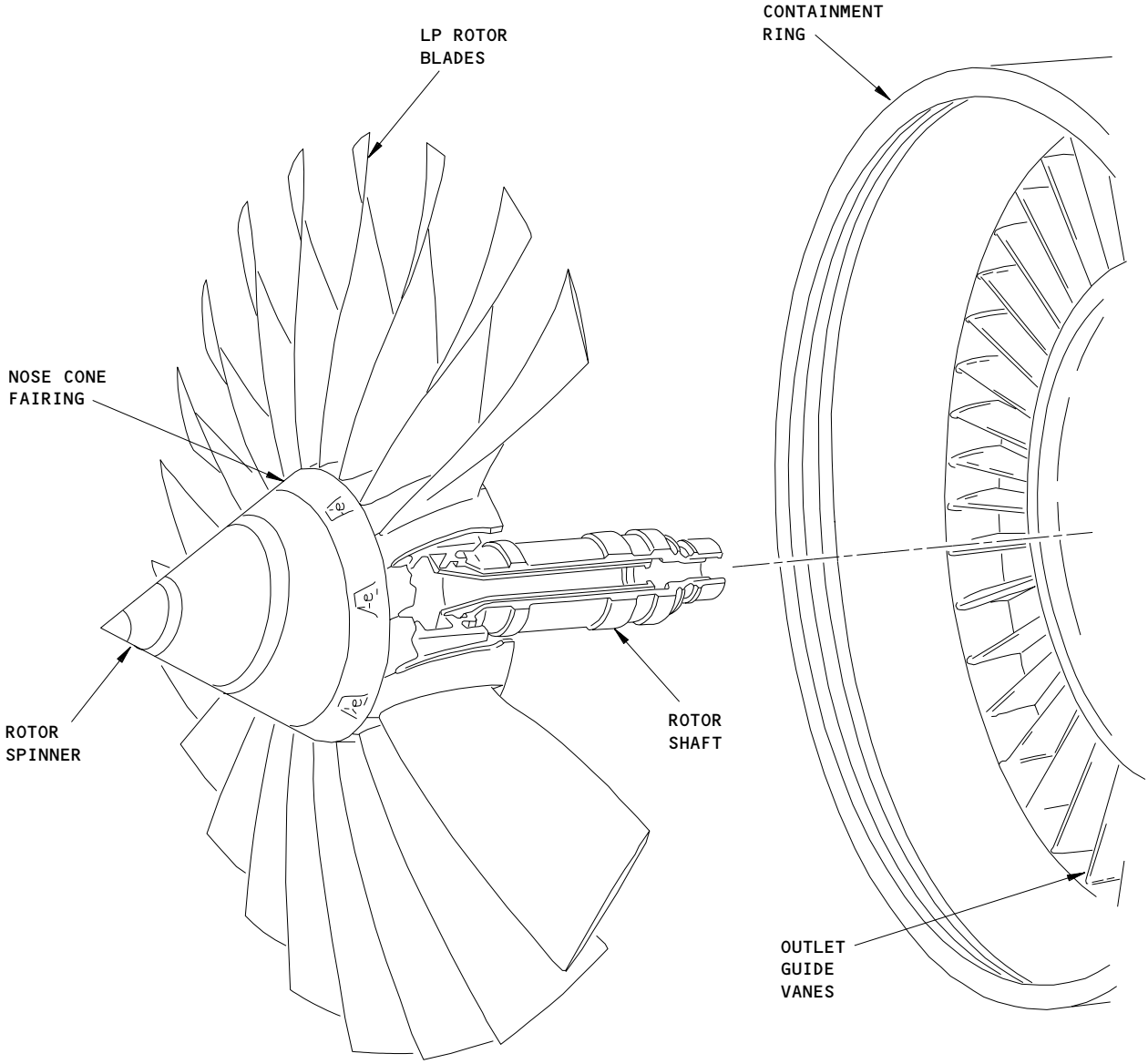
Compressor Section
Figure 1 (Sheet 1)

196317



Compressor Section
Figure 1 (Sheet 2)

EFFECTIVITY
ON ENGINES WITH
RR SB 72-9177



Compressor Section
Figure 1 (Sheet 3)

(9) ENGINES POST-RR-SB 72-9177 AND RR-SB 72-9723;
The one-piece composite (GRP) spinner and the nose cone fairing are bolted to the nose cone support ring.

(10) ENGINES POST-RR-SB 72-9177;
An extended rotor spinner, nose cone fairing and rotor spinner extension are attached to the nose cone support ring.

(11) Splined and retained to the rear of the compressor disc is the rear seal panel which provides location of the annulus fillers and to which the inner rotor seal arm is attached to control cooling air flow (AMM 72-02-00).

B. LP Compressor Case

(1) The LP compressor case is a fabricated cylindrical structure, the outer case of which forms the LP compressor case while the inner case forms a housing for the IP compressor and intermediate case.

(2) Integral with the inner case are the outlet guide vanes (OGV) to which the outer case is attached.

(3) Rearward of the OGV are two opposing V-shaped struts (A-frame), attached to the outer case and a rib on the inner case.

(4) Rakes contained within two opposing struts in the A-frame sense LP compressor outlet pressure (PF air) (AMM 77-11-00).

(5) The front flange of the outer case provides for the attachment of the inlet cowl, and on the rear flange of the firewall. A double ribbed stiffening ring provides attachment for the external gearbox (AMM 72-60-00) and front mount (AMM 71-21-00). An internal honeycomb lining of the outer case suppresses noise from the LP compressor.

(6) A radial web feature at the forward edge of the outer case prevents the departure forward of a failed LP compressor rotor blade.

(7) Radial containment is accomplished by a soft, non-metalic, woven material (Kevlar) wrapped circumferentially to the outer case.

(8) Secured mid-way between the forward flange and the stiffening ring is an accessory mounting strap, to which the engine oil tank and engine accessory units are mounted, through brackets.

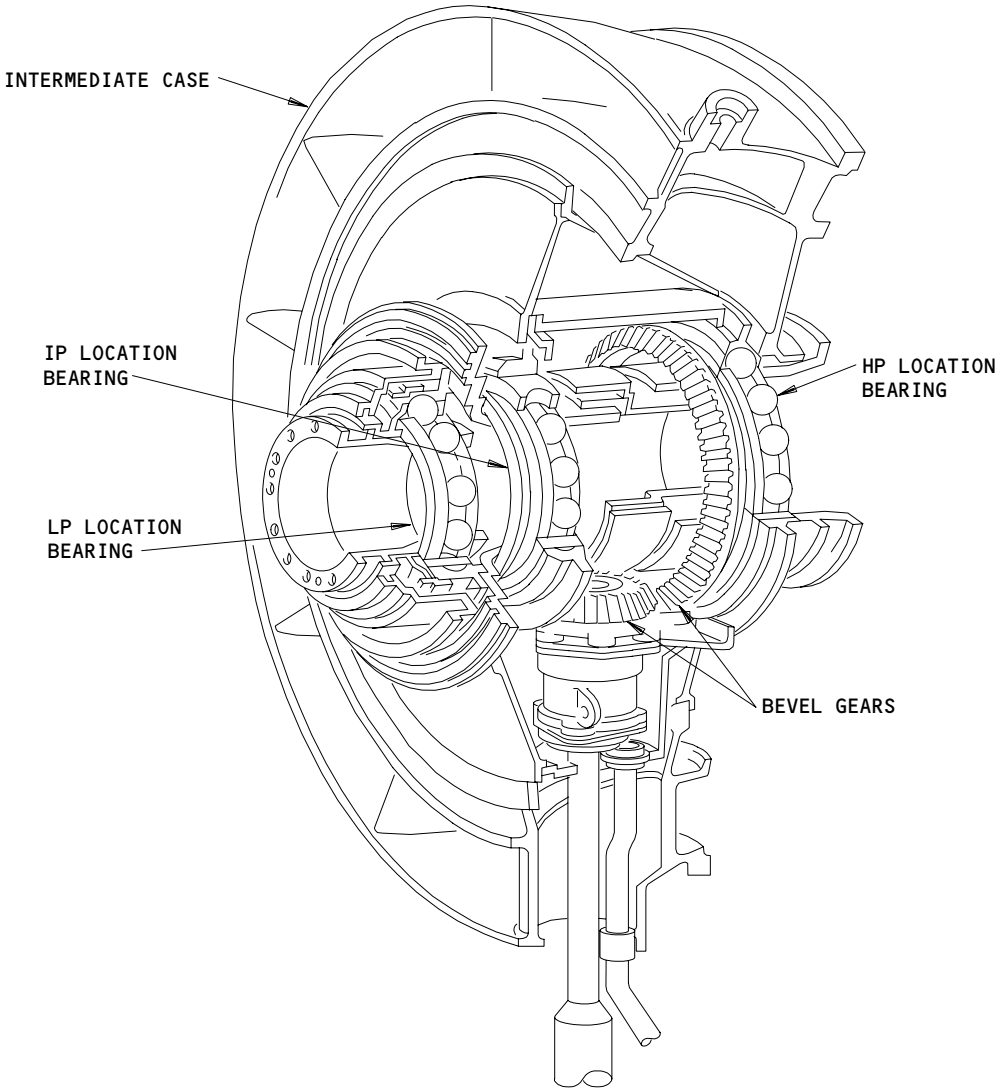
C. IP Compressor

(1) The IP compressor comprises a front bearing housing, a six stage rotor and an outer case containing six stages of stator vanes. The compressor is mounted in the LP compressor inner case.

(2) The IP compressor rotor is supported on a roller bearing in the front bearing housing, located by a ball bearing in the intermediate case, and is driven by the IP turbine through a helical spline.
(3) The front bearing housing consists of a case containing one stage of hollow, fixed inlet guide vanes and a hub into which is secured the LP and IP compressor front roller bearings and the LP and IP speed indication probes (N1 and N2).
(4) The rotor blades have an axial dovetail at the root which provides radial retention to the rotor disc, while axial retention is accomplished through lockplates.
(5) The outer case consists of two half cases, having axial split lines into which are secured the stator vanes. The cases contain abradable linings that forms seals with the rotor blade tips. Abradable shroud rings attached to the stator vanes form seals with integral lands on the rotor.
(6) Ports within the lower half case provide access for borescope inspection.

D. Intermediate Case
(1) The intermediate case (Fig. 2) is a fabricated structure housed within the LP compressor inner case, and consists of the main LP, IP and HP location bearings and the internal gearbox.
(2) Housed within the assembly are the location bearings to which the IP and HP compressors through curvic couplings are attached. A bevel gear attached to the HP compressor stub shaft provides transmission to the external gearbox, through a radial driveshaft (AMM 72-60-00).

E. HP Compressor
(1) The HP compressor comprises a six stage rotor and a case assembly containing five stages of stators. The compressor is mounted between the IP compressor and combustion chamber.
(2) The rotor is located on a ball bearing in the intermediate case and, being attached through the HP turbine, is supported on a roller bearing in the IP turbine case. A bevel gear attached at the front of the rotor provides the drive to the internal gearbox.
(3) The rotor blades have an axial dovetail at the blade root which provides radial retention to the rotor while axial retention is accomplished through lockplates.



INTERMEDIATE MODULE

51506

Intermediate Case
Figure 2

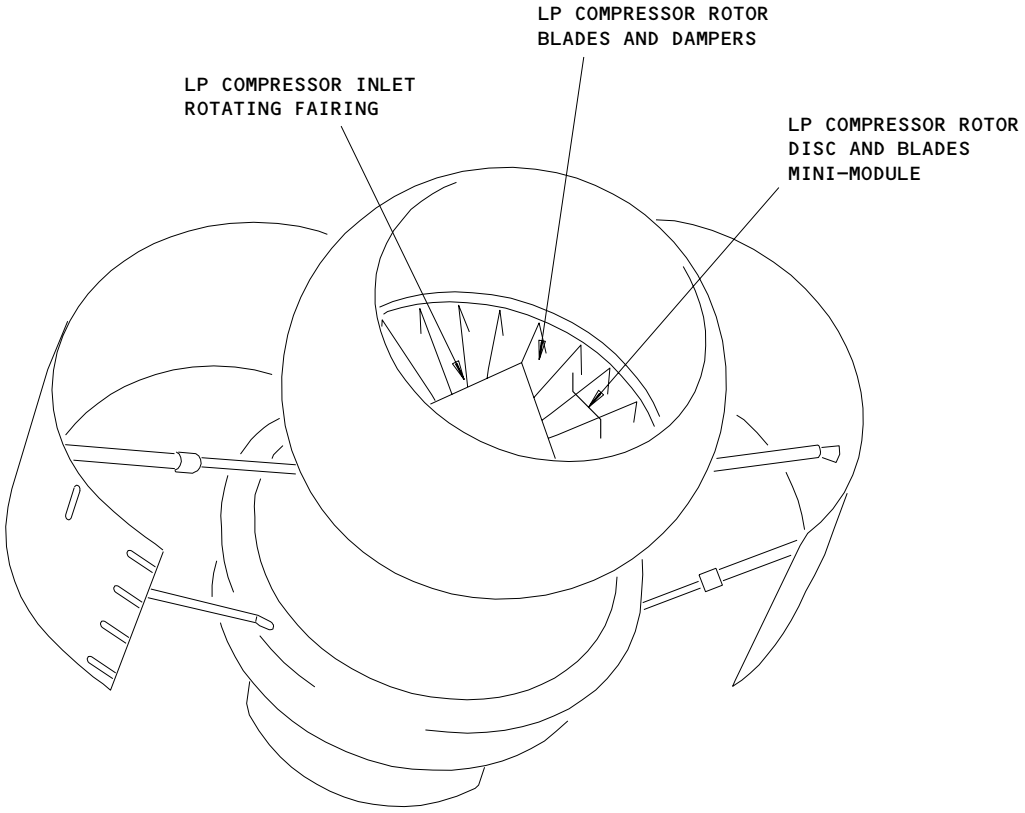
(4) The stator assembly consists of a series of fabricated cylindrical cases and cones bolted together and attached to the combustion outer case. Each case has an abradable lining that forms an air seal with the rotor blade tips. Each stage of stators is retained between adjacent cases. Abradable shroud rings attached to the stator vanes form a seal with integral lands on the rotor.

(5) Ports within the lower part of the cases provide for borescope inspection.

COMPRESSOR SECTION

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
FAIRING – LP COMPRESSOR INLET ROTATING	---	2	COMPRESSOR SECTION	72-35-01
ROTOR BLADES AND DAMPERS – LP COMPRESSOR	---	44	COMPRESSOR SECTION	72-31-11
ROTOR DISC AND BLADES MINI-MODULE – LP COMPRESSOR	---	2	COMPRESSOR SECTION	72-31-10

Compressor Section – Component Index
Figure 101



Compressor Section - Component Location
Figure 102

COMPRESSOR SECTION - CLEANING/PAINTING

1. General
   A. This procedure has ten tasks:
      (1) The task to clean the LP rotor blade with water and washing fluid
      (2) The task to clean the LP rotor blade with water, washing fluid and antifreeze additive
      (3) The task to clean the IP and HP compressors with water and washing fluid (Lance Method)
      (4) The task to clean the IP and HP compressors with water, washing fluid and antifreeze additive (Lance Method)
      (5) The task to clean the IP and HP compressors with water only
      (6) The task to clean the IP and HP compressors with water and antifreeze additive (Lance Method)
      (7) The task to clean the IP and HP compressors with water and washing fluid {Core Mounted Engine Wash Probe(s))
      (8) The task to clean the IP and HP compressors with water, washing fluid and antifreeze additive (Core Mounted Engine Wash Probe(s))
      (9) The task to clean the IP and HP compressors with water only {Core Mounted Engine Wash Probe(s))
      (10) The task to clean the IP and HP compressors with water and antifreeze additive (Core Mounted Engine Wash Probe(s)).
      (11) These tasks can be used as an alternative:
         (a) Tasks (1) and (2) are alternatives.
         (b) Tasks (3) and (10) are alternatives.
         (c) Tasks (3), (5), (7) and (9) must only be used at air temperatures of more than 5 degrees C (41 degrees F).
         (d) Tasks (4), (6) (8) and (10) must only be used at air temperatures of more than -15 degrees C (5 degrees F).
         (e) It is recommended that task 1 or 2 is completed after task (3) to (9) to decrease the contamination of previously cleaned components.
         (f) Tasks (5) and (9) use only water to clean the compressors.
            1) The use of a water only wash is less effective than a water and wash fluid wash.

               NOTE: The advantage of this wash that no air conditioning (AC) pack contamination is likely. Therefore, there is no requirement for high power ground runs to remove AC pack contamination.

(g) Tasks (3),(4), (6), (7), (8), and (10) all use washing fluid or antifreeze additive solution which can cause contamination of the AC packs. These tasks require a high power ground and a cross bleed between the engines to remove the contamination.

B. Water Supply
(1) Demineralized water must have a conductance less than 20 microsiemens.
(2) It is permitted to use tap water to replace demineralised water if the local potable water supply agrees with the specification that follows:
(a) Sodium (NA) plus Potassium (K) - Maximum 50 parts per million (ppm)
(b) Calcium (CA) Plus Magnesium (Mg) - 100 ppm
(c) Total halides - Maximum 100 ppm
(d) Sulphates Maximum 100 ppm
(e) Phosphates - Maximum 100 ppm
(f) Total dissolved solids (TDS) - Maximum 500 ppm
(g) Relative acidity and alkalinity (ph) (range between 6.4 and 8.5)

C. Do not clean the compressor at air temperatures below 34 degrees F (1 degree C).

TASK 72-30-00-167-042-R00

2. Clean the LP Rotor Blade with Water and Washing Fluid

A. Equipment
(1) Protective work mats, Air intake - Rolls-Royce 289200

B. Consumable Materials
(1) Compressor washing fluid
British Spec/Ref - ZOK 27
American Spec/Ref -
OMat No. 1070
(2) Compressor washing fluid
British Spec/Ref - Castrol, ICD 177
American Spec/Ref -
OMat No. 1070A
(3) Compressor washing fluid
British Spec/Ref - Turbo Clean
American Spec/Ref -
OMat No. 1070B
(4) Compressor washing fluid
British Spec/Ref - Ardrox 6345
American Spec/Ref -
OMat No. 1070D
(5) Compressor washing fluid
British Spec/Ref - Rivanaes, RMC-G21
American Spec/Ref -
OMat No. 1070E
(6) Demineralized water - Local Supply

(7) Clean cloth or soft bristle brush - Local supply

C. Access

(1) Location Zones

210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)

D. Prepare to Clean the LP Rotor Blades

S 867-043-R00

(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D19, ENGINES START CONT LEFT

S 867-038-R00

(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D20, ENGINES START CONT RIGHT

S 947-004-R00

(3) Put the protective work mats in the inlet cowl.

(a) Make sure you can clearly see the warning pennants from the ground.

S 167-044-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON- FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

(4) Prepare approximately 6 U.S. gallons (22.5 liters) of cleaning solution.

(a) Use a ratio of water to washing fluid as given in the manufacturer's instructions.

E. Clean the LP Rotor Blades

S 167-045-R00

CAUTION: PUT THE ROTOR BLADE THAT YOU CLEAN AT THE 6 O'CLOCK POSITION. THIS WILL KEEP UNWANTED MATERIAL FROM THE BLADE ROOT. IF YOU DO NOT DO THIS, DAMAGE TO THE ENGINE CAN OCCUR.

(1) Turn the LP rotor until the blade that you will clean is at the 6 o'clock position.

S 167-046-R00
(2) Go into the inlet cowl and clean the LP rotor blades with a clean cloth or a soft bristle brush that is moist with the cleaning solution. Apply the cleaning solution to the front and the rear of the blade.

S 167-047-R00
(3) Wipe the blade dry with clean cloths.

S 167-053-R00
(4) Do the steps given above again until all the blades are clean.

F. Put the Airpane Back to Its Usaual Condition

S 947-048-R00
(1) Remove the protective work mats from the inlet cowl.

S 867-054-R00
(2) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-055-R00
(3) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

TASK 72-30-00-167-049-R00

3. Clean the LP Rotor Blade with Water, Washing Fluid and Antifreeze Additive

A. Equipment
(1) Protective work mats, Air intake - Rolls-Royce 289200

B. Consumable Materials
(1) Compressor washing fluid
British Spec/Ref - ZOK 27
American Spec/Ref -
OMat No. 1070
(2) Compressor washing fluid
British Spec/Ref - Castrol, ICD 177
American Spec/Ref -
OMat No. 1070A
(3) Compressor washing fluid
British Spec/Ref - Turbo Clean
American Spec/Ref -
OMat No. 1070B
(4) Compressor washing fluid
British Spec/Ref - Ardrox 6345
American Spec/Ref -
OMat No. 1070D

(5) Compressor washing fluid
British Spec/Ref - Rivanaes, RMC-G21
American Spec/Ref -
OMat No. 1070E
(6) Demineralized water - Local Supply
(7) Monopropolylene glycol Antifreeze
OMat No.1076
(8) Clean cloth or soft bristle brush - Local supply

C. Access
(1) Location Zones
210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)

D. Prepare to Clean the LP Rotor Blades

S 867-050-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-051-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 947-052-R00
(3) Put the protective work mats in the inlet cowl.
(a) Make sure you can clearly see the warning pennants from the ground.

S 167-056-R00

WARNING: USE THE MANUFACTURERS INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON-FLAMMABLE AND NON-TOXIC, THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURERS INSTRUCTIONS, INJURY TO PERSONS CAN OCCUR.

(4) Prepare approximately 6 U.S. gallons (22.5 liters) of cleaning solution.
(a) Use a ratio of water to washing fluid as specified in the manufacturer's instructions.

(b) Mix 30% antifreeze (OMat 1076) with 70% water.
(c) Mix the water and antifreeze solution with the cleaning solution to the ratio given in the manufacturer's instructions.

E. Clean the LP Rotor Blades

S 167-057-R00

CAUTION: PUT THE ROTOR BLADE THAT YOU CLEAN AT THE 6 O'CLOCK POSITION. THIS WILL KEEP UNWANTED MATERIAL FROM THE BLADE ROOT. IF YOU DO NOT DO THIS, DAMAGE TO THE ENGINE CAN OCCUR.

(1) Turn the LP rotor until the blade that you will clean is at the 6 o'clock position.

S 167-058-R00
(2) Go into the inlet cowl and clean the LP rotor blades with a clean cloth or a soft bristle brush that is moist with the cleaning solution. Apply the cleaning solution to the front and the rear of the blade.

S 167-059-R00
(3) Wipe the blade dry with clean cloths.

S 167-060-R00
(4) Do the steps given above again until all the blades are clean.

F. Put the Airplane Back to Its Usual Condition

S 947-061-R00
(1) Remove the protective work mats from the inlet cowl.

S 867-062-R00
(2) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-063-R00
(3) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

TASK 72-30-00-167-064-R00

4. Clean the IP and HP Compressors with Water and Washing Fluid (Lance Method)

A. Equipment
(1) Protective work mats, Air intake - Rolls-Royce 289200
(2) Pressure washing rig - Local Manufacture, with a probe (nominal inside diameter 0.140 to 0.160 inch) (3.50 to 4.00mm), operating pressures of 100 psi, pressure gage, with a minimum capacity of 24 U.S. Gallons (20 Imperial gallons, 90 liters)
(3) Lightweight rope 3x3 meters - local supply

B. Consumable Materials
(1) Compressor washing fluid
British Spec/Ref - ZOK 27
American Spec/Ref -
OMat No. 1070
(2) Compressor washing fluid
British Spec/Ref - Castrol, ICD 177
American Spec/Ref -
OMat No. 1070A
(3) Compressor washing fluid
British Spec/Ref - Turbo Clean
American Spec/Ref -
OMat No. 1070B
(4) Compressor washing fluid
British Spec/Ref - Ardrox 6345
American Spec/Ref -
OMat No. 1070D
(5) Compressor washing fluid
British Spec/Ref - Rivanaes, RMC-G21
American Spec/Ref -
OMat No. 1070E
(6) Demineralized water - Local Supply

C. References
(1) AMM 71-00-00/201, Power Plant
(2) AMM 21-00-00/201, Air Conditioning

D. Access
(1) Location Zones
210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)

E. Prepare to Clean the IP and HP Compressors

S 867-065-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-066-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 947-067-R00
(3) Put the protective work mat in the inlet cowl.
(a) Make sure you can clearly see the warning pennants from the ground.

S 427-068-R00

(4) Safety the LP rotor blades to the LP outlet guide vanes with a light weight rope.
  (a) Attach the LP rotor blades to the LP outlet guide vanes with three lengths of clean, light weight rope. Attach the rope at three locations that have an equal distance between them.

S 167-069-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON-FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

CAUTION: DO NOT CLEAN THE ENGINE WITH A CLEANING FLUID THAT CONTAINS SALT. USE ONLY THE CLEANING FLUIDS IN THE CONSUMABLE MATERIALS LIST. THESE DO NOT CONTAIN SALT. CLEANING FLUIDS THAT CONTAIN SALT CAN CAUSE CORROSION ON THE IP COMPRESSOR ROTOR PATH LINING.

(5) Prepare approximately 24 U.S. gallons (90 liters) of cleaning solution.
  (a) Use a ratio of water to washing fluid as given in the manufacturer's instructions.

S 167-070-R00

(6) Fill the washing rig with the cleaning solution.

S 867-071-R00

(7) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D19, ENGINES START CONT LEFT

S 867-072-R00

(8) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-073-R00

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-074-R00

CAUTION: DO NOT SPRAY THE P1 PROBE. YOU MUST KEEP THE CLEANING SOLUTION OUT OF THE P1 AIR SYSTEM. IF YOU GET FLUID IN THE P1 AIR SYSTEM, DAMAGE CAN OCCUR.

(2) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the cleaning solution.
   (a) Use the pressure washing rig to apply the cleaning solution at 8 to 16 U.S. gallons (30 to 60 liters) per minute.
   (b) Insert the probe between the LP compressor blades at the top of the engine.
      1) Point the flow at the blade roots of the IP Compressor.
   (c) Stop the flow of cleaning fluid when N3 goes below 5%

S 167-075-R00

(3) Stop for 10 minutes to let the cleaning fluid drain.

S 867-076-R00

(4) Insert the probe in the bottom of the engine.

S 867-077-R00

(5) Do the procedure to dry-motor the engine, apply the cleaning fluid and drain again.

S 167-078-R00

(6) Empty the cleaning fluid from the washing rig. Fill the washing rig with water.

S 867-079-R00

(7) Do the Power Plant Dry-Motor procedure to motor the engine (72-00-00/201) for 2 minutes.

S 167-080-R00

(8) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the water:
   (a) Use the pressure washing rig to apply the cleaning solution at 8 to 16 U.S. gallons (30 to 60 liters) per miinute.

(b) Insert the probe between the LP compressor blades at the top of the engine.
1) Point the flow at the blade roots of the IP Compressor.
(c) Stop the flow of cleaning fluid when N3 goes below 5%

S 167-081-R00
(9) Stop for 10 minutes.

S 167-082-R00
(10) Insert the probe in the bottom of the engine.

S 167-083-R00
(11) Do the procedure to dry-motor the engine, apply the cleaning fluid and drain again.

G. Put the Airplane Back to Its Usual Condition

S 947-084-R00
(1) Remove the rope from the LP rotor blades.

S 947-085-R00
(2) Remove the protective work mats from the inlet cowl.

S 947-086-R00
(3) Fully clean and examine the area after you complete the work to make sure that the inlet area is free from unwanted material.

S 867-087-R00
(4) Do the Power Plant Operation (Normal) procedure to start the engine that you cleaned (AMM 71-00-00/201).
(a) Let the engine become stable at minimum for 5 minutes.
(b) Slowly move the thrust lever forward to get 1.5 EPR
(c) Operate the two AC packs from the engine that is in operation to make sure that there is no contamination (AMM 21-00-00/201).
(d) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-088-R00
(5) If you cleaned the two engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201) for 30 seconds.
(a) Use the cross bleed air from the first engine that is in operation.
(b) Stop the first engine (AMM 71-00-00/201).
(c) Let the engine become stable at minimum for 5 minutes.
(d) Slowly move the thrust lever forward to get 1.5 EPR.
(e) Operate the two AC packs from the engine that is in operation to make sure that there is no contamination (AMM 21-00-00/201).
(f) Let the engine become stable at minimum for 5 minutes.
(g) Stop the second engine (AMM 71-00-00/201).

S 867-089-R00

(6) If you only cleaned one engine, do the Power Plant Dry-Motor procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove the washing fluid from the cross bleed pipes.

(a) Use the cross bleed air from the first engine that is in operation.

(b) Stop first engine (AMM 71-00-00/201).

TASK 72-30-00-167-090-R00

5. Clean the IP and HP Compressors with Water, Washing Fluid and Anti-Freeze Solution (Lance Method)

A. Equipment

(1) Protective work mats, Air intake - Rolls-Royce 289200

(2) Pressure washing rig - Local Manufacture, with a probe (nominal inside diameter 0.140 to 0.160 inch) (3.50 to 4.00mm), operating pressures of 100 psi, pressure gage, with a minimum capacity of 24 U.S. Gallons (20 Imperial gallons, 90 liters)

(3) Lightweight rope 3x3 meters - local supply

B. Consumable Materials

(1) Compressor washing fluid
British Spec/Ref - ZOK 27
American Spec/Ref -
OMat No. 1070

(2) Compressor washing fluid
British Spec/Ref - Castrol, ICD 177
American Spec/Ref -
OMat No. 1070A

(3) Compressor washing fluid
British Spec/Ref - Turbo Clean
American Spec/Ref -
OMat No. 1070B

(4) Compressor washing fluid
British Spec/Ref - Ardrox 6345
American Spec/Ref -
OMat No. 1070D

(5) Compressor washing fluid
British Spec/Ref - Rivanaes, RMC-G21
American Spec/Ref -
OMat No. 1070E

(6) Demineralized water - local supply

NOTE: Demineralized water can have a maximum conductance of 20 microsiemens.

(7) Monopropolylene glycol Antifreeze
OMat No.1076

C. References
(1) AMM 71-00-00/201, Power Plant
(2) AMM 21-00-00/201, Air Conditioning

D. Access
(1) Location Zones
210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)

E. Prepare to Clean the IP and HP Compressors

S 867-091-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-092-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 947-093-R00
(3) Put the protective work mat in the inlet cowl.
(a) Make sure that you can clearly see the warning pennants from the ground.

S 867-142-R00
(4) Safety the LP rotor blades to the LP outlet guide vanes with a light weight rope.
(a) Safety the LP rotor blades to the LP outlet guide vanes with three lengths of clean, light weight rope. Attach the rope at three locations that have an equal distance between them.

S 167-094-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON- FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

CAUTION: DO NOT CLEAN THE ENGINE WITH A CLEANING FLUID THAT CONTAINS SALT. USE ONLY THE CLEANING FLUIDS IN THE CONSUMABLE MATERIALS LIST. THESE DO NOT CONTAIN SALT. CLEANING FLUIDS THAT CONTAIN SALT CAN CAUSE CORROSION ON THE IP COMPRESSOR ROTOR PATH LINING.

(5) Prepare approximately 24 U.S. gallons (90 liters) of cleaning solution.
   (a) Use a ratio of washing fluid as specified in the cleaning solution manufacturer's instructions.

S 167-095-R00

(6) Fill the washing rig with the cleaning solution.

S 867-143-R00

(7) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D19, ENGINES START CONT LEFT

S 867-096-R00

(8) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-097-R00

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-098-R00

CAUTION: DO NOT SPRAY THE P1 PROBE. YOU MUST KEEP THE CLEANING SOLUTION OUT OF THE P1 AIR SYSTEM. IF YOU GET FLUID IN THE P1 AIR SYSTEM, DAMAGE CAN OCCUR.

(2) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the cleaning solution.
   (a) Use the pressure washing rig to apply the cleaning solution at 8 to 16 U.S. gallons (30 to 60 liters) per minute.
   (b) Insert the probe between the LP compressor blades at the top of the engine.
      1) Point the flow at the blade roots of the IP Compressor.
   (c) Stop the flow of cleaning fluid when N3 goes below 5%

S 867-099-R00
(3) Stop for 10 minutes to let the cleaning fluid drain.

S 867-100-R00
(4) Insert the probe in the bottom of the engine.

S 867-101-R00
(5) Do the procedure to dry-motor the engine, apply the cleaning fluid and drain again.

S 167-102-R00
(6) Empty the cleaning fluid from the washing rig. Fill the washing rig with water.

S 867-104-R00
(7) Do the Power Plant Dry-Motor procedure to motor the engine (72-00-00/201) for 2 minutes.

S 167-105-R00
(8) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the water:
   (a) Use the pressure washing rig to apply the cleaning solution at 8 to 16 U.S. gallons (30 to 60 liters) per miinute.
   (b) Insert the probe between the LP compressor blades at the top of the engine.
      1) Point the flow at the blade roots of the IP Compressor.
   (c) Stop the flow of cleaning fluid when N3 goes below 5%

S 167-106-R00
(9) Stop for 10 minutes to let the water drain.

S 167-107-R00
(10) Insert the probe in the bottom of the engine.

S 867-108-R00

(11) Do the procedure to dry-motor the engine, apply the cleaning fluid and drain again, with the probe at the bottom of the engine.

G. Put the Airplane Back to Its Usual Condition

S 947-111-R00

(1) Remove the rope from the LP rotor blades.

S 947-110-R00

(2) Remove the protective work mats from the inlet cowl.

S 867-112-R00

(3) Fully clean and examine the area after you complete the work to make sure that the inlet area is free from unwanted material.

S 867-113-R00

(4) Do the Power Plant Operation (Normal) procedure to start the engine that you cleaned (AMM 71-00-00/201).
   (a) Let the engine become stable at minimum for 5 minutes.
   (b) Slowly move the thrust lever forward to get 1.5 EPR
   (c) Operate the two AC packs from the engine that is in operation to make sure that there is no contamination (AMM 21-00-00/201).
   (d) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-114-R00

(5) If you cleaned the two engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201) for 30 seconds.
   (a) Use the cross bleed air from the first engine that is in operation.
   (b) Stop the first engine (AMM 71-00-00/201).
   (c) Let the engine become stable at minimum for 5 minutes.
   (d) Slowly move the thrust lever forward to get 1.5 EPR.
   (e) Operate the two AC packs from the engine that is in operation to make sure that there is no contamination (AMM 21-00-00/201).
   (f) Let the engine become stable at minimum for 5 minutes.
   (g) Stop the second engine (AMM 71-00-00/201).

S 867-115-R00

(6) If you only cleaned one engine, do the Power Plant Dry-Motor procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove the washing fluid from the cross bleed pipes.

TASK 72-30-00-167-116-R00

6. Clean the IP and HP Compressors with Water Only (Lance Method)

A. Equipment
   (1) Protective work mats, Air intake - Rolls-Royce 289200
   (2) Pressure washing rig - Local Manufacture, with a probe (nominal inside diameter 0.140 to 0.160 inch) (3.50 to 4.00mm), operating pressures of 100 psi, pressure gage, with a minimum capacity of 24 U.S. Gallons (20 Imperial gallons, 90 liters)
   (3) Lightweight rope 3x3 meters - local supply

B. Consumable Materials
   (1) Demineralized water - Local Supply

C. References
   (1) AMM 71-00-00/201, Power Plant
   (2) AMM 21-00-00/201, Air Conditioning

D. Access
   (1) Location Zones
       210 Control Cabin
       410 Power Plant (Left)
       411 Power Plant (Right)

E. Prepare to Clean the IP and HP Compressors

S 867-117-R00
   (1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
       (a) P11-2 Overhead Circuit Breaker Panel
           1) 11D19, ENGINES START CONT LEFT

S 867-118-R00
   (2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
       (a) P11-2 Overhead Circuit Breaker Panel
           1) 11D20, ENGINES START CONT RIGHT

S 947-119-R00
   (3) Put the protective work mat in the inlet cowl.
       (a) Make sure that you can clearly see the warning pennants from the ground.

S 427-120-R00
   (4) Safety the LP rotor blades to the LP outlet guide vanes with a light weight rope.
       (a) Attach the LP rotor blades to the LP outlet guide vanes with three lengths of clean, light weight rope. Attach the rope at three locations that have an equal distance between them.

S 167-121-R00
   (5) Fill the washing rig container with water.

S 867-123-R00

(6) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D19, ENGINES START CONT LEFT

S 867-124-R00

(7) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-125-R00

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-126-R00

CAUTION: DO NOT SPRAY THE P1 PROBE. YOU MUST KEEP THE CLEANING SOLUTION OUT OF THE P1 AIR SYSTEM. IF YOU GET FLUID IN THE P1 AIR SYSTEM, DAMAGE CAN OCCUR.

(2) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the cleaning solution.
  (a) Use the pressure washing rig to apply the water at 8 to 16 U.S. gallons (30 to 60 liters) per minute.
  (b) Insert the probe between the LP compressor blades at the top of the engine.
    1) Point the flow at the blade roots of the IP Compressor.
  (c) Stop the flow of water when N3 goes below 5%

S 167-127-R00

(3) Stop for 10 minutes to let the water drain.

S 167-128-R00

(4) Make sure that the water container has sufficient water. Fill the container if necessary.

S 867-129-R00

(5) Do the steps to Dry-Motor the engine, apply the water and drain two more times.
  (a) Insert the probe at a different location approximately 100 degrees from the previous position.

S 867-130-R00

(6) If necessary, do the procedure to wash the compressors one more time.

G. Put the Airplane Back to Its Usual Condition

S 947-131-R00

(1) Remove the rope from the LP rotor blades.

S 947-132-R00

(2) Remove the protective work mats from the inlet cowl.

S 867-133-R00

(3) Fully clean and examine the area after you complete the work to make sure that the inlet area is free from unwanted material.

S 867-134-R00

(4) Do the Power Plant Operation (Normal) procedure to start the engine that you cleaned (AMM 71-00-00/201).
   (a) Let the engine become stable at minimum for 5 minutes.
   (b) Operate the two AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).

S 167-135-R00

CAUTION: THE CORE WASH PROCEDURE WILL ADD WATER TO THE OIL SYSTEM. THIS CAN CAUSE DAMAGE TO THE ENGINE IF THE WATER IS NOT REMOVED.

(5) If the engine will not operate at high power during 24 hours after the compressor wash, or if AC pack contamination was noted, do the steps that follow:
   (a) Slowly move the thrust lever forward to get 1.5 EPR.
   (b) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-136-R00

(6) If you cleaned the two engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201).
   (a) Use the cross bleed air from the first engine in operation.
   (b) Stop the first engine (AMM 71-00-00/201).
   (c) Let the engine become stable at minimum idle for 5 minutes.
   (d) Operate the two AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).

S 867-137-R00

CAUTION: THE CORE WASH PROCEDURE WILL ADD WATER TO THE OIL SYSTEM. THIS CAN CAUSE DAMAGE TO THE ENGINE IF THE WATER IS NOT REMOVED.

(7) If the second engine will not operate at high power during 24 hours after the compressor wash, or if AC pack contamination was noted, do the steps that follow:
  (a) Slowly move the thrust lever forward to get 1.5 EPR
  (b) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-138-R00

(8) Stop the second engine (AMM 71-00-00/201).

S 867-139-R00

(9) If you only cleaned one engine and the AC pack was not contaminated,
  (a) Stop the first engine (AMM 71-00-00/201).

S 867-140-R00

(10) If you only cleaned one engine and the AC pack contaminated,
  (a) Do the Power Plant Operation (Normal) procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

    NOTE: This will remove contamination from the cross bleed pipes.

  (b) Use the cross bleed air from the first engine in operation.
  (c) Stop the first engine (AMM 71-00-00/201).

TASK 72-30-00-167-141-R00

7. Clean the IP and HP Compressors with Water and Anti-Freeze Solution (Lance Method)

A. Equipment
  (1) Protective work mats, Air intake - Rolls-Royce 289200
  (2) Pressure washing rig - Local Manufacture, with a probe (nominal inside diameter 0.140 to 0.160 inch) (3.50 to 4.00mm), operating pressures of 100 psi, pressure gage, with a minimum capacity of 24 U.S. Gallons (20 Imperial gallons, 90 liters)
  (3) Lightweight rope 3x3 meters - local supply

B. Consumable Materials
  (1) Demineralized water - local supply
  (2) Monopropolylene glycol Antifreeze
    OMat No.1076

C. References
  (1) AMM 71-00-00/201, Power Plant
  (2) AMM 21-00-00/201, Air Conditioning

D. Access
(1) Location Zones
210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)

E. Prepare to Clean the IP and HP Compressors

S 867-144-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-145-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 947-146-R00
(3) Put the protective work mat in the inlet cowl.
(a) Make sure that you can clearly see the warning pennants from the ground.

S 427-147-R00
(4) Safety the LP rotor blades to the LP outlet guide vanes with a light weight rope.
(a) Attach the LP rotor blades to the LP outlet guide vanes with three lengths of clean, light weight rope. Attach the rope at three locations that have an equal distance between them.

S 167-148-R00
(5) Prepare approximately 24 U.S. gallons (90 liters) of the cleaning solution.
(a) Use a ratio of 70% water to 30% antifreeze.

S 167-149-R00
(6) Fill the washing rig container with cleaning solution.

S 867-150-R00
(7) For the left engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-151-R00
(8) For the right engine, close this circuit breaker and remove the DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-152-R00

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-153-R00

CAUTION: DO NOT SPRAY THE P1 PROBE. YOU MUST KEEP THE CLEANING SOLUTION OUT OF THE P1 AIR SYSTEM. IF YOU GET FLUID IN THE P1 AIR SYSTEM, DAMAGE CAN OCCUR.

(2) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the cleaning solution:
   (a) Use the pressure washing rig to apply the cleaning solution at 8 to 16 U.S. gallons (30 to 60 liters) per minute.
   (b) Insert the probe between the LP compressor blades at the top of the engine.
   (c) Stop the flow of water when N3 goes below 5%.

S 167-154-R00

(3) Stop for 10 minutes to let the water drain.

S 167-155-R00

(4) Make sure that the water container has sufficient cleaning fluid. Fill the container if necessary.

S 867-156-R00

(5) Do the Dry-Motor procedure, apply the water and drain two more times.
   (a) Insert the probe at a different location approximately 100 degrees from the previous position.

S 867-157-R00

(6) If it is necessary, do the procedure to wash the compressors one more time.

G. Put the Airplane Back to Its Usual Condition

S 947-158-R00

(1) Remove the rope from the LP rotor blades.

S 947-194-R00

(2) Remove the protective work mats from the inlet cowl.

S 947-159-R00

(3) Fully clean and examine the area after you complete the work to make sure that the inlet area is free from unwanted material.

S 867-160-R00

(4) Do the Power Plant Operation (Normal) procedure to start the engine that you cleaned (AMM 71-00-00/201).
   (a) Let the engine become stable at minimum idle for 5 minutes.
   (b) Move the thrust lever slowly forward to get 1.5 EPR.
   (c) Operate the two AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).
   (d) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-161-R00

(5) If you cleaned the two engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201).
   (a) Use the cross bleed air from the first engine in operation.
   (b) Do the Power Plant Operation (Normal) procedure to stop the first engine (AMM 71-00-00/201).
   (c) Let the engine become stable at minimum idle for 5 minutes.
   (d) Move the thrust lever slowly forward to get 1.5 EPR.
   (e) Operate the two AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).
   (f) Let the engine become stable at 1.5 EPR for 5 minutes.
   (g) Stop the second engine (AMM 71-00-00/201).

S 867-162-R00

(6) If you only cleaned one engine, do the Power Plant Dry-Motor procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove the washing fluid from the cross bleed pipes.

   (a) Use the cross bleed air from the first engine in operation.
   (b) Stop the first engine (AMM 71-00-00/201).

TASK 72-30-00-167-163-R00

8. Clean the IP and HP Compressors with Water and Washing Fluid {Core Mounted Engine Wash Probe(s)}

A. Equipment

(1) T9832 Rolls-Royce Integrated Washing Rig and Water Collection System or Local manufacture washing rig with probe(s) with a minimum fluid capacity of 24 U.S, gallons (20 imperial gallons, 90 liters)

(2) Local manufacture engine wash probe(s)
These can be supported from the rear of the fan case (short probes) or from the CNA lip (long probes)

(3) Access platform - 1 meter high

B. Consumable Materials
(1) Compressor washing fluid
British Spec/Ref - ZOK 27
American Spec/Ref -
OMat No. 1070
(2) Compressor washing fluid
British Spec/Ref - Castrol, ICD 177
American Spec/Ref -
OMat No. 1070A
(3) Compressor washing fluid
British Spec/Ref - Turbo Clean
American Spec/Ref -
OMat No. 1070B
(4) Compressor washing fluid
British Spec/Ref - Ardrox 6345
American Spec/Ref -
OMat No. 1070D
(5) Compressor washing fluid
British Spec/Ref - Rivanaes, RMC-G21
American Spec/Ref -
OMat No. 1070E
(6) Demineralized water - local supply
C. References
(1) AMM 71-00-00/201, Power Plant
(2) AMM 21-00-00/201, Air Conditioning
(3) AMM 78-31-00/201, Thrust Reverser
D. Access
(1) Location Zones
210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)
415/416 Thrust reverer - left
425/426 Thrust reverser - right
E. Prepare to Clean the IP and HP Compressors

S 867-164-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-165-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 867-218-R00

(3) Deactivate the thrust reversers (AMM 78-31-00/201).

NOTE: When you use the long probe, it is not necessary to deactivate and open the thrust reversers.

S 167-167-R00

(4) Install the appropriate wash probes for the engine to be washed.
  (a) Open the thrust reversers (AMM 78-31-00/201).
  (b) Put the access platform in a safe position next to the engine.

CAUTION: MAKE SURE THAT THE PROBES DO NOT HAVE LOOSE PARTS. LOOSE PARTS CAN BECOME DETACHED AND GO INTO THE ENGINE. IF LOOSE PARTS GO INTO THE ENGINE THEY CAN CAUSE DAMAGE TO THE ENGINE COMPONENTS.

  (c) Put the wash probes through the outlet guide vanes (OGV's) from the rear of the engine at approximately 4 o'clock and 8 o'clock positions.

CAUTION: MAKE SURE THAT THE FAN BLADES DO NOT ROTATE DURING THE WASH PROBE INSTALLATION.

CAUTION: MAKE SURE THAT THE ENGINE PROBES ARE INSTALLED SECURELY TO THE ENGINE WITH THE HOSES ATTACHED. INCORRECT INSTALLATION CAN CAUSE DAMAGE TO THE ENGINE.

  (d) Locate the hook at the forward end of the wash probe safely around the intake of the IPC fairing. Attach the rear end of the probe with the clamping devices provided.
    1) The short probes are secured to the rear of the fan case.
    2) The long probes are secured to the rear lip of the CNA.
  (e) Connect the hose assemblies to both probes and to the selected delivery hose on the wash rig.

S 167-177-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON-FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

CAUTION: DO NOT CLEAN THE ENGINE WITH A CLEANING FLUID THAT CONTAINS SALT. USE ONLY THE CLEANING FLUIDS IN THE CONSUMABLE MATERIALS LIST. THESE DO NOT CONTAIN SALT. CLEANING FLUIDS THAT CONTAIN SALT CAN CAUSE CORROSION ON THE IP COMPRESSOR ROTOR PATH LINING.

(5) Prepare the cleaning solution as follows:
  (a) Fill the washing rig container with 24 U.S gallons (90 liters) of cleaning solution.
  (b) Mix at the ratio of water to washing fluid as specified in the cleaning solution manufacturer's instructions.

S 167-169-R00

(6) Heat the cleaning solution to 70 degrees C (158 degrees F)

NOTE: Hot water cleans better than cold water. Heating is optional.

S 867-170-R00

(7) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D19, ENGINES START CONT LEFT

S 867-171-R00

(8) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-172-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON-FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY-MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Use the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-173-R00

(2) During the motoring procedure and subsequent engine rundown, do the steps that follow to apply the cleaning solution.
   (a) Use the washing rig to apply the washing fluid at a rate of between 30 to 60 liters per minute.
   (b) Stop the flow of cleaning fluid when N3 goes below 5%.

S 167-174-R00

(3) Stop for 10 minutes to let the cleaning solution drain.

S 867-175-R00

(4) Make sure that there is fluid level in the washing rig. Refill and heat as necessary.

S 167-176-R00

(5) Do the steps given above to Dry-Motor the engine, apply the cleaning solution and drain.

S 167-178-R00

(6) Empty the cleaning solution from the washing rig. Fill the washing rig with water.

S 167-179-R00
(7) Heat the cleaning solution to 70 degrees C (158 degrees F)

NOTE: Hot water cleans better than cold water. Heating is optional.

S 867-180-R00
(8) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-181-R00
(9) During the motoring procedure and the subsequent engine rundown, do the steps that follow to apply the water:
(a) Use the washing rig to apply the water at a delivery flow rate of between 30-60 liters per minute.
(b) Stop the flow of water when N3 goes below 5%

S 167-182-R00
(10) Stop for 10 minutes to let the water drain.

S 167-183-R00
(11) Do the steps given above to Dry-Motor the engine, apply the water and drain.

G. Put the Airplane Back to Its Usual Condition

S 867-184-R00
(1) Remove the wash probes from the engine.
(a) Disconnect the hoses from the wash probes.
(b) Remove the probes from the engine through the outlet guide vanes (OGV's).
(c) Clean and examine the area after work has been completed and make sure that the inlet area is free from unwanted material.
(d) Remove the access platform.
(e) Close the thrust reversers (AMM 78-31-00/201)
(f) Activate the thrust reversers (AMM 78-31-00/201).

S 867-185-R00
(2) Use the Power Plant Operation (Normal) procedure to start the engine which you cleaned (AMM 71-00-00/201).
(a) Let the engine become stable at minimum idle for 5 minutes.
(b) Move the thrust lever slowly forward to get 1.5 EPR.
(c) Operate the two AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).
(d) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-186-R00

(3) If you cleaned both engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201).
  (a) Use the cross bleed air from the first engine in operation.
  (b) Do the Power Plant Operation (Normal) procedure to shutdown the first engine (AMM 71-00-00/201).
  (c) Let the engine become stable at minimum idle for 5 minutes.
  (d) Move the thrust lever slowly forward until you get 1.5 EPR.
  (e) Operate both AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).
  (f) Let the engine become stable at 1.5 EPR for 5 minutes.
  (g) Stop the second engine (AMM 71-00-00/201).

S 867-187-R00

(4) If you only cleaned one engine, do the Power Plant Dry-Motor procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove the washing fluid from the cross bleed pipes.

  (a) Use the cross bleed air from the first engine in operation.
  (b) Stop the first engine (AMM 71-00-00/201).

TASK 72-30-00-167-188-R00

9. Clean the IP and HP Compressors with Water, Washing Fluid and Anti-Freeze Solution {Core Mounted Engine Wash Probe(s)}

A. Equipment
  (1) T9832 Rolls-Royce Integrated Washing Rig and Water Collection System or Local manufacture washing rig with probe(s) with a minimum fluid capacity of 24 U.S, gallons (20 imperial gallons, 90 liters)
  (2) Local manufacture engine wash probe(s)
  These can be supported from the rear of the fan case (short probes) or from the CNA lip (long probes)
  (3) Access platform - 1 meter high

B. Consumable Materials
  (1) Compressor washing fluid
  British Spec/Ref - ZOK 27
  American Spec/Ref -
  OMat No. 1070
  (2) Compressor washing fluid
  British Spec/Ref - Castrol, ICD 177
  American Spec/Ref -
  OMat No. 1070A
  (3) Compressor washing fluid
  British Spec/Ref - Turbo Clean
  American Spec/Ref -
  OMat No. 1070B

(4) Compressor washing fluid
British Spec/Ref - Ardrox 6345
American Spec/Ref -
OMat No. 1070D
(5) Compressor washing fluid
British Spec/Ref - Rivanaes, RMC-G21
American Spec/Ref -
OMat No. 1070E
(6) Demineralized water - local supply
(7) Monopropolylene glycol Antifreeze
OMat No.1076

C. References
(1) AMM 71-00-00/201, Power Plant
(2) AMM 21-00-00/201, Air Conditioning
(3) AMM 78-31-00/201, Thrust Reverser

D. Access
(1) Location Zones
210 Control Cabin
410 Power Plant (Left)
411 Power Plant (Right)
415/416 Thrust reverer - left
425/426 Thrust reverser - right

E. Prepare to Clean the IP and HP Compressors

S 867-189-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-190-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 867-192-R00

(3) Deactivate the thrust reversers (AMM 78-31-00/201)

NOTE: When you use the long probe, it is necessary to deactivate and open the thrust reversers.

S 167-193-R00

(4) Install the appropriate wash probes for the engine to be washed.
(a) Open the thrust reversers (AMM 78-31-00/201).
(b) Put the access platform in a safe position next to the engine.

CAUTION: MAKE SURE THAT THE PROBES DO NOT HAVE LOOSE PARTS. LOOSE PARTS CAN BECOME DETACHED AND GO INTO THE ENGINE. IF LOOSE PARTS GO INTO THE ENGINE THEY CAN CAUSE DAMAGE TO THE ENGINE COMPONENTS.

(c) Put the wash probes through the outlet guide vanes (OGV's) from the rear of the engine at approximately 4 o'clock and 8 o'clock positions.

CAUTION: MAKE SURE THAT THE FAN BLADES DO NOT ROTATE DURING THE WASH PROBE INSTALLATION.

CAUTION: MAKE SURE THAT THE ENGINE PROBES ARE INSTALLED SECURELY TO THE ENGINE WITH THE HOSES ATTACHED. INCORRECT INSTALLATION CAN CAUSE DAMAGE TO THE ENGINE.

(d) Locate the hook at the forward end of the wash probe safely around the intake of the IPC fairing. Attach the rear end of the probe with the clamping devices provided.
1) The short probes are secured to the rear of the fan case.
2) The long probes are secured to the rear lip of the CNA.
(e) Connect the hose assemblies to both probes and to the selected delivery hose on the wash rig.

S 167-195-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON-FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

CAUTION: DO NOT CLEAN THE ENGINE WITH A CLEANING FLUID THAT CONTAINS SALT. USE ONLY THE CLEANING FLUIDS IN THE CONSUMABLE MATERIALS LIST. THESE DO NOT CONTAIN SALT. CLEANING FLUIDS THAT CONTAIN SALT CAN CAUSE CORROSION ON THE IP COMPRESSOR ROTOR PATH LINING.

(5) Prepare approximately 24 U.S. gallons (90 liters) of cleaning solution.
   (a) Use a ratio of water to washing fluid as given in the cleaning solution manufacturer's instructions.
   (b) Use a ratio of 70% water to 30% anti-freeze solution.

S 167-196-R00

(6) Fill the washing rig container with cleaning solution.

S 167-197-R00

(7) Heat the cleaning solution to 70 degrees C (158 degrees F)

NOTE: Hot water cleans better than cold water. Heating is optional.

S 867-199-R00

(8) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D19, ENGINES START CONT LEFT

S 867-198-R00

(9) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-200-R00

WARNING: USE THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE WASHING FLUIDS. ALTHOUGH THE WASHING FLUIDS ARE NON-FLAMMABLE AND NON-TOXIC THEY ARE IRRITANTS. IF YOU DO NOT FOLLOW THE MANUFACTURER'S INSTRUCTIONS, INJURY CAN OCCUR.

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY-MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-201-R00

(2) During the motoring procedure and subsequent engine rundown, do the steps that follow to apply the water.
   (a) Use the washing rig to apply the washing fluid at a delivery flow rate of between 30 to 60 liters per minute.
   (b) Stop the flow of cleaning fluid when N3 goes below 5%

S 167-202-R00

(3) Stop for 10 minutes to let the cleaning solution drain.

S 167-204-R00

(4) Make sure that there is fluid level in the washing rig. Refill and heat as necessary.

S 167-203-R00

(5) Do the steps given above again to Dry-Motor the engine, apply the cleaning solution and drain.

S 167-205-R00

(6) Empty the cleaning solution from the washing rig. Fill the washing rig with water and anti-freeze.
   (a) Use a ratio of 70% water to 30% antifreeze solution.
   (b) Heat the water to 70 degrees C (158 degrees F)

NOTE: Hot water cleans better than cold water. Heating is optional.

S 867-206-R00

(7) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-207-R00

(8) During the motoring procedure and subsequent engine rundown, do the steps that follow to apply the water.
  (a) Use the washing rig to apply the washing fluid at a delivery flow rate of between 30 to 60 liters per minute.
  (b) Stop the flow of water when N3 goes below 5%.

S 167-208-R00

(9) Stop for 10 minutes to let the water drain.

S 167-209-R00

(10) Do the steps given above again to Dry-Motor the engine, apply the water and drain.

G. Put the Airplane Back to Its Usual Condition

S 867-210-R00

(1) Remove the wash probes from the engine.
  (a) Disconnect the hoses from the wash probes.
  (b) Remove the probes from the engine through the outlet guide vanes (OGV's).
  (c) Clean and examine the area after work has been completed and make sure that the inlet area is free from unwanted material.
  (d) Remove the access platform.
  (e) Close the thrust reversers (AMM 78-31-00/201).
  (f) Activate the thrust reversers (AMM 78-31-00/201).

S 867-211-R00

(2) Do the Power Plant Operation (Normal) procedure to start the engine which you cleaned (AMM 71-00-00/201).
  (a) Let the engine become stable at minimum idle for 5 minutes.
  (b) Move the thrust lever slowly forward to get 1.5 EPR.
  (c) Operate the two AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).
  (d) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-212-R00

(3) If you cleaned the two engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201).
  (a) Use the cross bleed air from the first engine in operation.
  (b) Do the Power Plant Operation (Normal) procedure to stop the first engine (AMM 71-00-00/201).
  (c) Let the engine become stable at minimum idle for 5 minutes.
  (d) Push the throttle forward until you get 1.5 EPR.
  (e) Operate both AC packs from the engine in operation to make sure there is no contamination (AMM 21-00-00/201).
  (f) Let the engine become stable at 1.5 EPR for 5 minutes.
  (g) Stop the second engine (AMM 71-00-00/201).

S 867-213-R00

(4) If you only cleaned one engine, do the Power Plant Dry-Motor procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove washing fluid from the cross bleed pipes.

(a) Use the cross bleed air from the first engine in operation.
(b) Do the Power Plant Operation (Normal) procedure to stop the second engine (AMM 71-00-00/201).

TASK 72-30-00-167-214-R00

10. Clean the IP and HP Compressors with Water Only {Core Mounted Engine Wash Probe(s)}

A. Equipment

(1) T9832 Rolls-Royce Integrated Washing Rig and Water Collection System or Local manufacture washing rig with probe(s) with a minimum fluid capacity of 24 U.S, gallons (20 imperial gallons, 90 liters)
(2) Local manufacture engine wash probe(s)
These can be supported from the rear of the fan case (short probes) or from the CNA lip (long probes)
(3) Access platform - 1 meter high
(4) Demineralized water - local supply

B. References

(1) AMM 71-00-00/201, Power Plant
(2) AMM 21-00-00/201, Air Conditioning
(3) AMM 78-31-00/201, Thrust Reverser

C. Access

(1) Location Zones

210	Control Cabin
410	Power Plant (Left)
411	Power Plant (Right)
415/416	Thrust reverer - left
425/426	Thrust reverser - right

D. Prepare to Clean the IP and HP Compressors

S 867-215-R00

(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-216-R00

(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 867-217-R00
(3) Deactivate the thrust reversers (AMM 78-31-00/201).

NOTE: When you use the long probe, it is not necessary to deactivate and open the thrust reversers.

S 167-219-R00
(4) Install the appropriate wash probes for the engine to be washed (AMM 78-31-00/201).
(a) Open the thrust reversers (AMM 78-31-00/201).
(b) Put the access platform in a safe position next to the engine.

CAUTION: MAKE SURE THAT THE PROBES DO NOT HAVE LOOSE PARTS. LOOSE PARTS CAN BECOME DETACHED AND GO INTO THE ENGINE. IF LOOSE PARTS GO INTO THE ENGINE THEY CAN CAUSE DAMAGE TO THE ENGINE COMPONENTS

(c) Put the wash probes through the outlet guide vanes (OGV's) from the rear of the engine fan case at approximately 4 o'clock and 8 o'clock positions.

CAUTION: MAKE SURE THAT THE FAN BLADES DO NOT ROTATE DURING THE WASH PROBE INSTALLATION.

CAUTION: MAKE SURE THAT THE ENGINE PROBES ARE ATTACHED SECURELY TO THE ENGINE WITH THE HOSES ATTACHED. INCORRECT INSTALLATION CAN CAUSE DAMAGE TO THE ENGINE.

(d) Locate the hook at the forward end of the wash probe safely around the intake of the IPC fairing and secure the rear end of the probe into position with the clamping devices provided.
1) The short probes are secured to the rear of the fan case.
2) The long probes are secured to the rear lip of the CNA.
(e) Connect the hose assemblies to both probes and to the selected delivery hose on the wash rig.

S 167-220-R00
(5) Heat the water to 70 degrees C (158 degrees F)

NOTE: Hot water cleans better than cold water. Heating is optional.

S 867-221-R00
(6) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 867-222-R00

(7) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D20, ENGINES START CONT RIGHT

E. Clean the IP and HP Compressors

S 867-223-R00

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Do the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 867-224-R00

(2) During the dry-motor procedure and the subsequent engine rundown, do the steps that follow to apply the water.
  (a) Use the washing rig to apply the water at a delivery flow rate of between 30 to 60 liters per minute.
  (b) Stop the flow of water when N3 goes below 5%

S 167-225-R00

(3) Stop for 10 minutes to let the cleaning solution drain.

S 167-226-R00

(4) Make sure that there is sufficient water in the container. Refill and heat the container if necessary.

S 167-228-R00

(5) Do the steps given above up to three more times to Dry-Motor the engine, apply the water and drain.

NOTE: A total of four dry-motors are recommended to return the engine performance to the previous level.

F. Put the Airplane Back to Its Usual Condition

S 867-229-R00

(1) Remove the wash probes from the engine.
  (a) Disconnect the hoses from the wash probes.

(b) Remove the probes from the engine through the outlet guide vanes (OGV's).
(c) Clean and examine the area after work has been completed and make sure that the inlet area is free from unwanted material.
(d) Remove the access platform.
(e) Close the thrust reversers (AMM 78-31-00/201).
(f) Activate the thrust reversers (AMM 78-31-00/201).

S 867-230-R00

(2) Do the Power Plant Operation (Normal) procedure to start the engine that you cleaned (AMM 71-00-00/201).
(a) Let the engine become stable at minimum idle for 5 minutes.
(b) Operate both AC packs from the engine in operation to make sure there is no contamination (AMM 21-00-00/201).

S 867-231-R00

(3) If the engine will not be run to high power for more than 24 hours after the compressor wash or if AC pack contamination was noted do the following steps.
(a) Move the thrust lever slowly forward until you get 1.5 EPR.
(b) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-232-R00

(4) If you cleaned the two engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201).
(a) Use the cross bleed air from the first engine in operation.
(b) Do the Power Plant Operation (Normal) procedure to shutdown the first engine (AMM 71-00-00/201).
(c) Let the engine become stable at minimum idle for 5 minutes.
(d) Operate both AC packs from the engine in operation to make sure there is no contamination (AMM 21-00-00/201).

S 867-233-R00

CAUTION: THE CORE WASH PROCEDURE WILL ADD WATER TO THE OIL SYSTEM. THIS WILL CAUSE DAMAGE TO THE ENGINE IF THE WATER IS NOT REMOVED.

(5) If the second engine will not be operated at high power for more than 24 hours after the compressor wash or if AC pack contamination was noted do the following steps.
(a) Move the thrust lever slowly forward until you get 1.5 EPR.
(b) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-234-R00

(6) Stop the second engine (AMM 71-00-00/201).

S 867-235-R00

(7) If you only cleaned one engine, and the AC pack was not contaminated:
(a) Stop the first engine (AMM 71-00-00/201).

S 867-236-R00

(8) If you only cleaned one engine, and the AC pack was contaminated:

(a) Do the Power Plant Operation (Normal) procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove contamination from the cross bleed pipes.

(b) Use the cross bleed air from the first engine in operation.

(c) Stop the first engine (AMM 71-00-00/201).

TASK 72-30-00-167-237-R00

11. Clean the IP and HP Compressors with Water and Anti-Freeze Solution (Core Mounted Engine Wash Probe(s))

A. Equipment

(1) T9832 Rolls-Royce Integrated Washing Rig and Water Collection System or Local manufacture washing rig with probe(s) with a minimum fluid capacity of 24 U.S, gallons (20 imperial gallons, 90 liters)

(2) Local manufacture engine wash probe(s)
These can be supported from the rear of the fan case (short probes) or from the CNA lip (long probes)

(3) Access platform - 1 meter high

B. Consumable Materials

(1) Demineralized water - local supply

(2) Monopropolylene glycol Antifreeze
OMat No.1076

C. References

(1) AMM 71-00-00/201, Power Plant

(2) AMM 21-00-00/201, Air Conditioning

(3) AMM 78-31-00/201, Thrust Reverser

D. Access

(1) Location Zones

210	Control Cabin
410	Power Plant (Left)
411	Power Plant (Right)
415/416	Thrust reverer - left
425/426	Thrust reverser - right

E. Prepare to Clean the IP and HP Compressors

S 867-238-R00

(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D19, ENGINES START CONT LEFT

S 867-239-R00

(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D20, ENGINES START CONT RIGHT

S 867-248-R00
(3) Deactivate the thrust reversers (AMM 78-31-00/201).

NOTE: When you use the long probe, it is not necessary to deactivate and open the thrust reversers.

S 167-240-R00
(4) Install the appropriate wash probes for the engine to be washed.
(a) Open the thrust reversers (AMM 78-31-00/201).
(b) Put the access platform in a safe position next to the engine.

CAUTION: MAKE SURE THAT THE PROBES DO NOT HAVE LOOSE PARTS. LOOSE PARTS CAN BECOME DETACHED AND GO INTO THE ENGINE. IF LOOSE PARTS GO INTO THE ENGINE THEY CAN CAUSE DAMAGE TO THE ENGINE COMPONENTS.

(c) Put the wash probes through the outlet guide vanes (OGV's) from the rear of the engine at approximately 4 o'clock and 8 o'clock positions.

CAUTION: MAKE SURE THAT THE FAN BLADES DO NOT ROTATE DURING THE WASH PROBE INSTALLATION.

CAUTION: MAKE SURE THAT THE ENGINE PROBES ARE INSTALLED SECURELY TO THE ENGINE WITH THE HOSES ATTACHED. INCORRECT INSTALLATION CAN CAUSE DAMAGE TO THE ENGINE.

(d) Locate the hook at the forward end of the wash probe safely around the intake of the IPC fairing. Attach the rear end of the probe with the clamping devices provided.
1) The short probes are secured to the rear of the fan case.
2) The long probes are secured to the rear lip of the CNA.
(e) Connect the hose assemblies to both probes and to the selected delivery hose on the wash rig.

S 167-241-R00
(5) Prepare the cleaning solution as follows:
(a) Fill the washing rig container with 24 U.S gallons (90 liters) of cleaning solution.
(b) Use a ratio of 70% water to 30% anti-freeze solution.

S 167-242-R00
(6) Heat the cleaning solution to 70 degrees C (158 degrees F)

NOTE: Hot water cleans better than cold water. Heating is optional.

S 867-243-R00

(7) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D19, ENGINES START CONT LEFT

S 867-244-R00

(8) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D20, ENGINES START CONT RIGHT

F. Clean the IP and HP Compressors

S 867-245-R00

WARNING: YOU MUST TELL THE GROUND PERSONNEL WHEN YOU ARE TO START THE DRY MOTOR PROCEDURE. IF YOU DO NOT TELL THE GROUND PERSONNEL, INJURY TO PERSONNEL AND/OR DAMAGE TO THE ENGINE CAN OCCUR.

(1) Use the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/021) for 2 minutes.

S 167-246-R00

(2) During the motoring procedure and the subsequent engine rundown, do the steps that follow to apply the cleaning solution:
  (a) Use the washing rig to apply the water at a delivery flow rate of between 30 to 60 liters per minute.
  (b) Stop the flow of cleaning fluid when N3 goes below 5%.

S 167-247-R00

(3) Stop for 10 minutes to let the cleaning fluid drain.

S 167-249-R00

(4) Make sure that there is sufficient water in the container. Fill and heat the container if necessary.

S 167-250-R00

(5) Do the steps given above two more times to Dry-Motor the engine, apply the cleaning solution and drain.

S 167-251-R00

(6) If it is necessary, do the procedure to wash the compressors one more time.

G. Put the Airplane Back to Its Usual Condition

S 867-252-R00

(1) Remove the wash probes from the engine.
   (a) Disconnect the hoses from the wash probes.
   (b) Remove the probes from the engine through the outlet guide vanes (OGV's).
   (c) Clean and examine the area after work has been completed and make sure that the inlet area is free from unwanted material.
   (d) Remove the access platform.
   (e) Close the thrust reversersr (AMM 78-31-00/201).
   (f) Activate the thrust reversers (AMM 78-31-00/201).

S 867-253-R00

(2) Do the Power Plant Operation (Normal) procedure to start the engine which you cleaned (AMM 71-00-00/201).
   (a) Let the engine become stable at minimum idle for 5 minutes.
   (b) Push the throttle forward until you get 1.5 EPR.
   (c) Operate both AC packs from the engine in operation to make sure that there is no contamination (AMM 21-00-00/201).
   (d) Let the engine become stable at 1.5 EPR for 5 minutes.

S 867-254-R00

(3) If you cleaned both engines, do the Power Plant Operation (Normal) procedure to start the second engine (AMM 71-00-00/201).
   (a) Use the cross bleed air from the first engine in operation.
   (b) Use the Power Plant Operation (Normal) procedure to shutdown the first engine (AMM 71-00-00/201).
   (c) Let the engine become stable at minimum idle for 5 minutes.
   (d) Push the throttle forward until you get 1.5 EPR.
   (e) Operate both AC packs from the engine in operation to make sure there is no contamination (AMM 21-00-00/201).
   (f) Let the engine become stable at 1.5 EPR for 5 minutes.
   (g) Stop the second engine (AMM 71-00-00/201).

S 867-255-R00

(4) If you only cleaned one engine, do the Power Plant Dry-Motor procedure to motor the second engine (AMM 71-00-00/201) for 30 seconds.

NOTE: This will remove the washing fluid from the cross bleed pipes.

(a) Use the cross bleed air from the first engine in operation.

(b) Stop the first engine (AMM 71-00-00/201).

LP COMPRESSOR ROTOR DISC AND BLADES - REMOVAL/INSTALLATION

1. General
   A. This task contains two tasks. The first task removes the LP Compressor rotor disc and blades mini-module. The second task installs the LP Compressor rotor disc and blades mini-module.
   B. For this procedure the LP Compressor rotor disc and blades mini-module will be referred to as the LPC disc and blades.
   C. For this procedure the oil and signal drive tube will be referred to as the tube.
   D. Service Bulletins referenced in this task:

      RR SB 72-9331: Introduces a revised fan retention shaft and coupling retaining plate to the LPC.

TASK 72-31-10-004-001-R00

2. Remove the LPC Disc and Blades
   A. Equipment
      (1) Rolls-Royce - HU28850, Removal/Installation tool
      (2) Rolls-Royce - HU28856, Draw Bar/Guide tool
      (3) Rolls-Royce - HU28857, Tommy bar
      (4) Rolls-Royce - HU28858, Installation tool
      (5) Rolls-Royce - HU28859, Spanner
      (6) Rolls-Royce - HU28860, Spanner support
      (7) Rolls-Royce - HU28805, Spanner support
      (8) Rolls-Royce - HU28801, Spanner
      (9) Rolls-Royce - HU28803, Immobilizer
      (10) Rolls-Royce - 1704300 or 1012394, Reduction gearbox
      (11) Rolls-Royce - HU12763, Anchor plate
      (12) Rolls-Royce - HU29583, Protection sleeve
      (13) Rolls-Royce - HU29584, Protection sleeve
      (14) Rolls-Royce - HU28848, Removal/Installation tool
      (15) Rolls-Royce - HU28849, Removal/Installation tool
      (16) Rolls-Royce - CP30400/5, Turnover stand
      (17) Rolls-Royce - HU28700/3, Peening tool
      (18) Rolls-Royce - HU29222, Indexing unit
      (19) Rolls-Royce - HU29223, Immobilizer
      (20) Rolls-Royce - HU28824/1, Pilot shaft
      (21) Rolls-Royce - HU28783/2, Lifting adapter
      (22) Rolls-Royce - CP30427 or CP30745, Lifting sling
      (23) Rolls-Royce - HU29177, Special bolt
      (24) Rolls-Royce - HU29179, Adjusting wrench
      (25) Rolls-Royce - HU28773, Torque spanner
      (26) Rolls-Royce - HU28820/1, Peening tool

(27) Rolls-Royce - HU28851, Timing pin
(28) Rolls-Royce - E2J52529, Guide Punch
(29) Rolls-Royce - HU29289, Restraining tool
(30) Rolls-Royce - CP30570, Dummy shaft
(31) Rolls-Royce - HU31896, Spanner

B. References
(1) AMM 71-11-01/401, Inlet Cowl
(2) AMM 72-35-01/401, Low Pressure (LP) Compressor Inlet Rotating Fairing
(3) AMM 72-52-01/401, LP Turbine Bearing Housing End Cover

C. Access
(1) Location Zone
410 Power Plant
420 Power Plant

(2) Access Panels
412 Nose Cowl
422 Nose Cowl

D. Prepare to Remove the Fan Disc and Blades

S 864-002-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

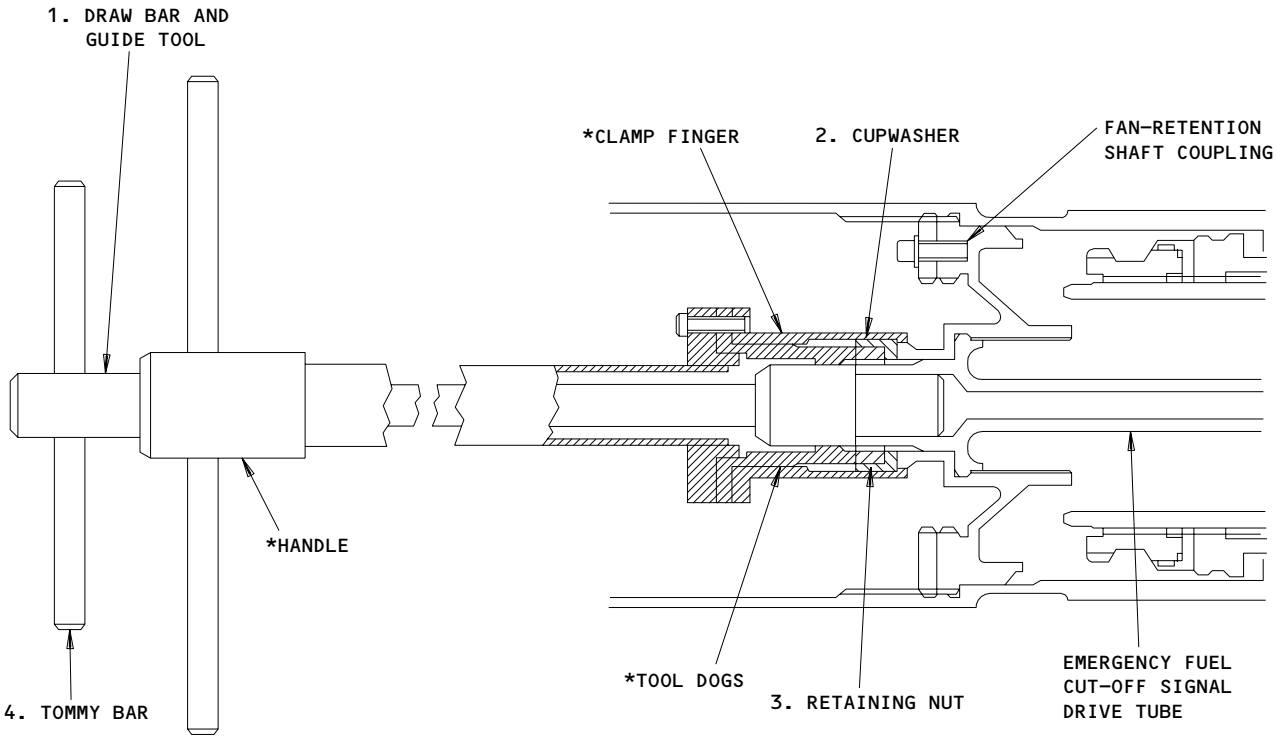
S 864-003-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 014-004-R00
(3) Remove the inlet cowl (AMM 71-11-01/401).

S 014-005-R00
(4) Remove the inlet rotating fairing (AMM 72-35-01/401).

E. Remove the LPC Disc and Blades

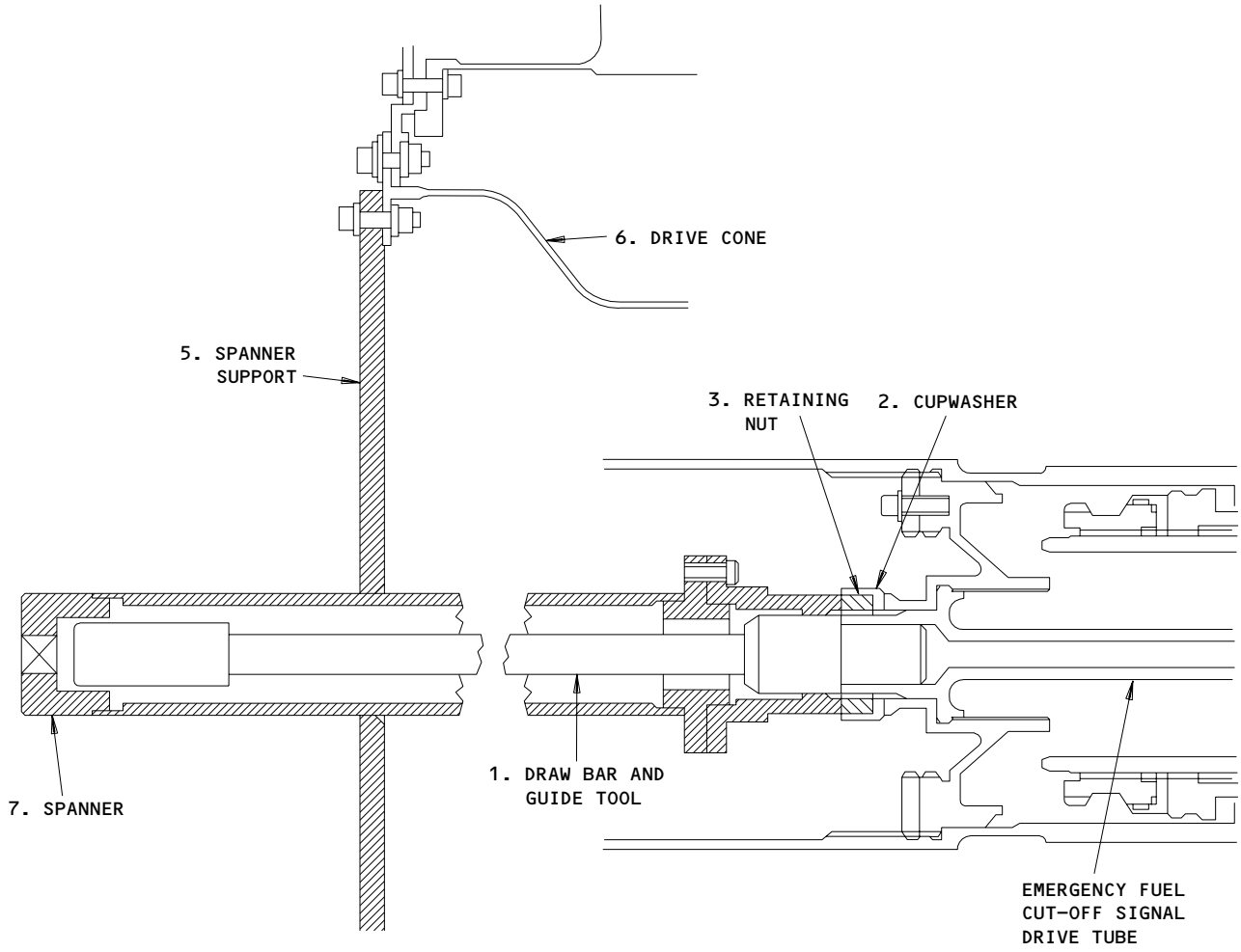
S 034-006-R00
(1) Remove the retaining nut (3) and the cupwasher (2) from the tubes (Fig. 401).
(a) Release the cupwasher (2).
(b) Install the guide tool (1) (HU28856) in the end of the tube.



* DETAILS OF DRAW BAR AND GUIDE TOOL (1)

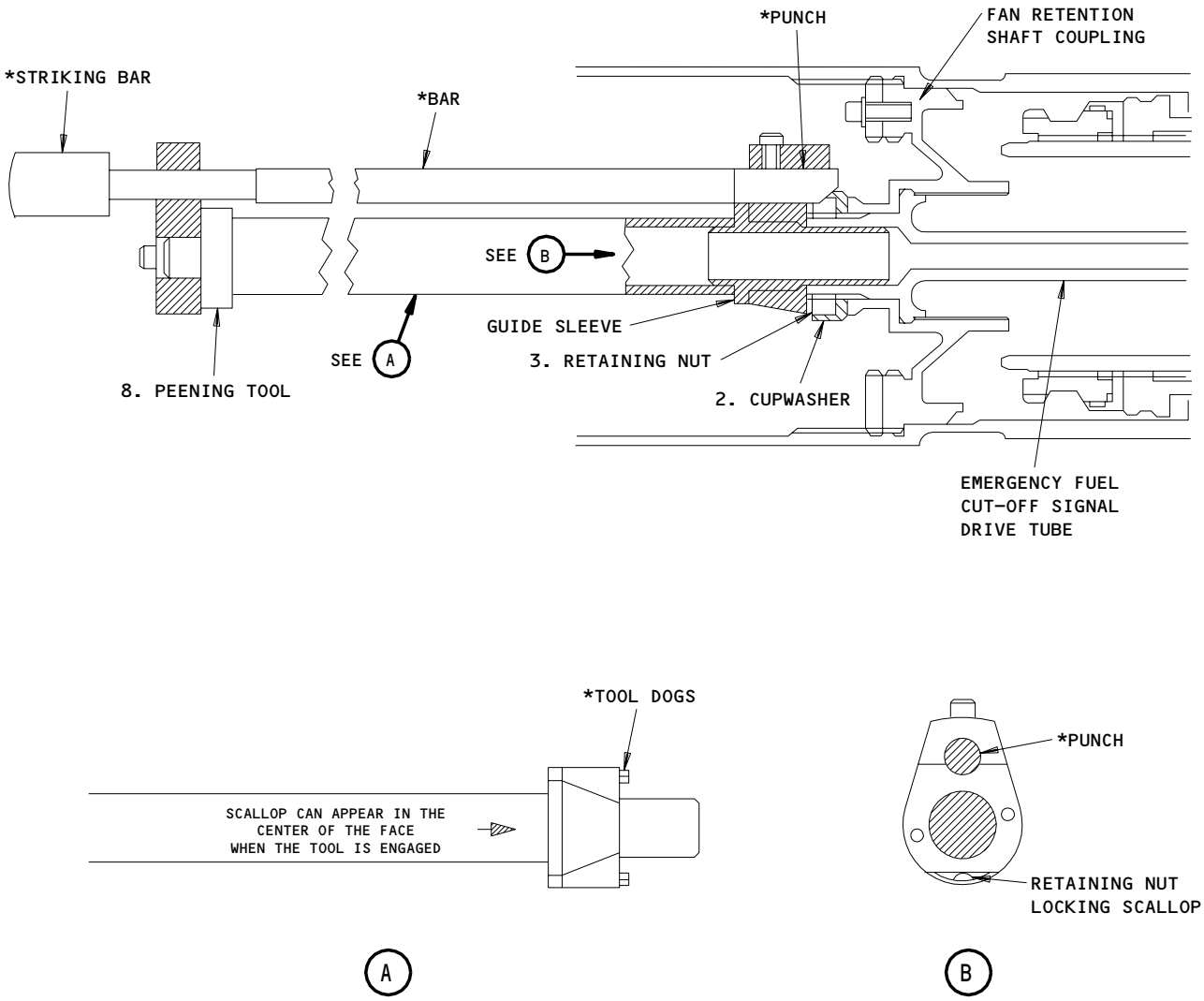
77527

Oil and Signal Tube Retaining Nut and Cupwasher – Installation
Figure 401 (Sheet 1)



77528

Oil and Signal Tube Retaining Nut and Cupwasher - Installation
Figure 401 (Sheet 2)



77529

Oil and Signal Tube Retaining Nut and Cupwasher - Installation
Figure 401 (Sheet 3)

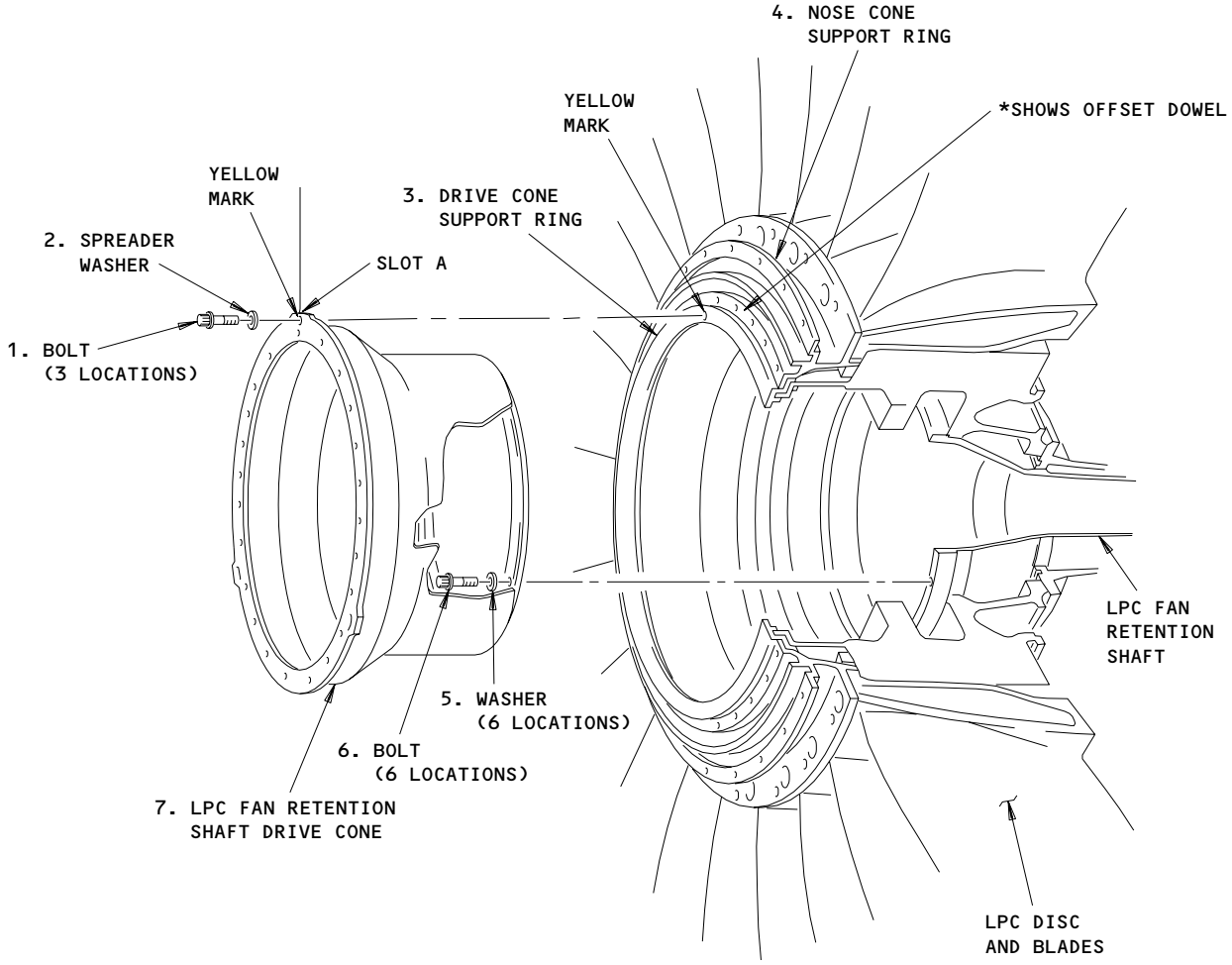
(c) Remove the tommy bar (4) (HU28857) (if they are installed) from the guide tool (1).
(d) Move the spanner (7) (HU28859) along the guide tool (1).
1) Install the tool dogs with the retaining nut (3).
(e) Use three tool bolts to attach the spanner support (5) (HU28860) to the drive cone (6) of the retention shaft on the LPC fan.
(f) Remove the retaining nut (3), the spanner support (5) and the spanner (7).
(g) Remove the draw bar along the guide tool (1).
1) Install the tommy bar (4) to the guide tool (1).
2) Install the cupwasher (2).
3) Remove all of the tools, with the cupwasher (2) and the nut (3) and discard the cupwasher (2).

S 034-007-R00

(2) Remove the drive cone (7) on the retention shaft (Fig. 402).
(a) Remove the bolts (6) and the washers (5) that attach the drive cone (7) to the retention shaft.
(b) Remove the bolts (1) and the spreader washers (2) that attach the drive cone (7) to the support ring (4) on the nose cone.
1) Remove the drive cone.

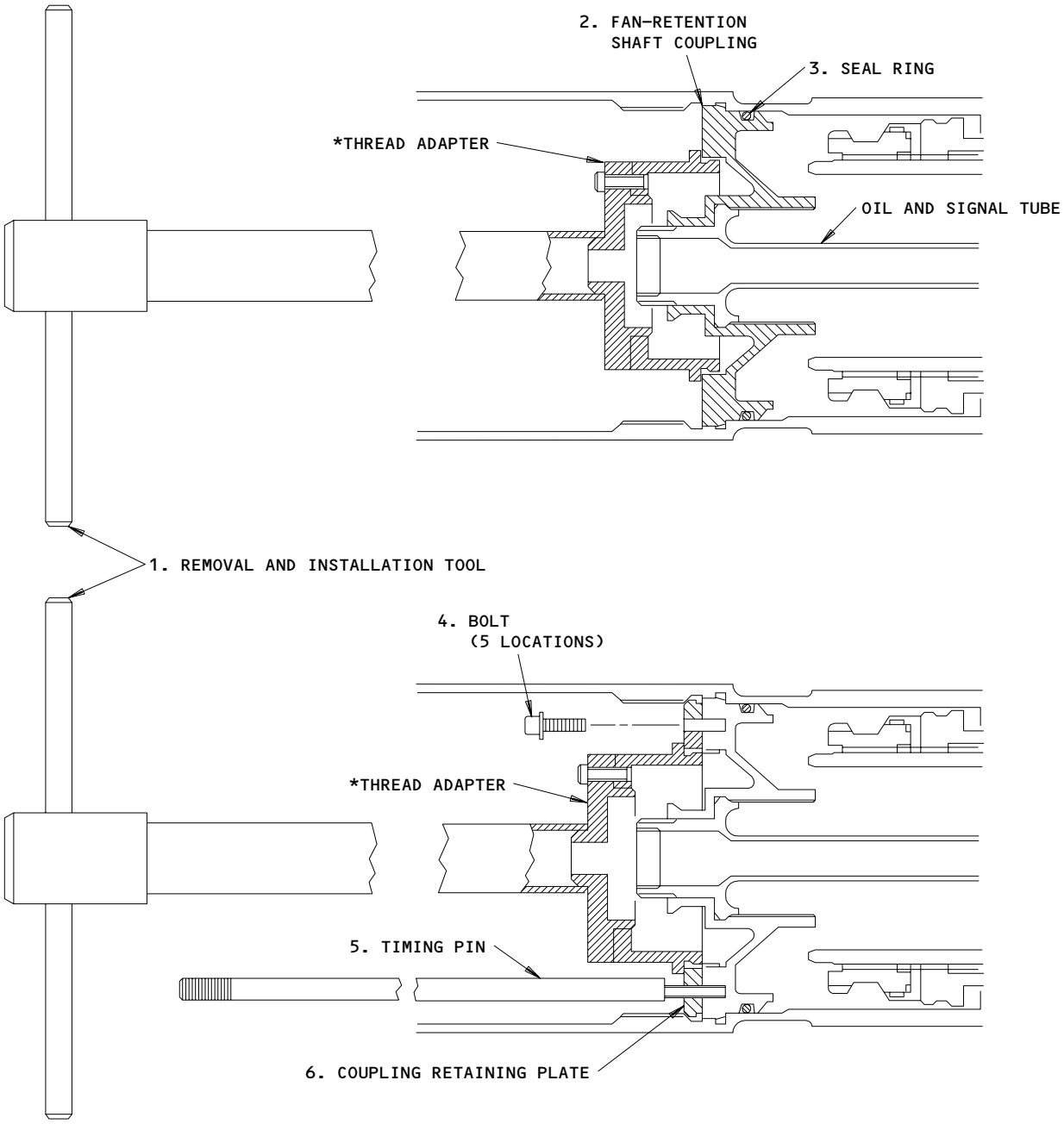
S 034-008-R00

(3) Remove the coupling (2) on the LP turbine shaft and coupling retaining plate (6) (Fig. 403).
(a) Remove the bolts (4) (5 locations) that connect the plate (6) to the coupling (2).
(b) Put the (removal and installation) tool (1) (HU28850) in the retention shaft.
1) Engage the tool (1) and the shaft with the inner surface of the coupling on the retention plate (6).
(c) Turn the plate (6).
1) ON RB 211-535E4 ENGINES WITH RR SB 72-9331;
you must align the rivet slots and splines on the plate with the rivets and splines on the retention shaft.
a) Use the timing pin (5) (HU28851), if it is necessary.
2) ON RB 211-535E4 ENGINES WITHOUT RR SB 72-9331;
you must align the splines on the plate with the splines on the retention shaft.
a) Use the timing pin (5) (HU28851), if it is necessary.
3) Remove the tools and the plate (6) through the inner surface of the retention shaft.
(d) Put the tool (1) and the pin (5) in the retention shaft.
1) You must install the tool (1) in the coupling (2).



77530

LPC Fan Retention Shaft Drive Cone – Installation
Figure 402



* DETAILS OF REMOVAL AND INSTALLATION TOOL (1)

77531

LP Turbine Shaft Coupling and Retaining Plate - Installation
Figure 403

2) Install the pin (5) in one of the five bolt holes in the coupling (2).

NOTE: The bolt holes all have threads.

3) Remove the coupling (2) through the retention shaft.

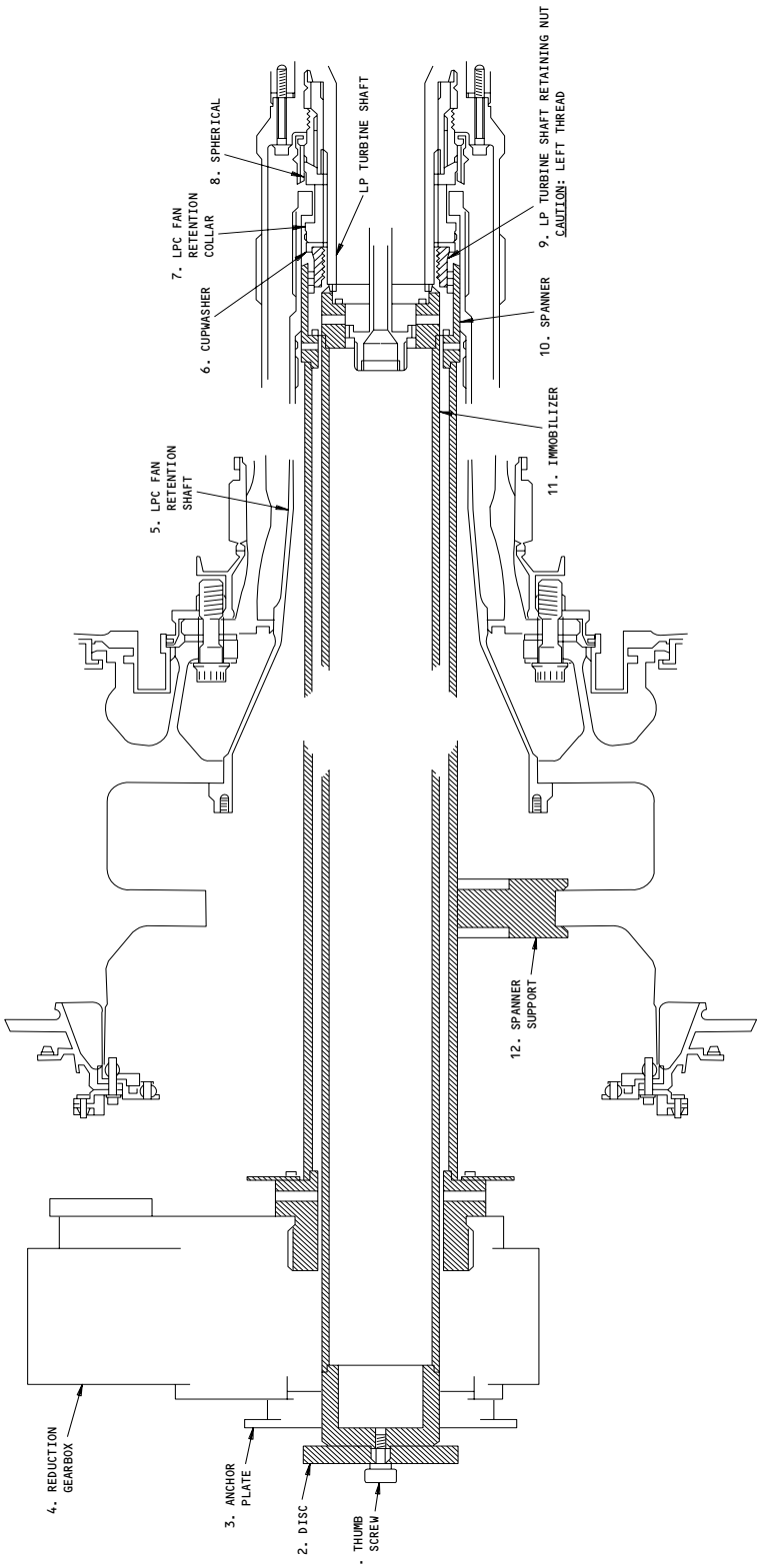
S 034-009-R00

(4) Remove the retaining nut (9) on the LP turbine shaft (5) (Fig. 404).
(a) Put the punch (E2J52529) in the retention shaft.
1) You must align the punch with the peened scallop on the retaining nut (9).
2) Hit the end of the punch to loosen the cupwasher (6) at the two positions.
(b) Put the spanner support (12) (HU28805) in the inner diaphragm of the LPC rotor disk.
(c) Put the spanner (10) (HU28801) through the retention shaft.
1) Install the tool dogs with the retaining nut (9).
(d) Put the immobilizer (11) (HU28803) through the inner surface of the spanner (10).
1) Install the tool dogs with the forward end of the LP turbine shaft.
(e) Install the reduction gearbox (4) (1704300) to the spanner (10) and the immobilizer (11).
(f) Install the anchor plate (3) (HU12763) to the reduction gearbox (4).
1) Attach the anchor plate (3) to the reduction gearbox (4).
(g) Install the disk (2) (detail of HU28803).
1) You must attach the tools (assembled) with a thumb screw (1).

CAUTION: YOU MUST TIGHTEN THE RETAINING NUT TO THE LP TURBINE SHAFT, THAT HAS A LEFT THREAD, CORRECTLY. IF YOU DO NOT TIGHTEN THE NUT CORRECTLY, DAMAGE TO THE EQUIPMENT CAN OCCUR.

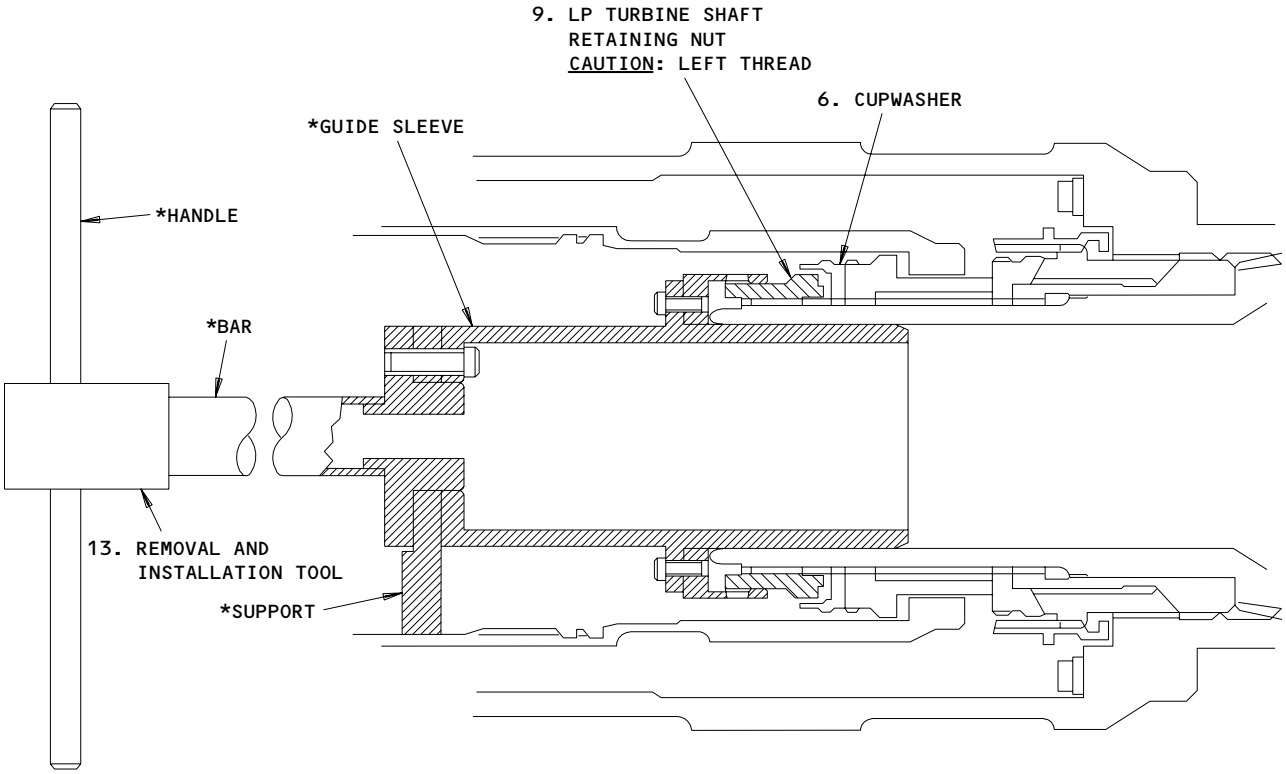
(h) Loosen the retaining nut (9) to the LP turbine shaft.
(i) Remove the tools that follow:
1) Disc (2) (detail of HU28803)
2) Anchor plate (3) (HU12763)
3) Reduction gearbox (4) (1704300)
4) Immobilizer (11) (HU28803)
5) Spanner (10) (HU28801)
6) Spanner support (12) (HU28805)
(j) Install the protection sleeve (8) (HU29584) to the forward inner diaphragm on the LPC disk (Fig. 405).

77532



LP Turbine Shaft Retaining Nut - Installation
Figure 404 (Sheet 1)

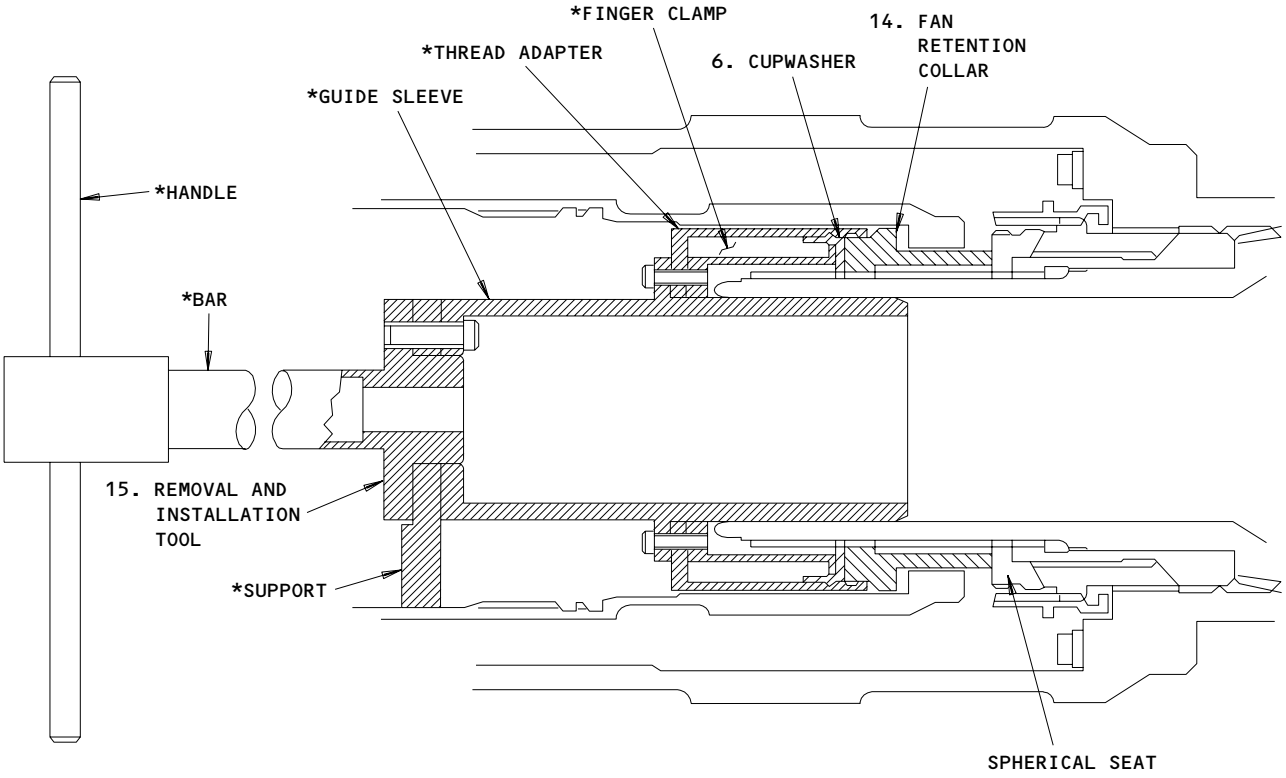
187194



* DETAILS OF REMOVAL AND INSTALLATION TOOL (13)

77533

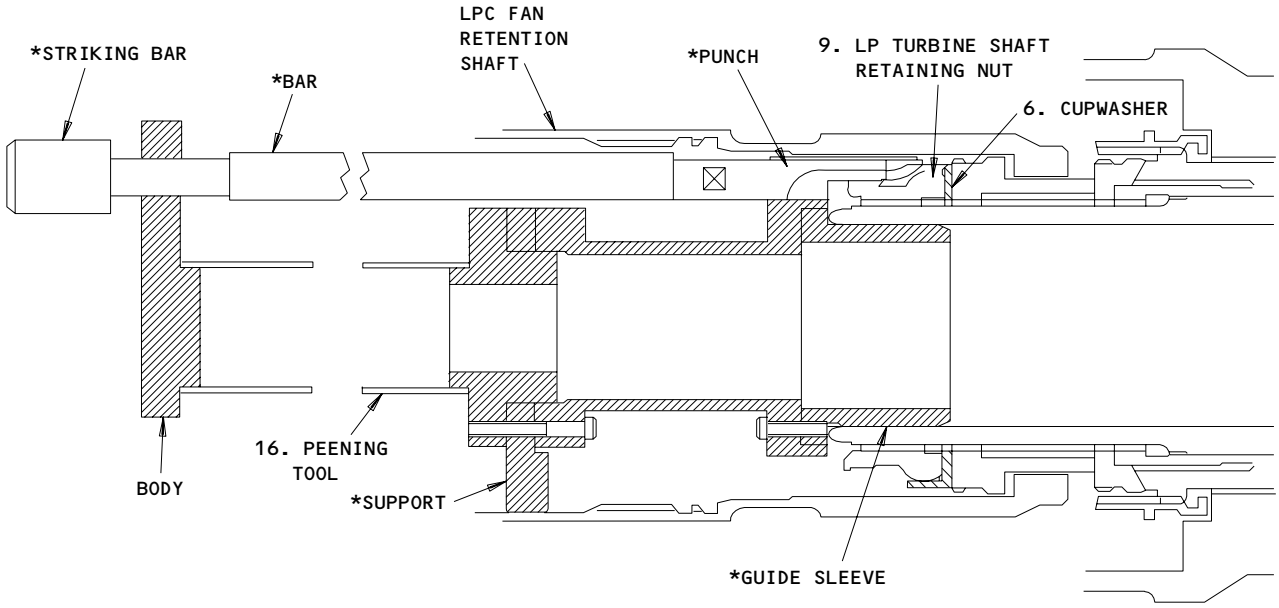
LP Turbine Shaft Retaining Nut - Installation
Figure 404 (Sheet 2)



* DETAILS OF REMOVAL AND INSTALLATION TOOL (15)

77534

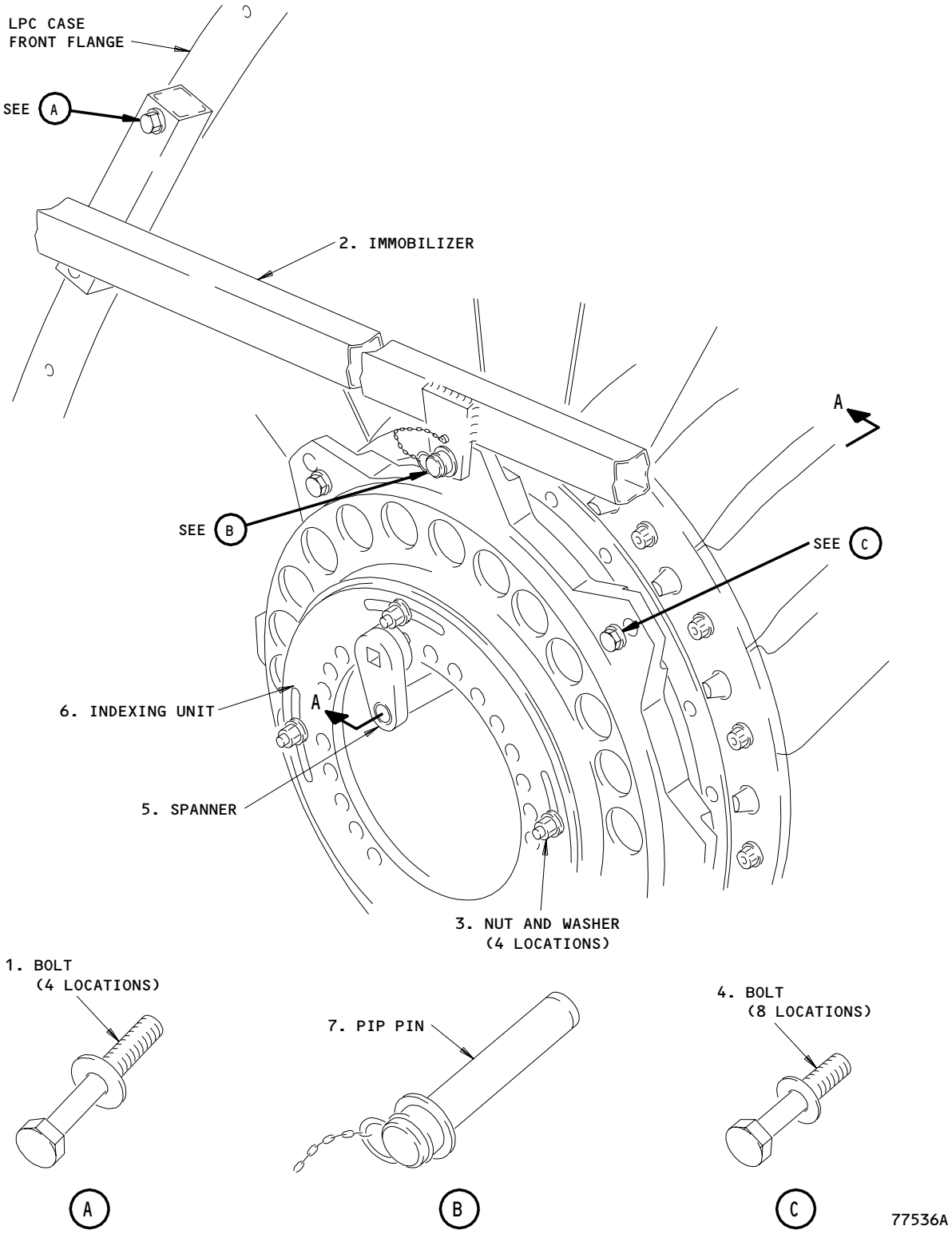
LP Turbine Shaft Retaining Nut - Installation
Figure 404 (Sheet 3)



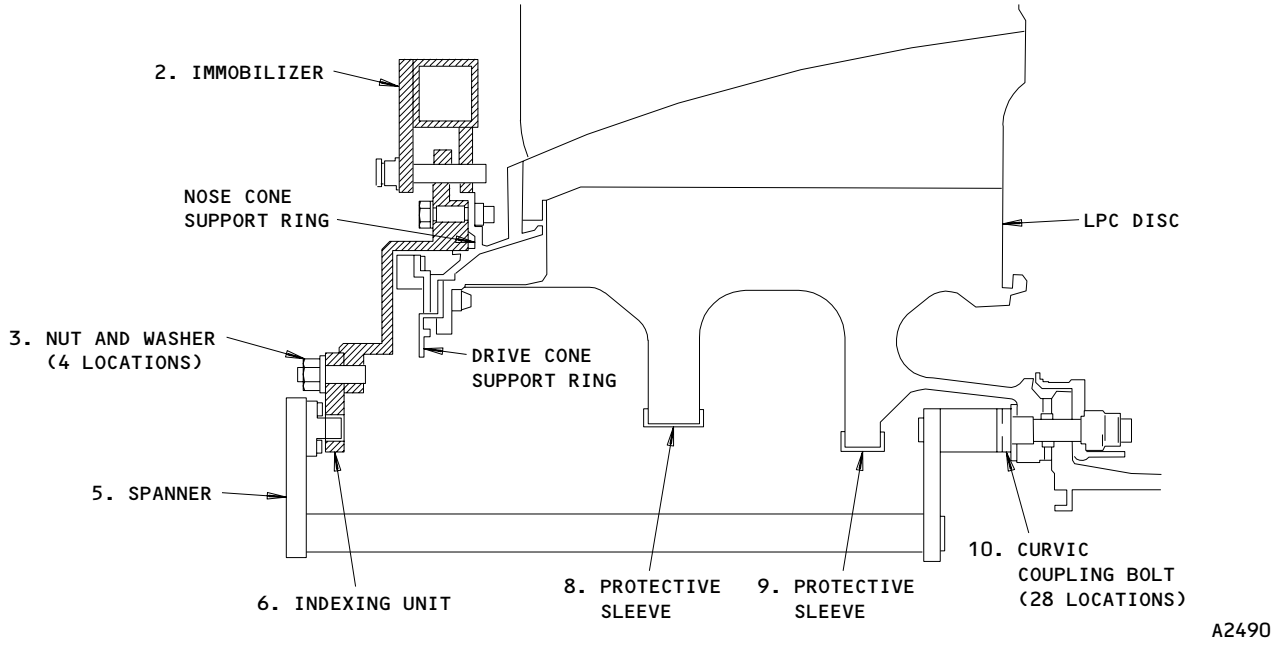
* DETAILS OF PEENING TOOL (16)

77535

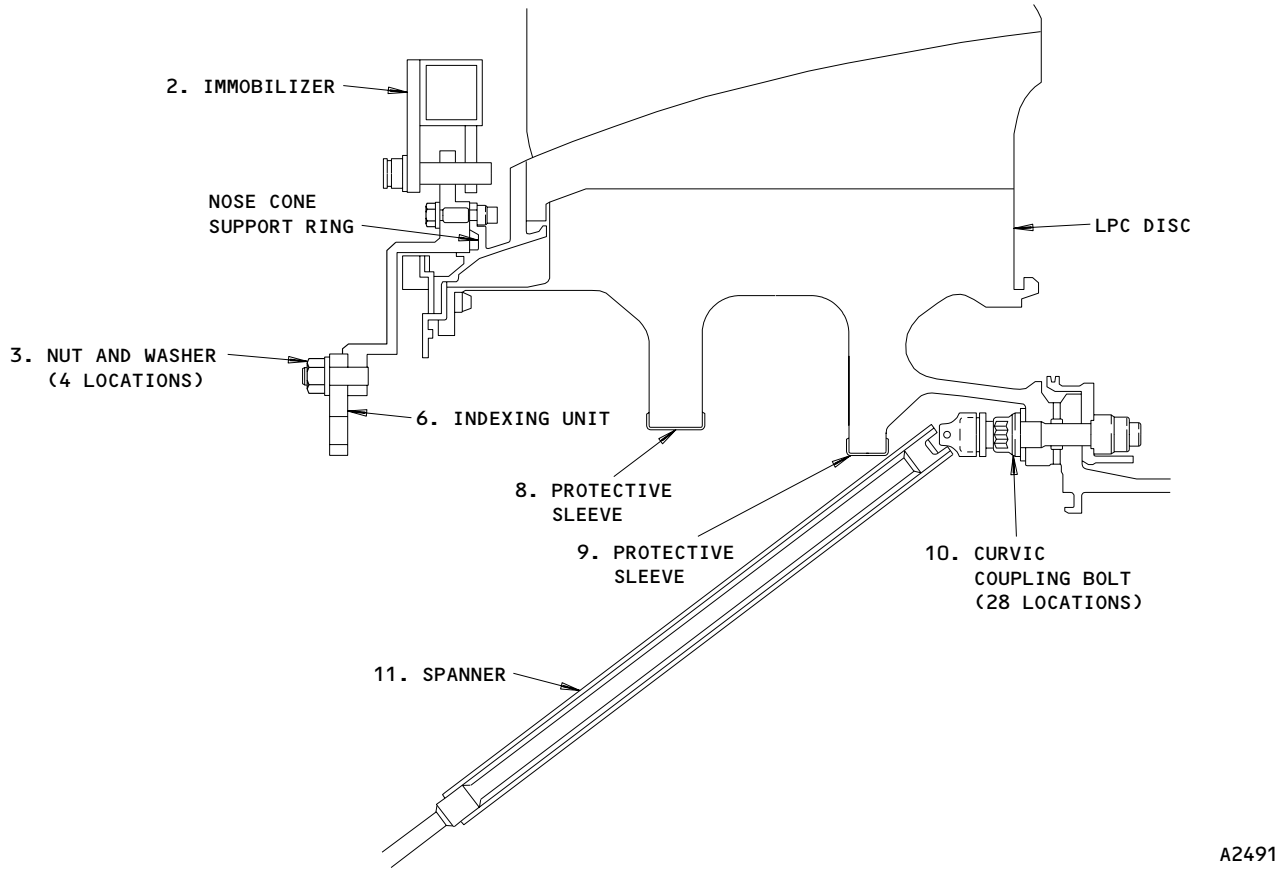
LP Turbine Shaft Retaining Nut - Installation
Figure 404 (Sheet 4)



LPC Disc Curvic Coupling Bolts - Installation
Figure 405 (Sheet 1)



A-A



LPC Disc Curvic Coupling Bolts - Installation
Figure 405 (Sheet 2)

(k) Put the (removal and installation) tool (13) (HU28849) in the retention shaft.
1) Engage the retaining nut dogs (9) on the turbine shaft to the retention shaft.
2) Remove the tool and the retaining nut.

S 034-010-R00

(5) Remove the retention collar (7), the cupwasher (6) and the retention shaft (5) (Fig. 404).
(a) Put the (removal and installation) tool (15) (HU28848) in the shaft (5).
1) Engage the tool (15) with the retention collar (14).
2) Remove the collar (14) and the cupwasher (6).
(b) Pull the shaft (5) away from the inner surface of the disk.
1) Put the shaft (5) on a surface that is correct for protection.
(c) Install the protection sleeve (9) (HU29583) to the aft inner diaphragm on the LPC disk (Fig. 405).

S 034-011-R00

(6) Remove the bolts (10) to the curvic coupling on the LPC disk (Fig. 405).
(a) Install the indexing unit (6) (HU29222) to the inner flange on the support ring for the nose cone.
1) Use the tool bolts (4) (8 locations).
(b) Install the immobilizer (2) (HU29223) to the front flange of the fan case.
1) Put the tool bolts (1) (4 locations) through the holes in the support legs on the immobilizer end.
2) You must align the unit (6) (Number 1 position at the T.D.C.) with the middle lug on the immobilizer.
3) Put the tool pip pin (7) to attach the immobilizer to the unit (6).
(c) Loosen the lock nuts (3) (4 locations) on the unit (6).
1) You must align the guide holes in the unit (6) with the bolts (10) for the curvic coupling with a spanner (5) (HU28773).
2) Tighten the nuts (3).
(d) Loosen the bolts (10) with a spanner (5).
1) Remove the spanner (5).

NOTE: Do not remove the bolts (10).

(e) Keep 4 bolts (10) that have equal spaces tight.
1) Remove all the other bolts (10) with a spanner (11) (HU31896).

(f) Hold the immobilizer.
1) Remove the bolts (1) (4 locations) and the pip pin (7).
2) Remove the immobilizer.
(g) Remove the bolts (4) (8 locations).
1) Remove the unit (6).

S 024-012-R00
(7) Move the LPC disc and blades to the turnover stand (Fig. 406).
(a) Put the pilot shaft (2) (HU28824/1) in the LPC disk to come against the front face of the LPC shaft (5).
1) Turn the locking key (1) clockwise to the LOCK position.
(b) Put the lifting adapter (3) (HU28783/2) on the support ring to the nose cone.
1) You must attach the adapter (3) to the support ring with the bolts (4) (24 locations).
(c) Lift the lifting sling (CP30427).
1) Attach the sling to the adapter (3) with the tool pins (4 locations).
2) Adjust the sling center of gravity for the disk and blades.
(d) Install the dummy shaft (CP30570) on the turnover stand (CP30400/5).
1) Put the turnover stand (CP30400/5) in the work area.
(e) Hold the weight of the disk and blades on the hoist.
1) Remove the four bolts (6) to the curvic coupling that stayed.
(f) Move the disk and blades away from the pilot shaft (2) and the engine.
(g) Install the disk and blades in the turnover stand.
1) Attach the disk and blades with the bolts (6) for the curvic coupling to the dummy shaft.
(h) Adjust the sling center of gravity for the tools only.
1) Remove the bolts (4) (24 locations) that attach the adapter (3).
2) Move the sling and adapter (3) away from the disk and blades.
(i) Lower the hoist.
1) Remove the sling and the adapter (3).

CAUTION: YOU MUST TIGHTEN THE RETAINING NUT TO THE LP TURBINE SHAFT, THAT HAS A LEFT THREAD, CORRECTLY. IF YOU DO NOT TIGHTEN THE NUT CORRECTLY, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(j) Put the restraining tool (1) (HU29289) on the LPC shaft (5) (Fig. 407).

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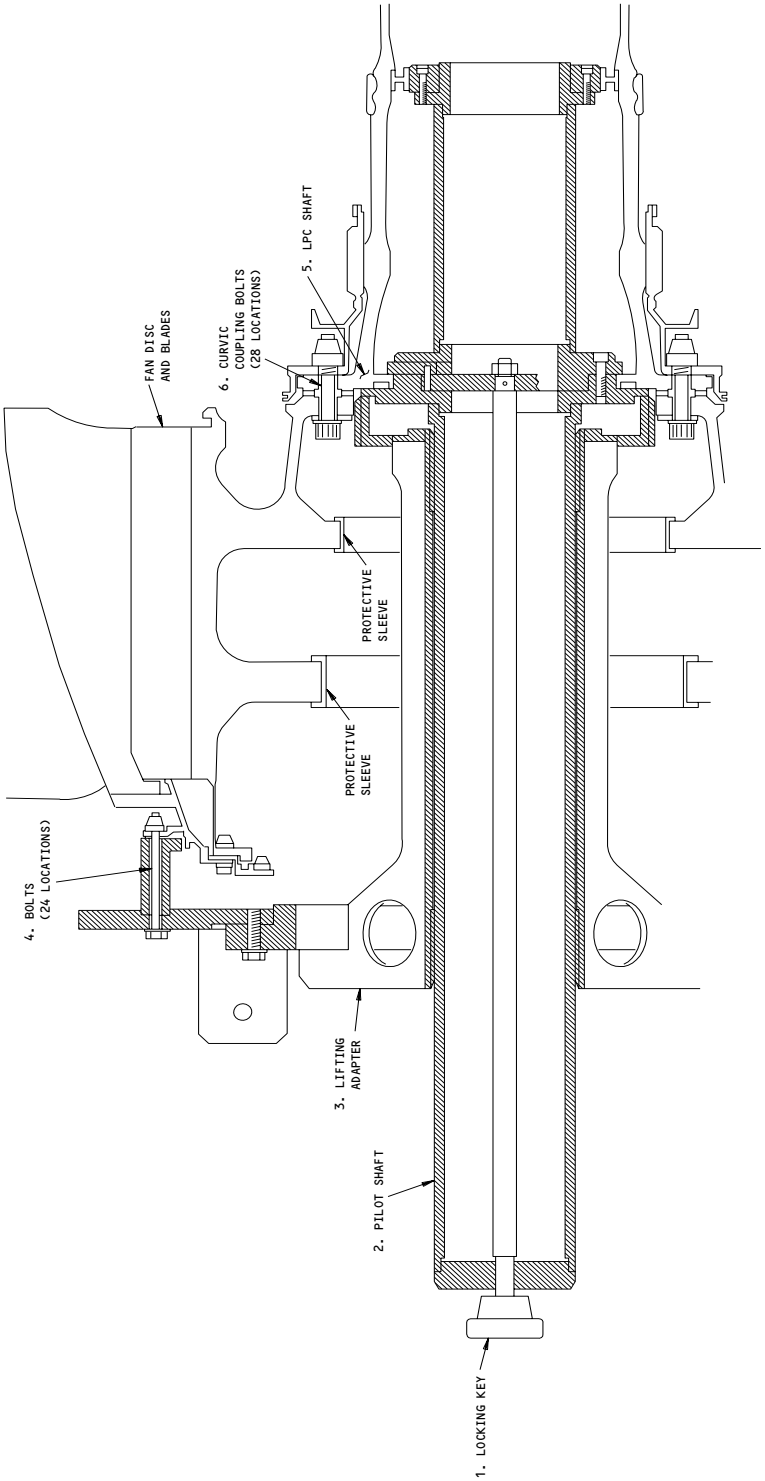

Lifting Adapter and Pilot Shaft - Installation
Figure 406

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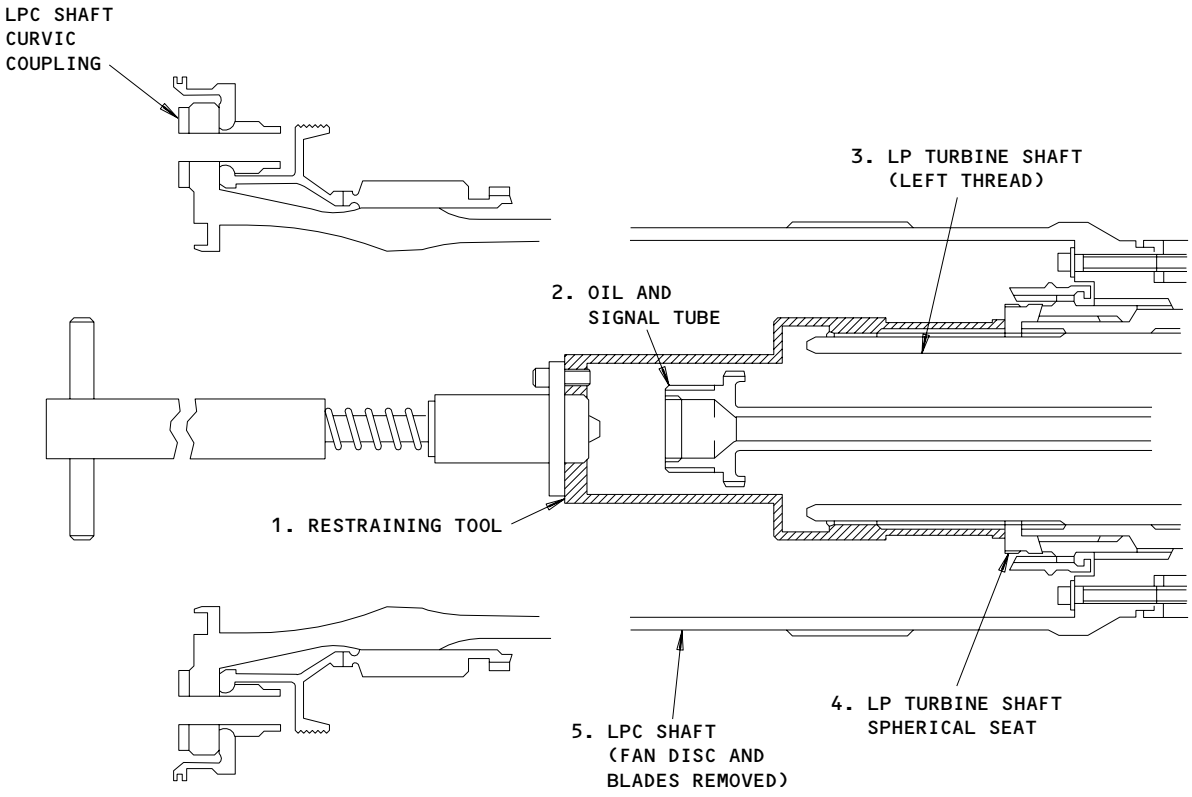


77581

LP Turbine Shaft Axial Restraining Tool – Installation
Figure 407

1) Engage the thread (3) of the LP turbine shaft and the screw tool (left thread).

NOTE: They must come against the spherical seating ring (4) on the LP turbine shaft.

2) The screw tool (left thread) must come against the spherical ring (4) of the LP turbine shaft.

(k) Examine the attrition lining (AMM 72-34-10/601).

TASK 72-31-10-404-013-R00

3. Install the LPC Disc and Blades

A. Equipment

(1) Rolls-Royce - HU28850, Removal/Installation tool
(2) Rolls-Royce - HU28856, Draw Bar/Guide tool
(3) Rolls-Royce - HU28857, Tommy bar
(4) Rolls-Royce - HU28858, Installation tool
(5) Rolls-Royce - HU28859, Spanner
(6) Rolls-Royce - HU28860, Spanner support
(7) Rolls-Royce - HU28805, Spanner support
(8) Rolls-Royce - HU28801, Spanner
(9) Rolls-Royce - HU28803, Immobilizer
(10) Rolls-Royce - 1704300, Reduction gearbox
(11) Rolls-Royce - HU12763, Anchor plate
(12) Rolls-Royce - HU29583, Protection sleeve
(13) Rolls-Royce - HU29584, Protection sleeve
(14) Rolls-Royce - HU28848, Removal/Installation tool
(15) Rolls-Royce - HU28849, Removal/Installation tool
(16) Rolls-Royce - CP30400/5, Turnover stand
(17) Rolls-Royce - HU28700/3, Peening tool
(18) Rolls-Royce - HU29222, Indexing unit
(19) Rolls-Royce - HU29223, Immobilizer
(20) Rolls-Royce - HU28824/1, Pilot shaft
(21) Rolls-Royce - HU28783/2, Lifting adapter
(22) Rolls-Royce - CP30427, Lifting sling
(23) Rolls-Royce - HU29177, Special bolt
(24) Rolls-Royce - HU29179, Adjusting wrench
(25) Rolls-Royce - HU28773, Torque spanner
(26) Rolls-Royce - HU28820/1, Peening tool
(27) Rolls-Royce - HU28851, Timing pin
(28) Rolls-Royce - E2J52529, Guide Punch
(29) Rolls-Royce - HU29289, Restraining tool
(30) Rolls-Royce - CP30570, Dummy shaft
(31) Rolls-Royce - HU31896, Spanner

B. Consumable Materials
   (1) Clean engine oil (AMM 12-13-01/301).
C. References
   (1) AMM 12-13-01/301, Engine - (Oil Replenishing)
   (2) AMM 70-51-00/201, Torque Tightening Technique
   (3) AMM 71-00-00/501, Power Plant
   (4) AMM 71-11-01/401, Inlet Cowl
   (5) AMM 72-35-01/401, Low Pressure (LP) Compressor Inlet Rotating Fairing
   (6) AMM 72-52-01/401, LP Turbine Bearing Housing End Cover
D. Access
   (1) Location Zone
       410/420 Power Plant
   (2) Access Panels
       412/422 Nose Cowl
E. Procedure

S 214-014-R00

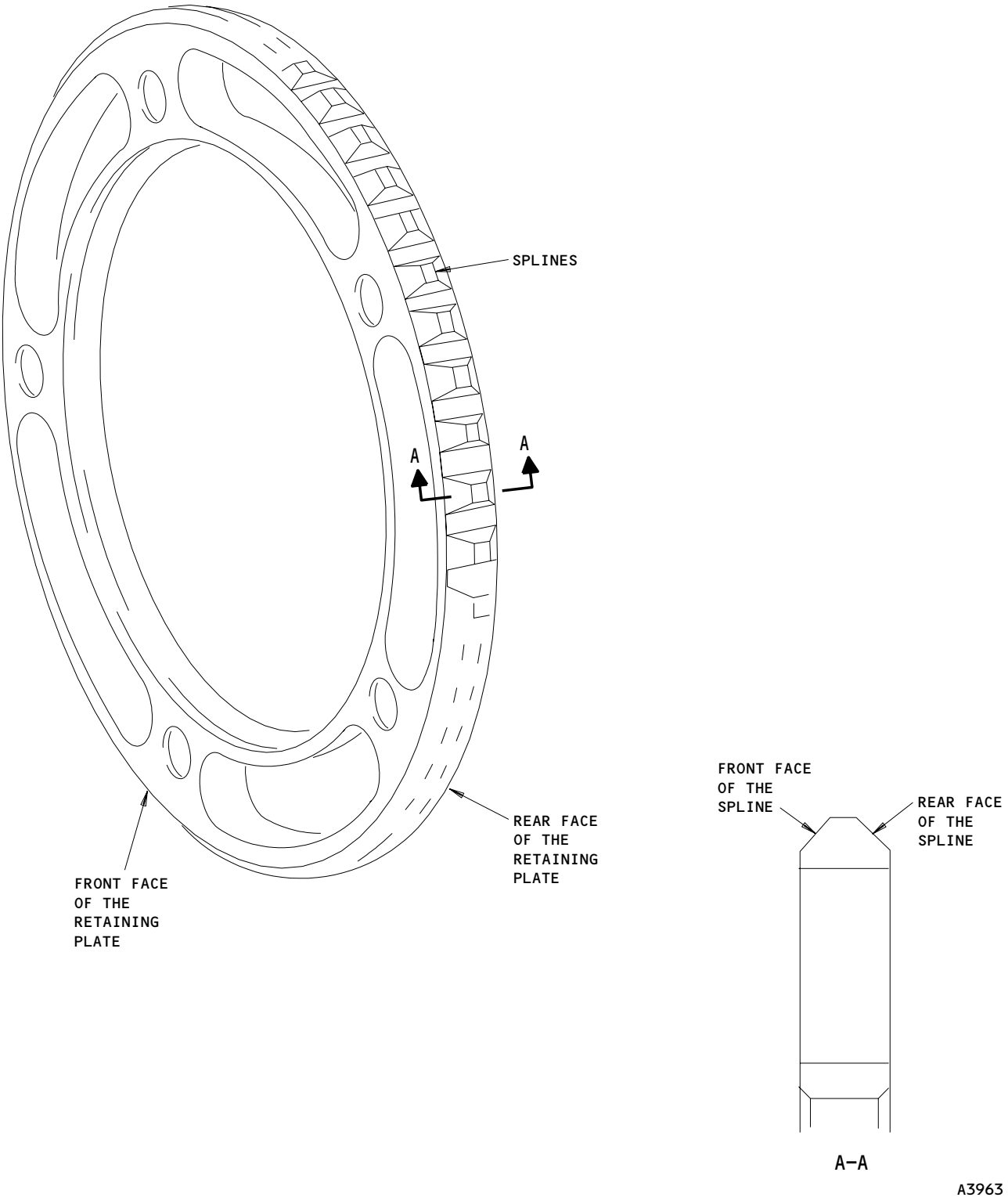
(1) Examine the retaining plate on the retention shaft coupling for the LP fan (Fig. 408).
   (a) Examine the spines on the retaining plate.
      1) Reject the spines, if the scoring is more than 0.005 inch (0.127 mm) in depth.
      2) Reject the spines, if the galling is more than 0.020 inch (0.50 mm) in depth, axially, on one of the two faces (front or rear).
      3) Reject the spines, if the galling is on the two faces (front and rear).
   (b) Examine the two faces (front and rear) on the retaining plate.
      1) Reject the retaining plate, if the galling is more than 0.005 inch (0.127 mm) in depth.

S 414-015-R00

(2) Prepare to Install the disk and blades.

CAUTION: YOU MUST TIGHTEN THE RETAINING NUT TO THE LP TURBINE SHAFT, THAT HAS A LEFT THREAD, CORRECTLY. IF YOU DO NOT TIGHTEN THE NUT CORRECTLY, DAMAGE TO THE EQUIPMENT CAN OCCUR.

   (a) Remove the restraining tool (HU29289) (Fig. 407).
   (b) Examine the faces to the curvic coupling for the disk and the shaft.
      1) Make sure the teeth are clean and not damaged.



LP Fan Retention Shaft Coupling Retaining Plate
Figure 408

CAUTION: DO NOT REMOVE THE BALANCE PLATES (IF THEY ARE INSTALLED) FROM THE OUTER (36 HOLE) BALANCE FLANGE. IF YOU DO REMOVE THE BALANCE PLATES FROM THE ENGINE, DAMAGE TO THE ENGINE CAN OCCUR.

(c) If you replace the disk and blades assembly, do the step that follows:
1) Remove the trim balance plates (if they are installed) from the balance flange (25 hole-inner) on the thrust ring.

(d) Make a mark on the inner surface of the curvic coupling on the LPC shaft at the seven positions (Fig. 409).
1) Make sure you align the teeth and bolt holes.
2) Make sure you align one of the marks at the T.D.C.
3) If it is necessary, turn the LP turbine shaft.

S 424-016-R00

(3) Move the LPC disc and blades to the engine (Fig. 406).
(a) Put the pilot shaft (2) (HU28824/1) in the LPC shaft against the front face of the shaft (5).
1) Turn the locking key (1) on the pilot shaft clockwise to the LOCK position.

(b) Install the protective sleeves (8) (HU29584) and (9) (HU29583) to the inner surface of the LPC disk, front and rear, diaphragms (Fig. 405).

(c) Install the dummy shaft to the turnover stand.
1) Put the turnover stand in the horizontal position.
2) Use the hoist, the four-legged sling and the lifting adapter (3) (HU28783/2) to lift the disk and blades from the packing case.
3) Attach the disk and blades to the dummy shaft with the bolts to the curvic coupling.
4) Remove the tools.
5) Turn the turnover stand to put the disk and blades in the vertical position.

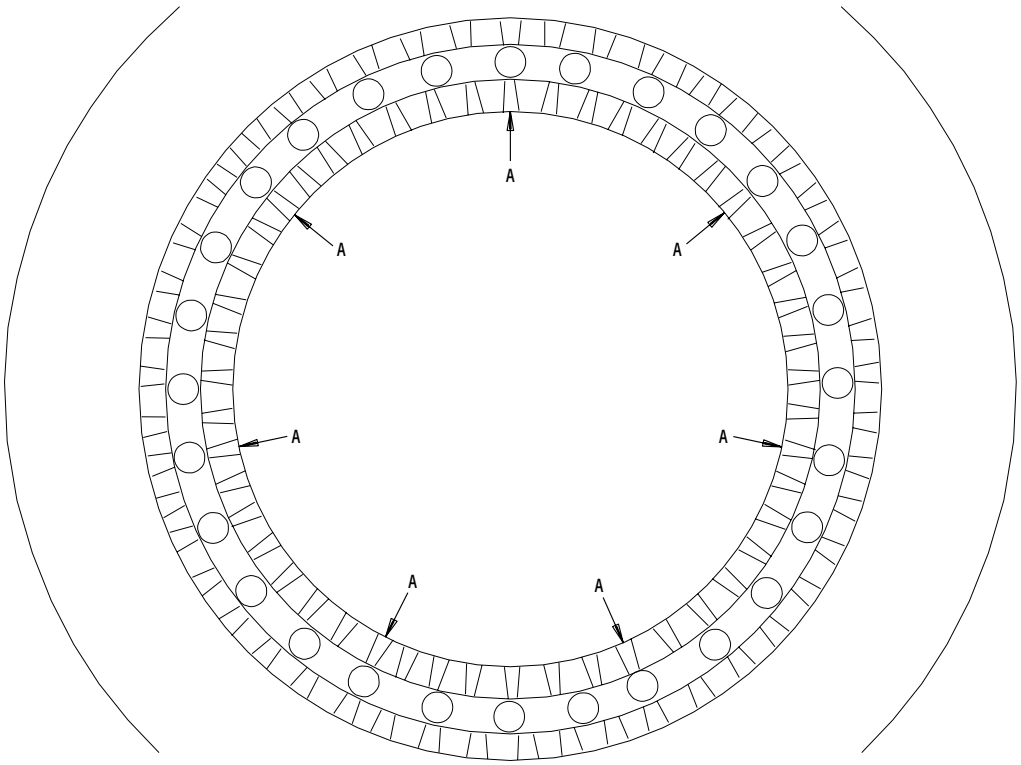
(d) Lift the sling (CP30427) on the hoist.
1) Use the 4 tool pins to attach the adapter (3) to the sling.

(e) Adjust the sling center of gravity for the lifting assembly.

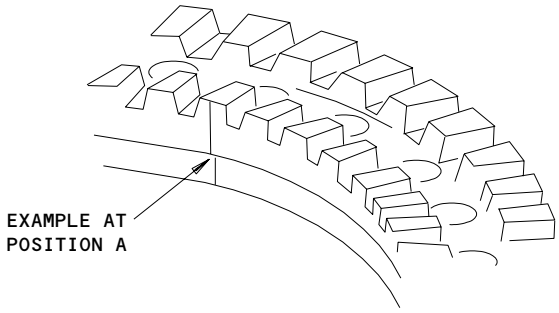
(f) Lift the sling and the adapter in the LPC disk.
1) Move the sling and the adapter in the LPC disk.

(g) Use the bolts (24 locations) to attach the adapter (3) to the support ring on the nose cone (Fig. 406).

(h) Adjust the sling center of gravity to the lifting assembly, the disk and blades and the support weight.



VIEW ON THE DISC OF THE REAR FACE



NOTE: THERE ARE 7 POSITIONS (MARKED A) ON THE CURVIC FACE OF THE SHAFT WHERE THE CURVIC TEETH AND BOLT HOLES ARE COINCIDENT, MARK THE BORE AT THESE POSITIONS.

60162

Correlate Compressor Disc - Installation
Figure 409

(i) Remove the bolts that attach the disk and blades to the dummy shaft.
   1) Move the disk and blades away from the turnover stand.
(j) With a temporary marker, make a mark on the edge of the curvic coupling at the seven positions (Fig. 409).
   1) Make sure you align the bolt holes and teeth.
(k) Put the disk and blades in the turnover stand.
   1) Attach the dummy shaft (CP30570) with the bolts (6).
(l) Adjust the sling center of gravity for the lifting assembly.
(m) Remove the bolts (4) (24 locations).
   1) Attach the adapter (HU28783/2) to the support ring on the nose cone.
   2) Move the lifting assembly away from the work area.
(n) Use a mirror, light and a temporary marker to do the steps that follow:
   1) Find the marks you made on the edge of the curvic coupling.
   2) Make the marks continue across the inner surface of the compressor disk with a temporary marker.
(o) Install the lifting adapter (HU28783/2), the sling and the hoist to the support ring on the nose cone.

   NOTE: When you lift the LPC disk, one mark will be at the T.D.C. position.

(p) Adjust the sling center of gravity for the disk and blades.
   1) Hold the weight of the lifting assembly and the disk and blades on the hoist.
(q) Remove the bolts (6) that attach the disk and blades to the dummy shaft.
(r) Move the disk and blades away from the turnover stand.
(s) Lift the disk and blades in the position above the pilot shaft (2) (HU28824/1).
   1) Move the disk and blades aft until you engage the curvic coupling halves fully.
(t) Make sure you engage the curvic coupling as follows:
   1) Put the special (plastic) bolt (HU29177) on the adjusting wrench (HU29179), with the square drive in the locked position.

2) Install the special bolt in the bolt hole to the curvic coupling.
   a) Engage the thread.

      NOTE: If the special bolt will not engage the thread, move the disk forward away from the coupling a short distance. Turn the LP shaft. Do the check of the curvic coupling until the special bolts can be satisfactorily installed.

   b) Tighten the bolt.

S 434-017-R00

(4) Install the bolts to the curvic coupling on the LPC disk (Fig. 405).
   (a) Lubricate the four bolts (10) to the curvic coupling with clean engine oil (AMM 12-13-01/301).
      1) Install the curvic coupling bolts at the four positions of equal spaces.
      2) Make sure you install the bolts to the curvic coupling tightly.
      3) Remove the special bolt.

   CAUTION: BEFORE YOU REMOVE THE SUPPORT EQUIPMENT FROM THE DISC AND BLADES, MAKE SURE THE FOUR BOLTS TO THE CURVIC COUPLING ARE TIGHT (WITH NO OPENINGS BETWEEN THE UNDERSIDE OF THE BOLT AND THE FAN DISC FLANGE). IF THERE IS AN OPENING, THE CURVIC COUPLING WILL BE INCORRECTLY ENGAGED AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

   (b) Adjust the sling center of gravity for the lifting assembly.
   (c) Remove the bolts (24 locations) that attach the adapter (3) (HU28783/2) to the support ring on the nose cone (Fig. 406).
      1) Move the sling and the adapter away from the engine.
   (d) Turn the locking key on the pilot shaft counterclockwise to the UNLOCK position.
      1) Remove the pilot shaft from the LPC.
   (e) Use a mirror and a light to examine the marks you made on the disc and compressor shaft.
      1) Make sure you align the marks.
      2) Make sure you engage the curvic coupling fully.
   (f) Lubricate the bolts to the curvic coupling that stay with a clean, approved engine oil (AMM 12-13-01/301).
   (g) Install the bolts (10) to the curvic coupling with a spanner (11) (HU31896).
   (h) Tighten the bolts to the curvic coupling, in 3 stages, as follows:

CAUTION: DO NOT USE THE SPANNER (11) (HU31896) TO TIGHTEN THE CURVIC COUPLING BOLT (10). IF YOU TIGHTEN THE BOLTS TOO MUCH, DAMAGE TO THE EQUIPMENT CAN OCCUR.

WHEN YOU ASSEMBLE THE ENGINE, YOU MUST TIGHTEN THE BOLTS ON THE HORIZONTAL CENTER LINE FIRST. WHEN YOU APPLY THE LAST TORQUE LOAD ON EACH BOLT, THE SPANNER MUST SHOW AN INCREASE IN TORQUE. IF THE TORQUE SHOWN IS CONSTANT OR DECREASES, YOU MUST REPLACE THE BOLT.

1) Attach the indexing unit (6) (HU29222) to the support ring of the nose cone with the tool bolts (4) (8 locations) (number 1 position at the T.D.C.).
2) Install the immobilizer (2) (HU29223) to the front flange of the fan case and the top lug of the unit (6).
   a) Install the four tool bolts (1) through the beam ends of the immobilizer.
   b) Install the pip pin (7) through the middle lug.
3) Loosen the locknuts (3) to the unit (6).
   a) Use the torque spanner (5) (HU28773) to align the holes to the spanner support in the unit (6) with the bolts to the curvic coupling.
   b) Tighten the locknuts (3) (4 locations).
4) Do the indexing unit (6) sequence as follows:
   a) Install the spanner (5).
   b) Tighten the bolts to the initial torque of 260 pound-inches (29.00 Newton meters).

      NOTE: Start at the number 1 position at T.D.C.

   c) Remove the spanner (5).

   WARNING: YOU MUST BE CAREFUL WHEN YOU TURN THE LP COMPRESSOR SYSTEM. INJURY TO FINGERS AND HANDS CAN OCCUR.

   d) Turn the LP compressor rotor not less than 5 times.
   e) Install the spanner (5) again.
   f) Tighten the bolts again to 260 pound-inches (29.00 Newton meters), with the spanner (5) (HU28773), until all the bolts are tight.

      NOTE: Start at the number 1 position at T.D.C.

g) Tighten the bolts to the intermediate torque of 500 pound-inches (56.0 Newton meters).

NOTE: Start at the number 1 position at T.D.C.

h) Remove the spanner (5).

WARNING: YOU MUST BE CAREFUL WHEN YOU TURN THE LP COMPRESSOR SYSTEM. INJURY TO FINGERS AND HANDS CAN OCCUR.

i) Turn the LP compressor rotor not less than 5 times.
j) Install the spanner (5) again.
k) Tighten the bolts again to 500 pound-inches (56.0 Newton meters), with the spanner (5) (HU28773), until all the bolts are tight.

NOTE: Start at the number 1 position at T.D.C.

l) Remove the spanner (5).

WARNING: YOU MUST BE CAREFUL WHEN YOU TURN THE LP COMPRESSOR SYSTEM. INJURY TO FINGERS AND HANDS CAN OCCUR.

m) Turn the LP Compressor rotor not less than 5 times.
n) Install the spanner (5) again.
o) Tighten the bolts to the final torque of 1450 pound-inches (165 Newton meters).

NOTE: Start at the number 1 position at T.D.C.

p) Remove the spanner (5).

WARNING: YOU MUST BE CAREFUL WHEN YOU TURN THE LP COMPRESSOR SYSTEM. INJURY TO YOUR FINGERS AND HANDS CAN OCCUR.

q) Turn the LP Compressor rotor not less than 5 times.
r) Install the spanner (5) again.
s) Tighten the bolts again to 1450 pound-inches (165 Newton meters), with the spanner (5) (HU28773), until all the bolts are tight.

NOTE: Start at the number 1 position at T.D.C.

5) Remove the tool bolts (1), the pip pin (7) and the immobilizer (2).
6) Remove the tool bolts (4) (8 locations) and the indexing unit (6) (HU29222).

(i) Remove the protection sleeve (9) (HU29583) from the rear diaphragm of the LPC disk.

S 434-018-R00

(5) Install the retention shaft (5), the collar (14) and the cupwasher (6) to the LPC fan (Fig. 404).

CAUTION: IF YOU USE A FAN RETENTION SHAFT FOR THE LPC WITH RR SB 72-9331, YOU MUST ALSO USE A COUPLING RETAINING PLATE WITH RR SB 72-9331. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE COMPONENTS CAN OCCUR.

(a) ON RB211-535E4 ENGINES WITH RR SB 72-9331; temporarily identify the front face of the spline that aligns with the baulking rivet on the fan retention shaft.
(b) Put the shaft (5) of the LPC fan in the compressor disk.
1) Put the aft end of the shaft (5) above the front end of the LP turbine shaft.
2) Find the front flange of the retention shaft on the aft end of the diaphragm of the LPC disk.
(c) Push the central oil and the signal tube aft to the stop.
(d) Use the (removal and installation) tool (15) (HU28848) to install the collar (14) and the new cupwasher (6) on the LP turbine shaft.
1) Push the tool (15) aft to touch the spherical seat on the turbine shaft.
2) Remove the tool from the fan retention shaft.

S 434-019-R00

(6) Install the retaining nut (9) to the LP turbine shaft (Fig. 404).

CAUTION: YOU MUST TIGHTEN THE RETAINING NUT TO THE LP TURBINE SHAFT, THAT HAS A LEFT THREAD, CORRECTLY. IF YOU DO NOT TIGHTEN THE NUT CORRECTLY, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(a) Install the retaining nut (9) to the LP turbine shaft in the tool (15) (HU28848).
1) Put the tool (15) in the shaft (5) of the LPC.
2) Engage the nut (9) on the thread of the LP turbine shaft.
3) Lightly tighten the nut (9).
4) Remove the tool (15).

(b) Remove the protective sleeve (8) (HU29584) from the front diaphragm of the LPC disk (Fig. 405).
(c) Install the spanner support (12) (HU28805).
(d) Put the spanner (10) (HU28801) through the shaft (5) of the LPC fan.
    1) Engage the retaining nut (9) for the turbine shaft.
(e) Put the immobilizer (11) (HU28803) through the spanner (10).
    1) Engage the tool dogs with the forward end of the LP turbine shaft.
(f) Install the reduction gearbox (4) (1704300) to the spanner (10).
(g) Install the anchor plate (3) (HU12763) to the reduction gearbox (4).
    1) Attach the anchor plate (3) (HU12763) to the reduction gearbox (4).
(h) Install the disk (detail of HU28803).
    1) Attach the disk with the thumb screws (1).
(i) Tighten the retaining nut (9) for the LP turbine shaft to 1,400 pound-feet (1,898 Newton meters).
    1) Make a mark on the reduction gearbox, temporarily.
(j) Loosen the retaining nut (9).
(k) Tighten the nut to 1,400 pound-feet (1,898 Newton meters).
    1) Make sure you align the temporary marks.
    2) If you do not align the marks, do the steps that follow:
        a) Remove the marks.
        b) Loosen the retaining nut (9).
(l) Do the steps that follow until the marks align:
    1) Tighten the retaining nut (9) for the LP turbine shaft to 1,400 pound-feet (1,898 Newton meters).
        a) Make a mark on the reduction gearbox, temporarily.
    2) Loosen the retaining nut (9).
(m) Remove the tools that follow:
    1) Disc (2) (detail of HU28803)
    2) Anchor plate (3) (HU12763)
    3) Reduction gearbox (4) (1704300)
    4) Immobilizer (11) (HU28803)
    5) Spanner (10) (HU28801)
    6) Spanner support (12) (HU28805)
(n) Install the sleeve (8) to the front diaphragm in the LPC disk (Fig. 405).
(o) Put the peening tool (16) (HU28820/1) in the retention shaft (5) (Fig. 404).
    1) You must align the tool (16) with the scallop on the retaining nut (9) to the LP turbine shaft.
    2) Engage in the LP turbine shaft.

(p) Hit the end of the bar (detail of the peening tool) to push the cupwasher edge in the scallop.
(q) Do not remove the tool (16) fully.
1) Turn the tool (16) through 180 degrees.
(r) Put the tool (16) (HU28820/1) in the retention shaft (Fig. 404).
1) You must align the tool (16) with the scallop on the retaining nut to the LP turbine shaft.
2) Engage in the LP turbine shaft.
3) Hit the end of the bar (detail of the peening tool) to push the cupwasher edge in the scallop.
(s) Remove the tool (16).
(t) Remove the protective sleeve (HU29584).

S 434-020-R00

(7) Install the drive cone to the retention shaft (5) for the LPC fan (Fig. 402).
(a) Put the drive cone to the shaft (5) in the LPC disk.
1) Find the rear face of the drive cone on the front face of the shaft (5) for the LPC fan.
(b) Install the bolts (6) and washers (5) (6 locations) to attach the drive cone to the shaft (5) for the LPC fan.
1) Tighten the bolts (AMM 70-51-00/201).
(c) Turn the drive cone to align slot A (between the two yellow marks) with a yellow mark on the drive cone to the support ring.
1) The right edge of the 3 slots must align opposite the bolt holes.
2) Install the bolts (1) and the spreader washers (2).
3) Do not tighten the bolts at this time.

S 434-021-R00

(8) Install the coupling and retaining plate to the retention shaft for the LP fan (Fig. 403).

CAUTION: IF YOU USE A FAN RETENTION SHAFT FOR THE LPC WITH RR SB 72-9331, YOU MUST ALSO USE A COUPLING RETAINING PLATE WITH RR SB 72-9331. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DAMAGE TO THE COMPONENTS CAN OCCUR.

(a) 1145 RB211-535E4 ENGINES WITH RR SB 72-9331;
do these steps:
1) Temporarily identify the front face of the splines on the coupling that align with the baulking rivets on the fan retention shaft (Fig. 410).

2) Temporarily identify the spline immediately to the right of the rivet slot in the retaining plate.

NOTE: The slot lets the retaining plate be installed correctly over the baulking rivets in the fan retention shaft (Fig. 410).

(b) Before you install the coupling and the retaining plate, make sure you install the mechanism for the emergency fuel cutoff correctly as follows:

NOTE: The mechanism for the emergency fuel cutoff is found on the rear of the LP turbine module.

1) Remove the end cover to the bearing housing on the LP turbine (AMM 72-52-01/401).

CAUTION: BEFORE YOU INSTALL THE COUPLING TO THE RETENTION SHAFT AND THE RETAINING PLATE, MAKE SURE YOU ASSEMBLE THE MECHANISM TO THE EMERGENCY FUEL CUTOFF IN THE STATIC BUILD POSITION ('0' DEGREE). IF YOU DO NOT ASSEMBLE THE MECHANISM CORRECTLY, THE EMERGENCY FUEL CUTOFF SYSTEM WILL NOT OPERATE.

2) Examine the mechanism for the emergency fuel cutoff (Fig. 411).
   a) Make sure the pawls are engaged in the open end of the slots on the oil and signal tube.
   b) Make sure the pawls are engaged in the open end of the slots on the sleeve to the pawl carrier.

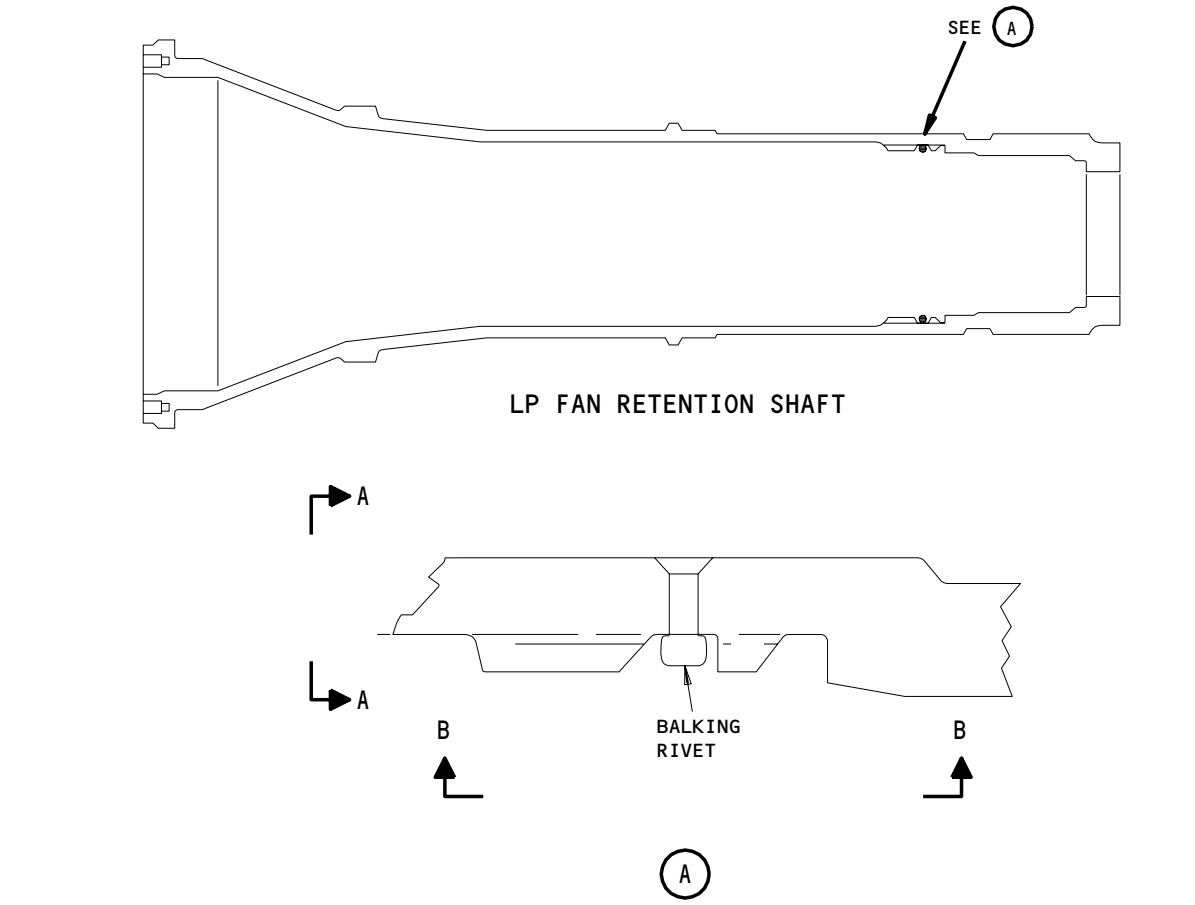
(c) Install the seal ring (3) to the coupling (2) on the fan retention shaft (Fig. 403).

S 424-022-R00

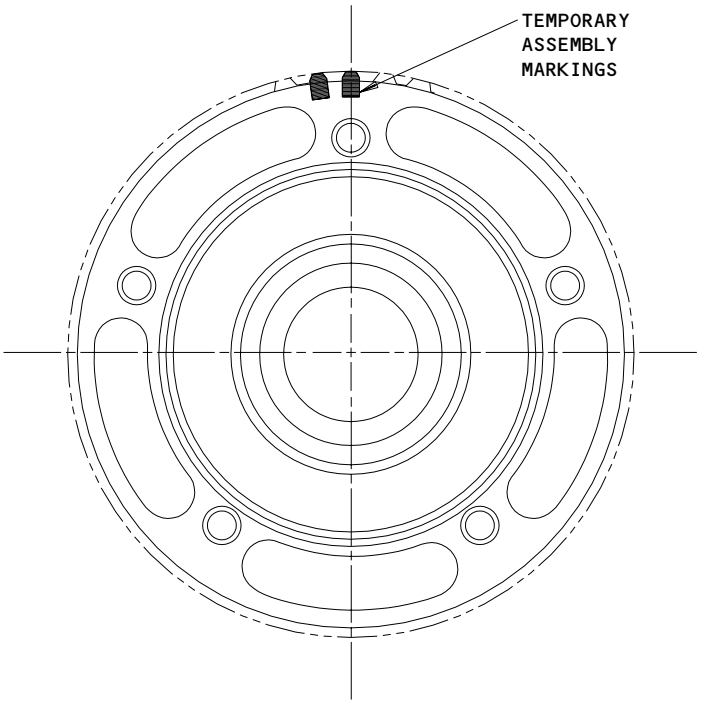
(9) ON RB211-535E4 ENGINES WITH RR SB 72-9331;
install the coupling in the fan retention shaft.

(a) Use the removal and installation tool (1) (HU28850) to put the coupling (2) in the bore of the fan retention shaft.
   1) Make sure the two temporary marks on the coupling outer splines align with the identified spline on the shaft bore (Fig. 410).

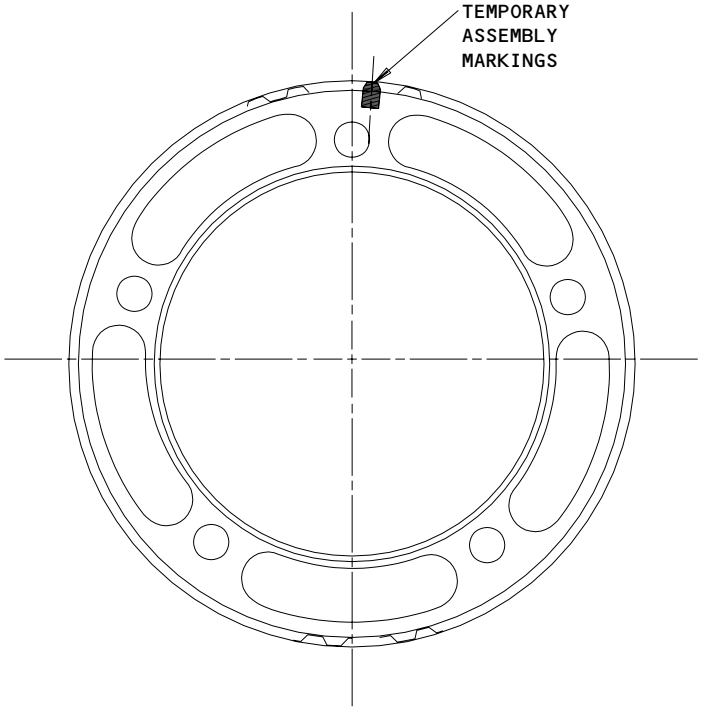
(b) Install the coupling in the correct position in the fan retention shaft.



LPC Fan Rentention Shaft - Temporary Assembly Markings
Figure 410 (Sheet 1)

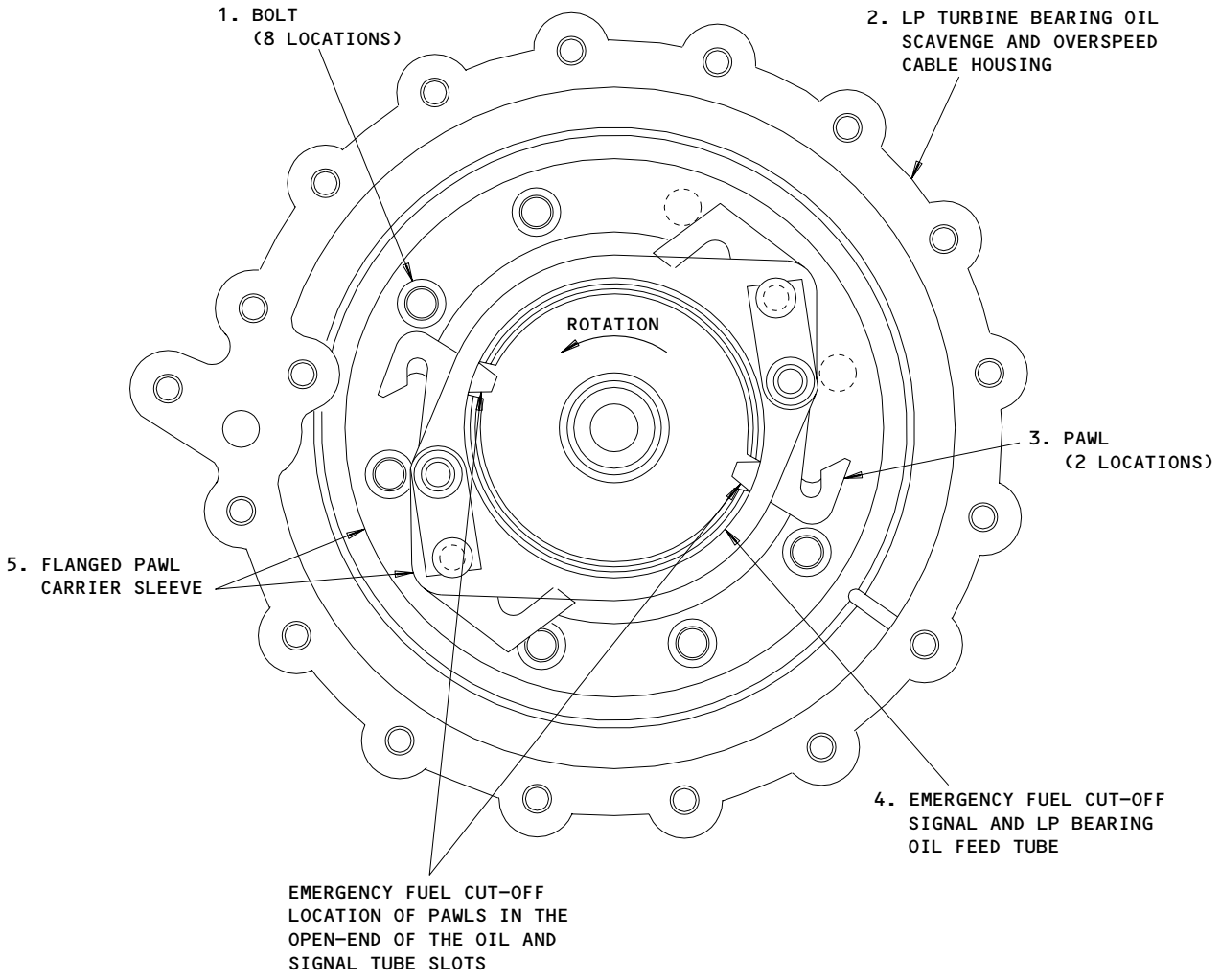


LPC FAN RETENTION SHAFT COUPLING



COUPLING RETAINING PLATE

LPC Fan Retention Shaft - Temporary Assembly Markings
Figure 410 (Sheet 2)



VIEW ON THE REAR OF THE IP AND LP TURBINE MODULE
WITH THE REAR COVER REMOVED

77538

LP Turbine Bearing Housing - Rear Cover Removed
Figure 411

CAUTION: YOU MUST IDENTIFY THE SOURCE OF THE RETENTION SHAFT BEFORE THE INSTALLATION OF THE COUPLING.

YOU MUST USE THE CORRECT ASSEMBLY PROCEDURE WHEN THE COUPLING IS INSTALLED.

(c) Use the correct assembly procedure.
  1) If the retention shaft was not initially made to RR SB 72-9331 standard but has had the modification included, use Assembly Procedure 1.
  2) If the retention shaft was initially made to RR SB 72-9331 standard, use Assembly Procedure 2.
  3) Assembly Procedure 1:
    a) Push the coupling aft to engage the splines on the oil and signal tube, then the splines in the bore of the fan retention shaft.
    b) Turn the drive cone if it is necessary to engage the splines.
    c) Push the coupling aft.
    d) Make sure the temporary spline mark is aligned correctly.
  4) Assembly Procedure 2:
    a) Push the coupling aft to engage the splines in the bore of the fan retention shaft, then the splines on the oil and signal tube.
    b) Turn the drive cone if it is necessary to engage the splines.
    c) Push the coupling fully aft.
    d) Make sure the temporary spline mark is aligned correctly.

S 424-024-R00

(10) ON RB211-535E4 ENGINES WITHOUT RR SB 72-9331; install the coupling in the fan retention shaft.
  (a) Put the coupling (2) in the bore of the fan retention shaft.
    1) Use the removal and installation tool (1) (HU28850) and timing pin (5) (HU28851) to hold the retaining plate.
    2) Engage the splines of the plate and shaft.
    3) Push the coupling fully aft.
  (b) Make sure the coupling is installed correctly.
  (c) Remove the tool (1).

S 424-025-R00

(11) ON RB211-535E4 ENGINES WITH RR SB 72-9331;
install the coupling retaining plate.

(a) Put the coupling retaining plate (6) in the bore of the fan retention shaft.
1) Use the removal and installation tool (1) (HU28850) and timing pin (5) (HU28851) to hold the retaining plate.

(b) The rivet slots and splines in the retaining plate must align with the rivets and splines in the bore of the retention shaft.
1) Make sure the identified plate spline is installed in the bore spline immediately to the right of the identified bore spline (Fig. 410).

(c) Engage the internal splines of the plate and shaft.

(d) Push the retaining plate through the splines to come against the retention shaft coupling.
1) Make sure the retaining plate is correctly installed.

S 424-027-R00

(12) ON RB211-535E4 ENGINES WITHOUT RR SB 72-9331;
install the coupling retaining plate.

(a) Put the coupling retaining plate (6) in the bore of the fan retention shaft.
1) Use the removal and installation tool (1) (HU28850) and timing pin (5) (HU28851) to hold the retaining plate.

(b) The splines in the retaining plate must align with the splines in the bore of the fan retention shaft.

(c) Engage the internal splines of the plate and shaft.

(d) Push the retaining plate through the splines to come against the retention shaft coupling.
1) Make sure the retaining plate is correctly installed.

(e) With the tool (1) and the timing pin (5) (HU28851), go into the coupling (6) to the retaining plate in the retention shaft.
1) Engage the internal splines to the coupling.
2) Push the plate through the splines to come against the coupling on the retention shaft.

(f) Turn the coupling to the retaining plate to align the bolt holes.
1) Tighten the pin (5) until the coupling engages fully.

(g) Install the bolts (4) (4 locations) to attach the retaining plate to the coupling (6).
1) Loosen the pin (5).
2) Remove the pin (5).
3) Install the fifth bolt (4).

S 434-028-R00

(13) Install the cupwasher (2) and the retaining nut (3) to the oil and signal tube (Fig. 401).
  (a) Use the draw bar and guide tool (1) (HU28856) and the tommy bar (4) (HU28857).
    1) Pull the oil and signal tube forward to engage the coupling on the fan retention shaft (Fig. 401).
  (b) Use the installation tool (HU28858) and the tool (1) together to install the new cupwasher (2) and the retaining nut (3).
  (c) Remove the installation tool.
  (d) Tighten the bolts (1) that attach the drive cone to the support ring on the drive cone (AMM 70-51-00/201) (Fig. 402).
  (e) With a spanner (7) (HU28859), put the spanner in the retention shaft.
    1) Engage the tool dogs with the retaining nut (3) to the oil and signal tube.
  (f) Move the spanner support (5) (HU28860) above the end of the spanner (7).
    1) Attach the spanner support (5) to the drive cone.
  (g) Tighten the retaining nut (3) to the oil and signal tube to 40 pound-feet (54.2 Newton meters).
  (h) Remove the spanner support (5) and the spanner (7).
  (i) Remove the tool (1).
  (j) Put the peening tool (8) (HU28700) in the fan retention shaft.
    1) Engage the dogs to the retaining nut (3).
    2) Find the guide sleeve of the tool in the oil and signal tube.
    3) Make sure the locking scallop to the retaining nut (3) is square with the bevel face of the tool (8).
  (k) Hit the end of the bar (detail of the peening tool).
    1) Push the edge of the cupwasher (2) in the scallop.
    2) Do again on the opposite scallop.
  (l) Remove the tool (8).

CAUTION: MAKE SURE YOU ASSEMBLE THE MECHANISM TO THE EMERGENCY FUEL CUTOFF IN THE STATIC BUILD POSITION ('0' DEGREE). IF YOU DO NOT ASSEMBLE THE MECHANISM CORRECTLY, THE EMERGENCY FUEL CUTOFF SYSTEM WILL NOT OPERATE.

  (m) Examine the mechanism to the emergency fuel cutoff (Fig. 411).
    1) Make sure the pawls engage in the open end of the slots on the oil and signal tube.
    2) Make sure the pawls engage in the open end of the slots on the sleeve on the pawl carrier.
    3) If they do not continue as follows:

4) Remove the retaining nut (3) and the cupwasher (2) from the tubes again (Fig. 401) and discard the cupwasher.
   a) Remove the coupling (2) to the LP turbine shaft and the retaining plate (6) again (Fig. 403).
   b) Loosen the bolts (1) that attach the drive cone (7) to the support ring (3) on the drive cone (Fig. 402).
   c) Turn the oil and signal tube until you engage the pawls correctly (Fig. 411).
   d) Install the new cupwasher (2) and the retaining nut (3) to the oil and signal tube again (Fig. 401).

F. Put the Engine to its Usual Condition

S 414-029-R00
(1) Install the end cover on the bearing housing to the LP turbine (AMM 72-52-01/401).

S 414-030-R00
(2) Install the rotating fairing to the LP compressor inlet (AMM 72-35-01/401).

S 414-031-R00
(3) Install the inlet cowl (AMM 71-11-01/401).

S 864-032-R00
(4) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D19, ENGINES START CONT LEFT

S 864-033-R00
(5) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D20, ENGINES START CONT RIGHT

S 714-034-R00
(6) Test the engine in accordance to the Power Plant Test Reference Table (AMM 71-00-00/201).

RE-LUBRICATION OF BLADE ROOTS AND DISC DOVETAILS - MAINTENANCE PRACTICES

TASK 72-31-13-642-120-R00

1. Re-lubricate Blade Root and Disc Dovetail

A. General

(1) Deterioration of the dry film lubricant in the blade root dovetail fixing causes balance shifts in the L.P. compressor. This causes the N1 vibration levels to change from flight to flight and from ground to altitude. All blades and annulus fillers should be removed and the blade roots re-lubricated when instructed in Fault Isolation - High Indicated Vibration.

(2) There are three different aerodynamic standards of rotor blade.

(3) Aerodynamic identification of the rotor blades is as follows:

(a) The initial aerodynamic standard of rotor blades post RR SB 72-8354 and RR SB 72-9132 can be identified by a white paint mark on the blade root.

(b) The changed aerodynamic standard of rotor blades post RR SB 72-8342 can be identified by a gold paint mark on the blade root.

(c) The changed aerodynamic standard of rotor blades post RR SB 72-9513 can be identified by a sea green paint mark on the blade root.

(d) The changed aerodynamic standard of rotor blades post RR SB 72-C946 can be identified by a blue triangle on the suction surface of the rotor blade.

(4) Service Bulletins referred to:

SB 70-9816: Chocking pads to the LP Compressor wide chord fan blade - Introduction of adhesive tape to bond pad.

SB 72-7735: Rotor disc front balance weight carrier jacking feature - access hole blanked or deleted.

SB 72-8154: To include an increased length wide chord rotor blade.

SB 72-8342: To include an LP Compressor rotor blade with a different aerodynamic standard and a changed cavity etch.

SB 72-8354: To add chocking pads to the LP Compressor rotor blade and disc dovetails.

SB 72-8974: No. 1 fan blade position mark added to thrust ring.

SB 72-9132: To include an LP Compressor rotor blade with the initial aerodynamic standard and a changed cavity etch.

SB 72-9177: Introduction of extended nose cone and re-profiled annulus filler.

SB 72-9513: LP Compressor wide chord fan blade with recambered aerofoil.

SB 72-C946: Introduction of improved anti-frettage coating.

B. Equipment
(1) Extractor Bolt No. 10 UNF X 1.250 - commercially available.
(2) Protective work mat - 289200, Rolls Royce, Air intake
(3) Rotor blade extractor - Rolls-Royce HU33428/1 or HU81332/1
(4) Enerpac hydraulic pump - 286106'HC'

C. References
(1) AMM 70-51-00/201, Torque Tightening Technique
(2) AMM 71-00-00/501, Power Plant
(3) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing

D. Access
(1) Location Zones
412 Left Nose Cowl
422 Right Nose Cowl

E. Consumable Materials
(1) Anti-seize compound (graphite)
SAE AMS2518
OMat No. 432 (AMM 70-30-00/201)
(2) Temporary marker (AMM 70-30-00/201)

F. Prepare to Remove the Support Ring on the Nose Cone

S 862-002-R00

(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 862-003-R00

(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

G. Remove the Support Ring on the Nose Cone (Fig. 201)

S 492-004-R00

(1) Put the work mat in the air intake.

S 012-005-R00

(2) Remove the LPC inlet rotating fairing (AMM 72-35-01/401).

S 032-006-R00

WARNING: THE SUPPORT RING ON THE NOSE CONE WEIGHS 13.2 POUNDS (6.0 KILOGRAMS). THE SUPPORT RING ON THE NOSE CONE MUST BE HELD TIGHTLY WHEN IT IS REMOVED FROM THE COMPRESSOR ASSEMBLY. INJURY TO PERSONS CAN OCCUR.

(3) Remove the bolts and washers (11) and (12) that attach the support ring on the nose cone and the ring on the weight carrier.

NOTE: You must remove the two inner and outer rings of bolts.

S 032-007-R00

(4) Remove the ring on the weight carrier (15).

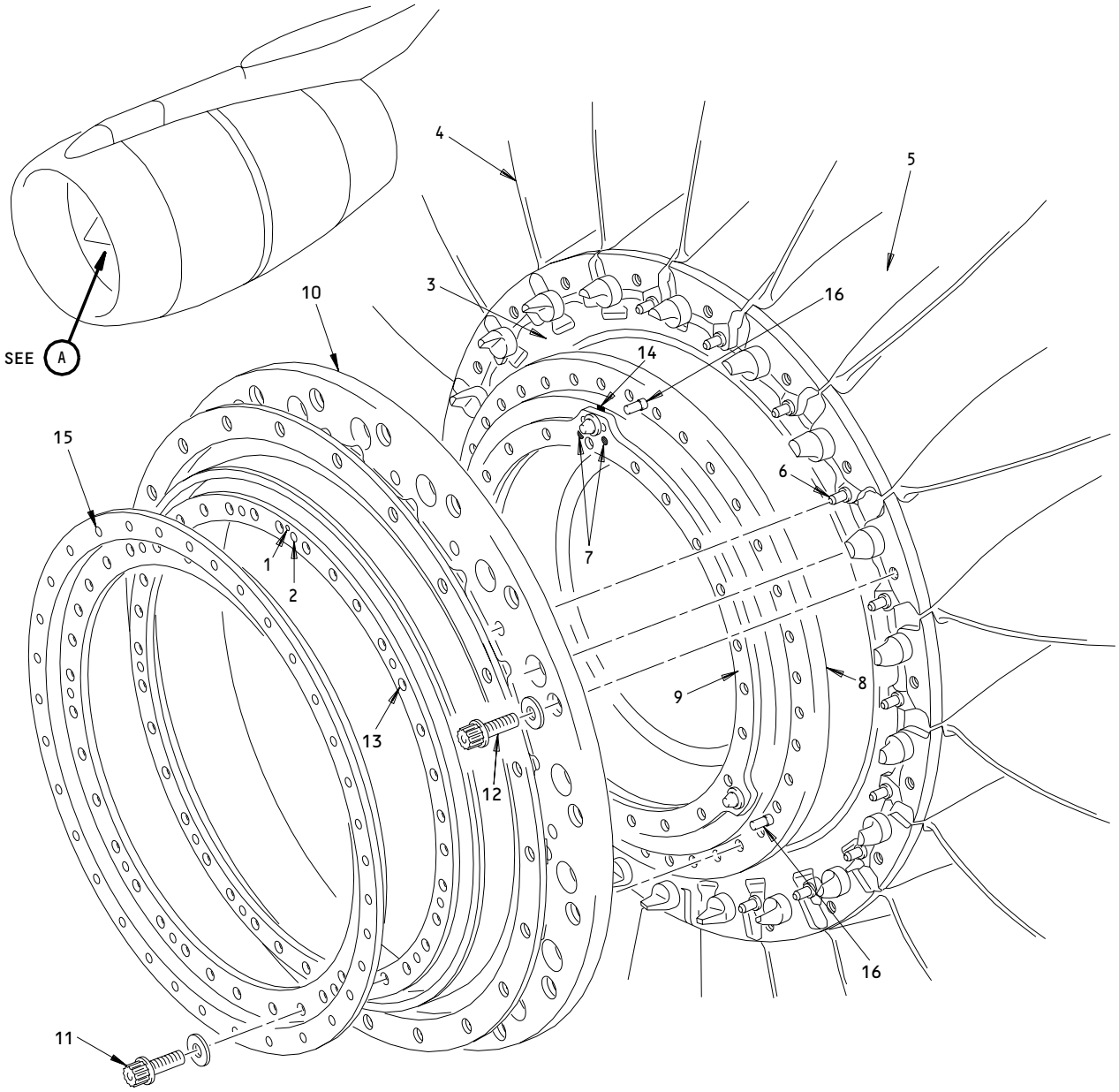
S 022-008-R00

(5) Remove the support ring on the nose cone (10).

NOTE: If it is not easy to remove the support ring on the nose cone, put the six extractor bolts in the threaded extraction holes (13). The threaded extraction holes (13) are in the inner flange to the support ring on the nose cone.

S 432-009-R00

(6) Tighten the extractor bolts diagonally in increments until you release the support ring on the nose cone.



1. OFFSET HOLE IDENT MARK
2. OFFSET DOWEL POSITION
3. ROTOR DISC
4. ROTOR BLADE
5. ANNULUS FILLER
6. HEADLESS PIN (22 LOCATIONS)
7. BALANCE ALIGNMENT MARKS
8. SUPPORT RING – DRIVE CONE
9. DRIVE CONE ASSEMBY – FRONT FACE
10. NOSE CONE SUPPORT RING
11. BOLT AND WASHER – INNER RING (36 LOCATIONS)
12. BOLT AND WASHER – OUTER RING (22 LOCATIONS)
13. EXTRACTOR HOLES – THREADED (6 LOCATIONS)
14. BALANCE ALIGNMENT MARK
15. WEIGHT CARRIER RING
16. HEADLESS PIN (3 LOCATIONS)

Nose Cone Support Ring Installation
Figure 201

S 022-010-R00

(7) Remove the support ring (10).

S 032-011-R00

(8) Remove the extractor bolts from the extractor holes (13) on the support ring.

H. Prepare to Remove the Rotor Blades

S 932-104-R00

(1) Using a temporary marker, correlate all annulus fillers and blades to the L.P. compressor disc front face by number.

S 822-118-R00

(2) Position the first blade to be removed at Top Dead Center (TDC).

S 932-016-R00

(3) Make a record of the number of rotor blades post RR SB 72-9513 you removed on a record sheet.

NOTE: This is to make sure the correct EPR trim code is used. General, part (3), gives information on how you can see the different aerodynamic standards of rotor blades.

I. Remove all the Rotor Blades

S 032-017-R00

(1) Remove the annulus fillers (5) on the two sides of blades A and B.
(a) Pull the fillers (5) forward to remove the rear retaining ring.
(b) Turn the fillers counterclockwise.

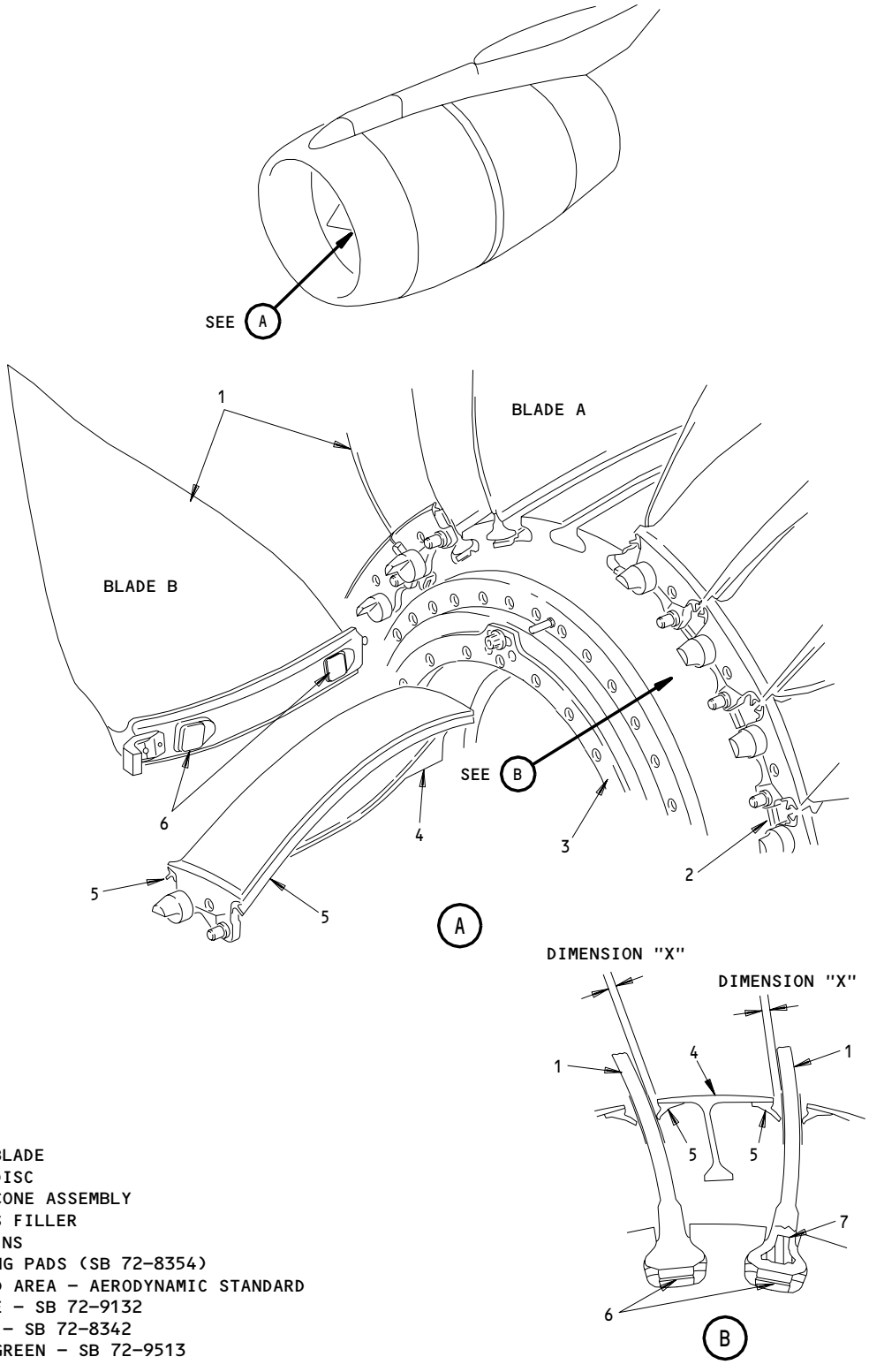
S 022-018-R00

WARNING: THE ROTOR BLADE WEIGHS 14.8 POUNDS (6.8 KILOGRAMS). THE ROTOR BLADE MUST BE HELD TIGHTLY WHEN IT IS REMOVED FROM THE ROTOR DISC. INJURY TO PERSONS CAN OCCUR.

TO PREVENT ROTATION OF THE L.P. COMPRESSOR WHEN REMOVING THE ROTOR BLADES, THE ROTOR BLADES MUST BE REMOVED IN THIS SEQUENCE. TDC FIRST, THEN BDC. UNCONTROLLED ROTATION OF THE L.P. COMPRESSOR DURING BLADE REMOVAL CAN CAUSE INJURY TO PERSONS.

(2) Use the rotor blade extractor to move blade 'A' forward approximately 1.000 inch (25.40 mm).
(a) Move the blade at an angle (radially) in the counterclockwise direction.

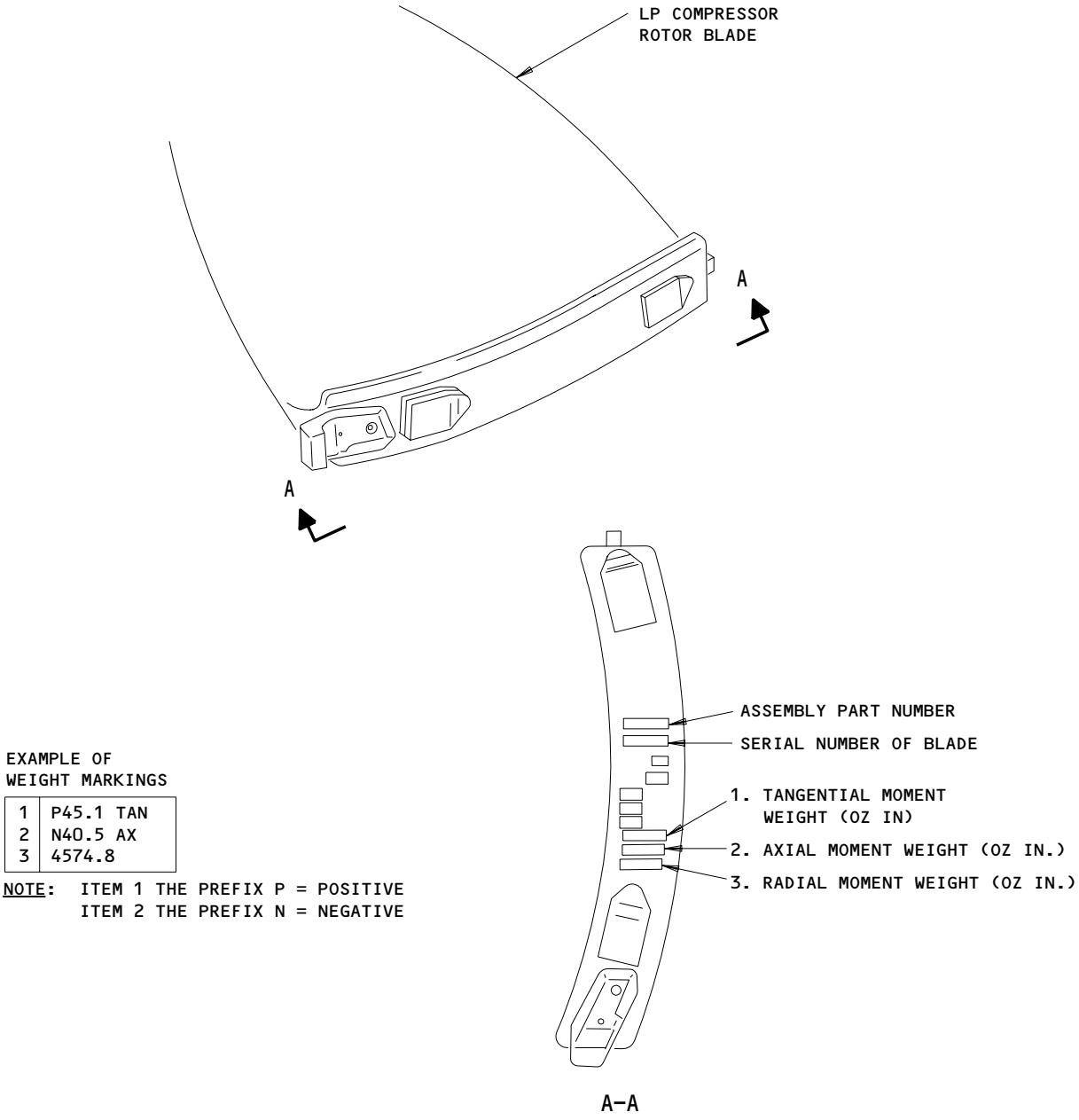
NOTE: This will permit blade 'A' to be clear of blade 'B' when it is removed.



1. ROTOR BLADE
2. ROTOR DISC
3. DRIVE CONE ASSEMBLY
4. ANNULUS FILLER
5. SEAL FINS
6. CHOCKING PADS (SB 72-8354)
7. PAINTED AREA - AERODYNAMIC STANDARD
   WHITE - SB 72-9132
   GOLD - SB 72-8342
   SEA GREEN - SB 72-9513

C2951A

LP Compressor Rotor Blade - Installation
Figure 202



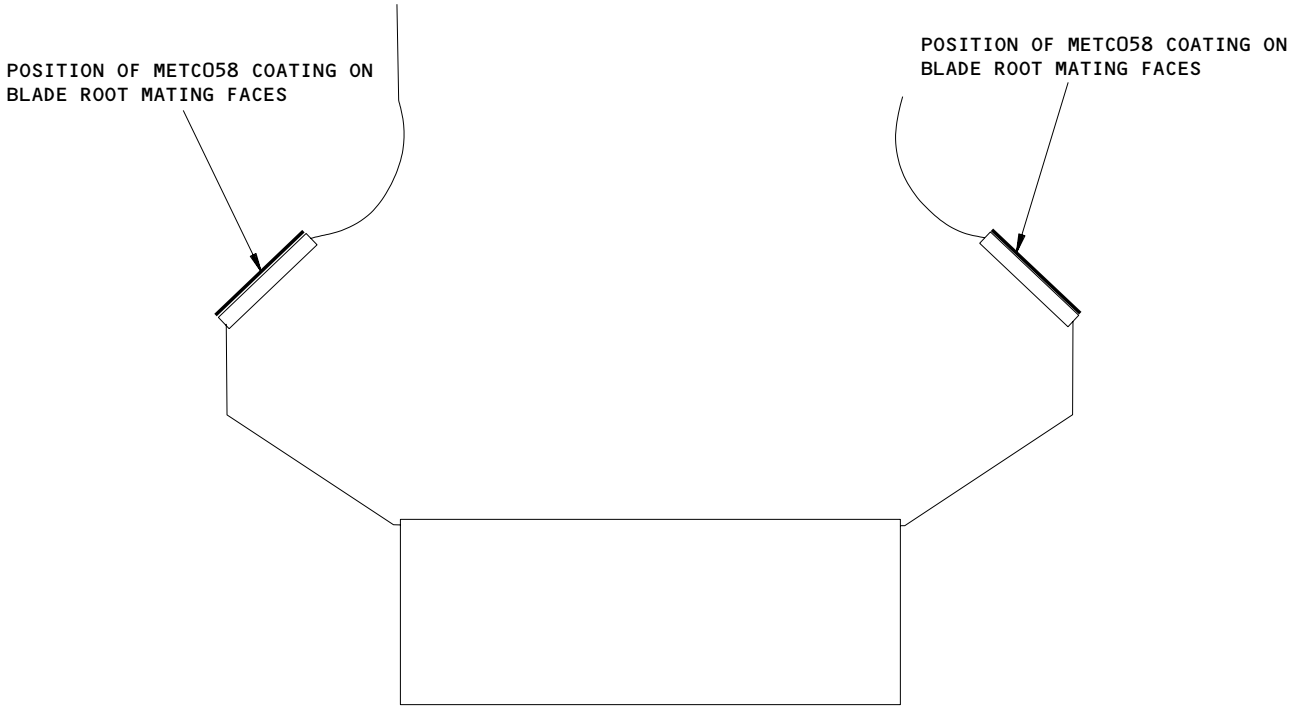
EXAMPLE OF
WEIGHT MARKINGS

1	P45.1 TAN
2	N40.5 AX
3	4574.8

NOTE: ITEM 1 THE PREFIX P = POSITIVE
ITEM 2 THE PREFIX N = NEGATIVE

A6712

Example of Blade Markings
Figure 203



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Fan Blade Root
Figure 204

S 022-020-R00
(3) Remove the blade B.

S 352-108-R00
(4) Turn the L.P. compressor until the next blade is at TDC.

S 022-109-R00
(5) Repeat the removal procedure at the TDC and BDC positions until all the rotor blades are removed.

S 972-021-R00
(6) If the blades are to be distributed for balance, record for each blade:
(a) Radial Moment Weight (oz.in.)
(b) Axial Moment Weight (oz.in.)
(c) Tangential Moment Weight (oz.in.)

NOTE: Moment weights are marked as shown in Fig. 203.

S 212-123-R00
(7) Limits for Metco58 Metal Spray anti-frettage coating condition for engines with SB 72-C946 blades:

NOTE: SB 72-C946 blades can be identified by a blue triangle chemically etched to the suction surface of the blade, adjacent to the leading edge tip The Metco58 metal spray anti-frettage coating is situated on the bedding flanks of the fan blade root (Fig. 204). It is golden in color and is only exposed where wear of the dry film lubricant occurs.

(a) Chipping:
1) Up to 5 isolated chips in the edge of the coating are permitted if each chip has a maximum of 0.06 inch (1.5 mm) in length.

(b) Loss of coating:
1) Up to 5% of the total surface area is permitted.

J. Examine the L.P. Compressor Disc and Blades

S 492-023-R00
(1) Use a stiff bristle brush to remove material from all disc dovetails. Remove the unwanted material to the front of the rotor disc.

S 492-122-R00
(2) Use a lint free cloth moistened with OMat 150 to remove all loose material from the rotor blades.

S 212-024-R00
(3) Examine the airfoil surface of the fan blade for these:
(a) If the airfoil surface of the fan blade that touches the sealing strip on the annulus filler is worn - Accept.
(b) Loss of polyurethane paint from the airfoil surface of the blade, where applicable - Accept.

S 212-025-R00
(4) Examine the rear pin on the fan blade root, where applicable:
(a) Accept the fan blade root pin if it is worn.

S 212-026-R00
(5) Make sure the two chocking pads at the root of the fan blade are there.
(a) If the chocking pads are gone - Accept (if you repair to FRS.5789).

S 212-027-R00
(6) Examine the panel segment to the rear seal on the LPC:
(a) Replace the panel segment if the frettage is more than 0.150 inch (3.81 mm) in depth.

S 212-028-R00
(7) Examine the dovetail slots on the L.P. Compressor disc for these:
(a) Frettage in the dovetail slots that touch the front tang on the fan blade - Accept.

(b) If the chocking pads are gone - Accept (if you repair to FRS.5789).

S 212-029-R00

(8) Examine the front face on the L.P. Compressor disc for this:
(a) Frettage on the front face of LPC disc adjacent to the dovetail slot that touches the front tang on the fan blade - Accept.

S 212-110-R00

(9) Examine the dry film lubricant on the blade and disc dovetail mating faces.
(a) If the lubricant is secure (not flaking), and covers more than 90 percent of the area of each mating face - Accept for installation without re-lubrication.
(b) If the lubricant is flaking, or covers less than 90 percent of the area of each mating face - Restore the dry film lubricant to FRS.5787 (blade) or FRS.5789 (disc).

K. Examine the balance weights.

S 222-121-R00

(1) If there are more than 4 balance weights on the drive cone assembly - front face (9), do the steps that follow:
(a) Use the computer programme VX45, or ask Rolls Royce to calculate a new blade installation. Give the radial, axial, and tangential weights.
(b) Identify each rotor blade with its new position number.
(c) Record the position of the balance weights and remove the drive cone assembly - front face (9), only. Do not disturb the balance weights on the weight carrier ring (15), as these are set during module build.

L. Prepare to Install the Rotor Blade (Fig. 202)

S 862-031-R00

(1) For the left engine, verify these circuit breakers are open, and a DO-NOT-CLOSE tag is attached:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 862-032-R00

(2) For the right engine, verify these circuit breakers are open, and a DO-NOT-CLOSE tag is attached:
  (a) P11-2 Overhead Circuit Breaker Panel
    1) 11D20, ENGINES START CONT RIGHT

S 492-033-R00

(3) Put the work mat in the air intake.

S 642-037-R00

CAUTION: LUBRICATE THE ROTOR BLADES BEFORE YOU INSTALL THEM. DAMAGE TO THE CHOCKING PADS (7) CAN OCCUR.

(4) Do these steps:
  (a) Apply a thin layer of OMat 432 anti-seize compound to help in the assembly of the chocking pads (7) (front and rear) on the rotor blade.
  (b) Remove the unwanted lubricant.

M. Install the Rotor Blades

S 642-119-R00

WARNING: THE ROTOR BLADES MUST BE INSTALLED IN THE SPECIFIED SEQUENCE TO PREVENT UNCONTROLLED ROTATION OF THE L.P. COMPRESSOR. THE UNCONTROLLED ROTATION OF THE L.P. COMPRESSOR CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Apply OMat No. 432 anti-seize compound to the blade root chocking pads.

S 422-114-R00

(2) Install the rotor blades and annulus fillers in their correlated positions, in the sequence that follows:
  (a) Install rotor blade No. 1 at BDC, then rotor blade No. 12 at the top.

(b) Rotate the L.P. compressor, install rotor blade No. 13 at BDC and rotor blade No. 2 at the top.
(c) Rotate the L.P. compressor, install rotor blade No. 3 at BDC and rotor blade No. 14 at the top.
(d) Rotate the L.P. compressor, continue to install the rotor blades in this sequence. In each quadrant, leave the next to last rotor blade approximately 1.00 inch (25 mm) forward, so that it is clear of the chocking pads.
(e) Move the next to last rotor blade sideways and install the final rotor blade of the quadrant. Push the rotor blades fully to the rear.

CAUTION: DO NOT INSTALL PRE-MOD SB 72-9177 ANNULUS FILLERS ON ENGINES POST-MOD SB 72-9177, THIS COULD EFFECT ENGINE OPERATION.

(f) Install each annulus filler in its correlated position.

N. Install the Support Ring on the Nose Ring

S 212-069-R00

(1) Identify the ident mark (1) on the offset dowel hole to the support ring (10) on the nose cone and the drive cone (8).
(a) Make sure the support ring (10) on the nose cone is correctly aligned with the ident marks.
(b) Put the ring (10) on the three headless pins (16) attached to the support ring on the drive cone (8).
(c) Put the ring on the headless pins (6) on the blade annulus fillers (5).

NOTE: If it is not easy to install the support ring on the nose cone, heat the ring in an oven to 302°F (150°C) before you install the ring.

S 432-070-R00

CAUTION: ENGINES PRE RR SB 72-7735;
YOU CAN INSTALL THE HEADLESS PINS IN THE CLEARANCE HOLES OF THE EXTRACTOR IN PLACE OF THE OFFSET DOWEL HOLES. IF YOU INSTALL THE PINS INCORRECTLY, ENGINE DAMAGE CAN OCCUR.

(2) Identify the offset dowel hole ident mark on the weight carrier ring (15) and the nose cone support ring (10).
(a) Make sure you correctly align the weight carrier ring (15) and nose cone support ring (10) ident marks with the balance alignment mark (14) on the support ring of the drive cone assembly.

(b) Put the ring (15) on the three headless pins (16) attached to the support ring on the drive cone (8).

S 432-071-R00

(3) Install and secure the bolts and washers (11) through the balance weight carrier ring (15) and the nose cone support ring (10) into the rotor disc (3).

S 432-072-R00

(4) Install and secure the bolts and washers (12) through the nose cone support ring (10) into the blade annulus fillers.

S 422-073-R00

(5) Tighten the bolts (11) and (12) on opposite sides in increments (AMM 70-51-00/201).

0. Put the Annulus Filler Sealing Strips in the Correct Position, Fig. 202

S 352-115-R00

(1) Do this procedure along the full chordal length at each side of each fan blade.

S 352-116-R00

(2) To do this procedure, use a strip of stiff plastic with the dimensions that follow:
(a) - Length: 3.150 to 4.724 inches (80.00 to 120.00 mm)
(b) - Width: 1.575 to 2.362 inches (40.00 to 60.00 mm)
(c) - Thickness: approximately 0.039 inch (1.00 mm)

CAUTION: MAKE SURE THAT THE PLASTIC STRIP HAS A SMOOTH SURFACE AND EDGES. IF YOU USE A ROUGH SURFACE OR EDGES, DAMAGE TO THE RUBBER SEAL CAN OCCUR.

MAKE SURE THAT YOU DO NOT BREAK THE PLASTIC STRIP AND LEAVE PIECES OF IT IN THE FAN. PIECES OF PLASTIC CAN CAUSE DAMAGE TO THE RUBBER.

(d) Push the plastic strip between the fan blade and the annulus filler at the rear of the fan.

NOTE: If this is not easy to do it can be an indication that the seal is caught.

(e) Use the plastic strip to move the seal into the correct position.

NOTE: When the seal is in the correct position you can easily move the plastic strip (from the front to the rear of the fan blade).

P. Examine the Annulus Filler Clearance

S 822-076-R00
(1) Put the No. 1 blade at the Bottom Dead Center (BDC).

S 822-077-R00
(2) Pull blade No. 1 to its most forward position.

S 222-078-R00
(3) Examine the clearance dimension 'X' between blade No. 1 and the annulus fillers (5).
(a) The minimum clearance is 0.016 in. (0.40 mm) along the length of each blade flank.

S 222-117-R00
(4) Repeat steps (1), (2) and (3) for each blade.

Q. Put the Engine to Its Usual Condition

S 432-099-R00
(1) Install the LPC rotating fairing (AMM 72-35-01/401).

S 092-100-R00
(2) Remove the work mat from the air intake.

S 862-101-R00

(3) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 862-102-R00

(4) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 712-103-R00

(5) Do a test of the engine in accordance to the Power Plant Vibration Survey (AMM 71-00-00/501).

NOTE: If serviceable blades are removed for access and subsequently installed back into their initial positions on the same engine, it is not necessary to do the vibration survey.

LP COMPRESSOR ROTOR BLADES - REMOVAL/INSTALLATION

1. General
   A. When a rotor blade to the LP compressor is damaged more than its limits and you replace the blade, do this:
      (1) You must keep the balance of the LP compressor assembly when you install it.
   B. When it is necessary to replace more than one blade, use method 1, 2 or 3 as applicable to each blade that you replace.
   C. ENGINES POST RR SB 72-8974;
      Fan blade location numbers 1, 2 or 3 are identified in yellow on the support ring to the nose cone.
      (1) The numbers are found adjacent to the leading edge of the related blade.
      (2) This lets you identify the position of the damaged blade before you disassemble the component.
   D. ENGINES PRE RR SB 72-8974;
      The fan blade location numbers 1, 2 or 3 are identified on the front face of the fan disc.
      (1) If you install the support ring of the nose cone, you cannot see the numbers.
   E. This procedure contains three methods (that relies on the radial moment of weight of the available blade you replace) that tell you the selection and fit of the blade you replace.
   F. Method 1 uses a different blade of which the radial moment of weight is less than ±5 ounce-inches of the damaged blades radial moment of weight.

      NOTE: Do not correct the balance of the blade.

   G. If you cannot find a different rotor blade to the LP compressor with the correct radial moment of weight, do this:
      (1) You must use Method 2 or 3 that rely on the radial moment of weight of the blade you replace.
   H. Method 2 uses a different (lighter or heavier) blade thru a maximum of 60 ounce-inches difference in the radial moment of weight to the damaged blade.
      (1) You correct the difference in the radial moment of weight when you install a balancing plate to the front flange of the drive cone assembly.
   I. Method 3 uses a different (lighter or heavier) blade more than 60 ounce-inches difference in the radial moment of weight to the damaged blade.

J. The radial moment of weight difference is corrected by a mixture of these:
   (1) An installed balancing plate to the front flange of the drive cone assembly.
   (2) A rotor blade you replace diagonally opposite the damaged blade with a blade of a different radial moment of weight.

K. There are three different aerodynamic standards of rotor blade.

L. Aerodynamic identification of the rotor blades is as follows:
   (1) The initial aerodynamic standard of rotor blades post RR SB 72-8354 and RR SB 72-9132 can be identified a white paint mark on the blade root.
   (2) The changed aerodynamic standard of rotor blades post RR SB 72-8342 can be identified by a gold paint mark on the blade root.
   (3) The changed aerodynamic standard of rotor blades post RR SB 72-9513 can be identified by a sea green paint mark on the blade root.
   (4) The changed aerodynamic standard of rotor blades post RR SB72-C946 can be identified by a blue triangle on the suction surface of the rotor blade.

M. SB 70-9816: Chocking pads to the LP Compressor wide chord fan blade - Introduction of adhesive tape to bond pad.
   SB 72-7735: Rotor disc front balance weight carrier jacking feature - access hole blanked or deleted.
   SB 72-8154: To include an increased length wide chord rotor blade.
   SB 72-8342: To include an LP Compressor rotor blade with a different aerodynamic standard and a changed cavity etch.
   SB 72-8354: To add chocking pads to the LP Compressor rotor blade and disc dovetails.
   SB 72-9132: To include an LP Compressor rotor blade with the initial aerodynamic standard and a changed cavity etch.
   SB 72-9177: Introduction of extended nose cone and re-profiled annulus filler.
   SB 72-9513: LP Compressor wide chord fan blade with recambered aerofoil.

   SB 72-C946: LP Compressor blades with Metco 58 coated blade roots.

TASK 72-31-13-004-001-R00

2. Remove the LPC Fan Retention Shaft Drive Cone and Support Ring on the Nose Cone.

A. Equipment
   (1) Extractor Bolt No. 10 UNF X 1.250 - commercially available.

(2) Protective work mat - 289200, Rolls Royce, Air intake

B. References
(1) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing

C. Access
(1) Location Zones
412 Left Nose Cowl
422 Right Nose Cowl

D. Prepare to Remove the LPC Fan Retention Shaft Drive Cone and Support Ring from the Nose Cone.

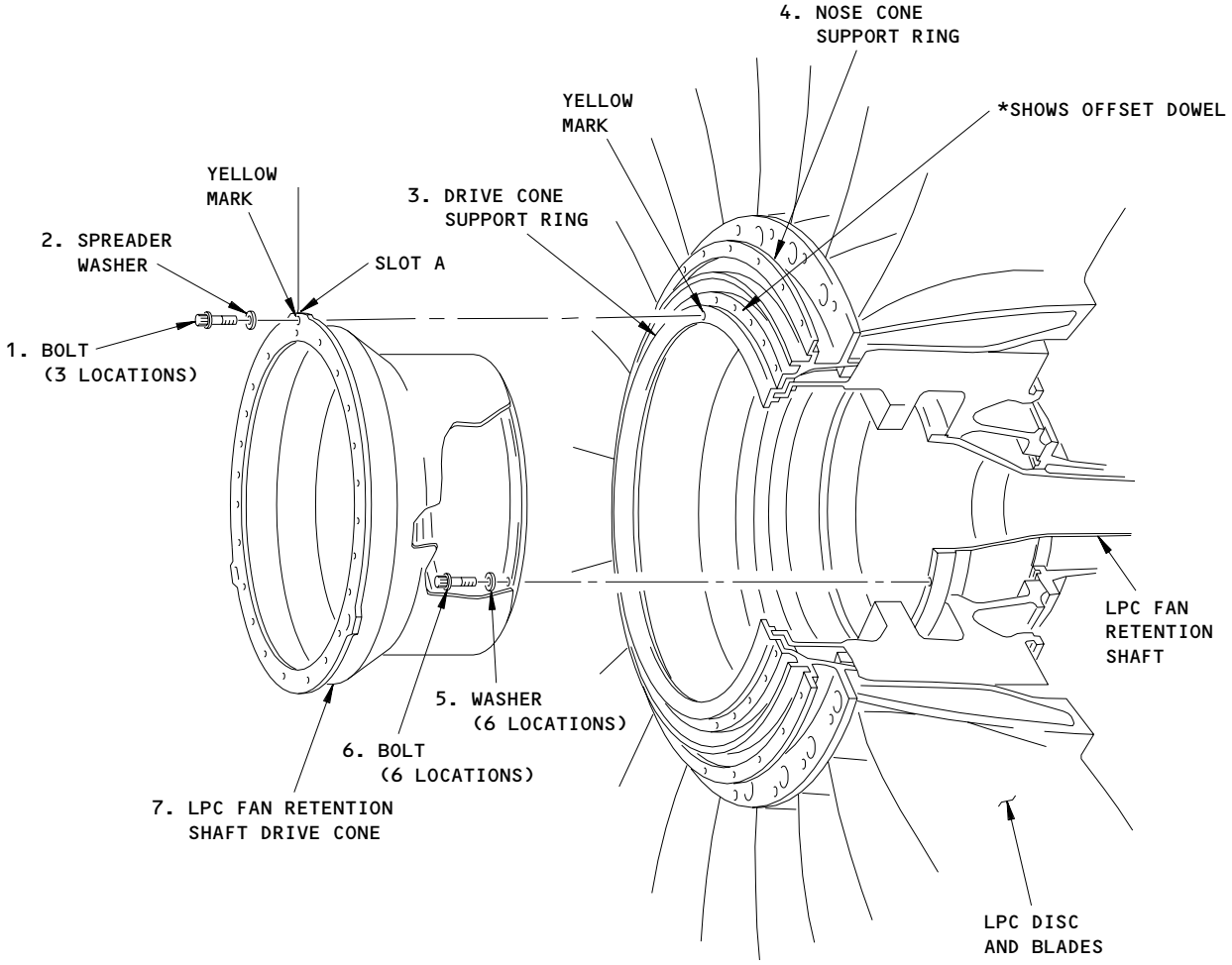
S 864-002-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 864-003-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

E. Remove the LPC Fan Retention Shaft Drive Cone (Fig. 401).

S 494-004-R00
(1) Put the work mat in the air intake.

S 014-005-R00
(2) Remove the LPC inlet rotating fairing (AMM 72-35-01/401).
(a) Remove the drive cone (7) from the retention shaft (Fig. 401).
1) Remove the bolts (6) and washers (5) that attach the drive cone (7) to the retention shaft.
2) Remove the bolts (1) and the spread washers (2) that attach the drive cone (7) to the support ring (3) on the nose cone.
a) Remove the drive cone (7).



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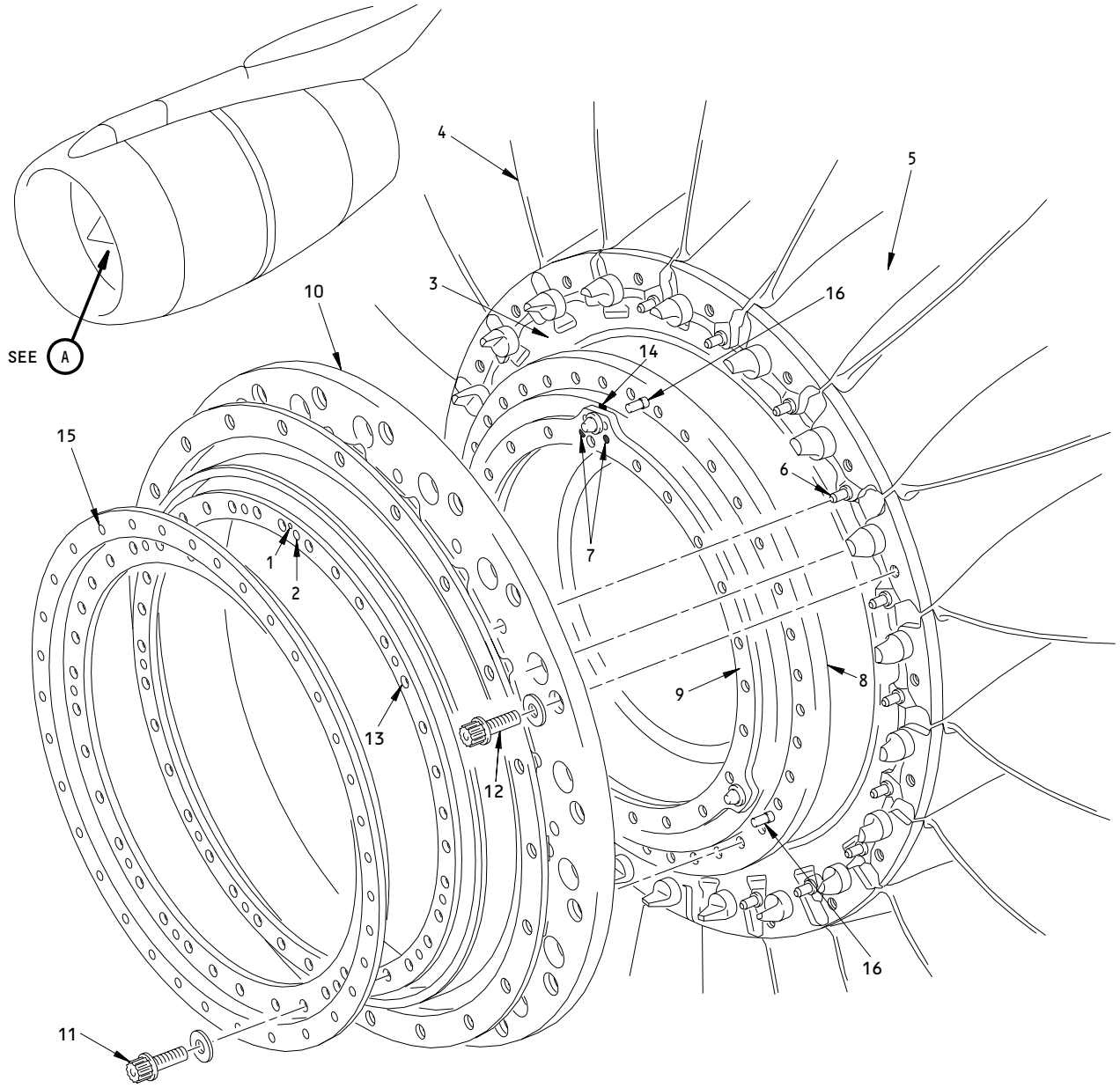
LPC Fan Retention Shaft Drive Cone Installation
Figure 401



1. OFFSET HOLE IDENT MARK
2. OFFSET DOWEL POSITION
3. ROTOR DISC
4. ROTOR BLADE
5. ANNULUS FILLER
6. HEADLESS PIN (22 LOCATIONS)
7. BALANCE ALIGNMENT MARKS
8. SUPPORT RING – DRIVE CONE
9. DRIVE CONE ASSEMBY – FRONT FACE
10. NOSE CONE SUPPORT RING
11. BOLT AND WASHER – INNER RING (36 LOCATIONS)
12. BOLT AND WASHER – OUTER RING (22 LOCATIONS)
13. EXTRACTOR HOLES – THREADED (6 LOCATIONS)
14. BALANCE ALIGNMENT MARK
15. WEIGHT CARRIER RING
16. HEADLESS PIN (3 LOCATIONS)

A

65418D

Nose Cone Support Ring Installation
Figure 401A

F. Remove the Support Ring from the nose cone (Fig. 401A).

S 034-006-R00

WARNING: THE SUPPORT RING ON THE NOSE CONE WEIGHS 13.2 POUNDS (6.0 KILOGRAMS). THE SUPPORT RING ON THE NOSE CONE MUST BE HELD TIGHTLY WHEN IT IS REMOVED FROM THE COMPRESSOR ASSEMBLY. INJURY TO PERSONS CAN OCCUR.

(1) Remove the bolts and washers (11) and (12) that attach the support ring on the nose cone and the ring on the weight carrier.

NOTE: You must remove the two inner and outer rings of bolts.

S 034-007-R00

(2) Remove the ring on the weight carrier (15).

S 024-008-R00

(3) Remove the support ring on the nose cone (10).

NOTE: If you have problems when you remove the support ring on the nose cone, put the six extractor bolts (17) in the threaded extraction holes (13). The threaded extraction holes (13) are in the inner flange to the support ring on the nose cone.

S 434-009-R00

(4) Tighten the extractor bolts diagonally in increments until you release the support ring on the nose cone.

S 024-010-R00

(5) Remove the support ring (10).

S 034-011-R00

(6) Remove the extractor bolts (17) from the extractor holes (13) on the support ring.

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-004-012-R00

3. Remove the Rotor Blade

A. Equipment

(1) Protective work mat - 289200, Rolls Royce, Air intake
(2) Rotor blade extractor - HU33428/1, Rolls Royce
(3) Enerpac hydraulic pump 286106 'HC'

B. Consumable Materials

(1) Temporary Marker

C. References

(1) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing

D. Access

(1) Location Zones

412 Left Nose Cowl
422 Right Nose Cowl

E. Prepare to Remove the Rotor Blade (Fig. 402 and 403)

S 494-013-R00

(1) Put the work mat in the air intake.

S 934-014-R00

(2) Make a mark (with a temporary marker) on the annulus fillers and blades (by the numbers) you removed from the front face of the compressor disc, until they agree.

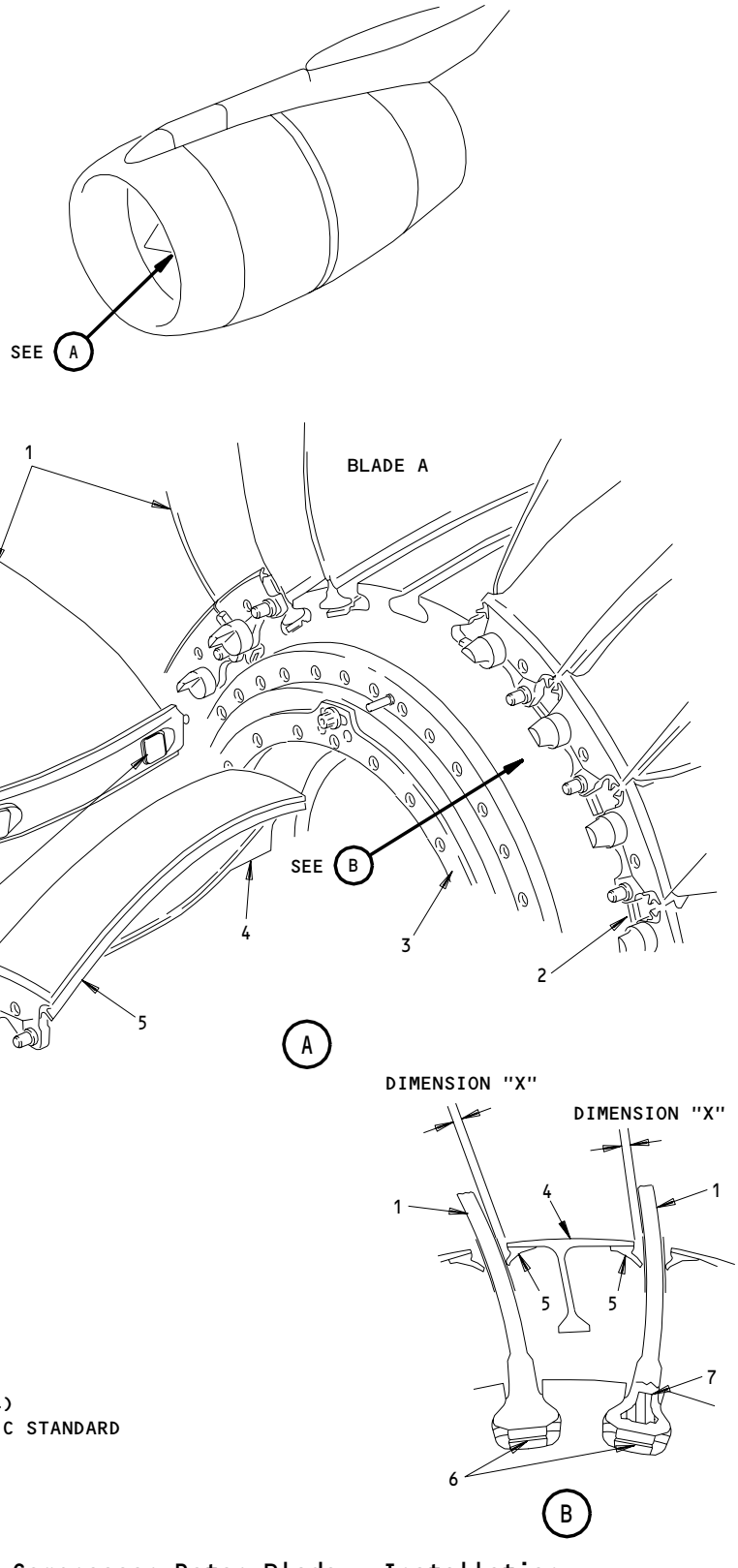
S 034-015-R00

(3) Put the rotor blade that you will remove at the Top Dead Center (TDC).

S 934-099-R00

(4) Make a record of the number of rotor blades post RR SB 72-9513 you removed on a record sheet.

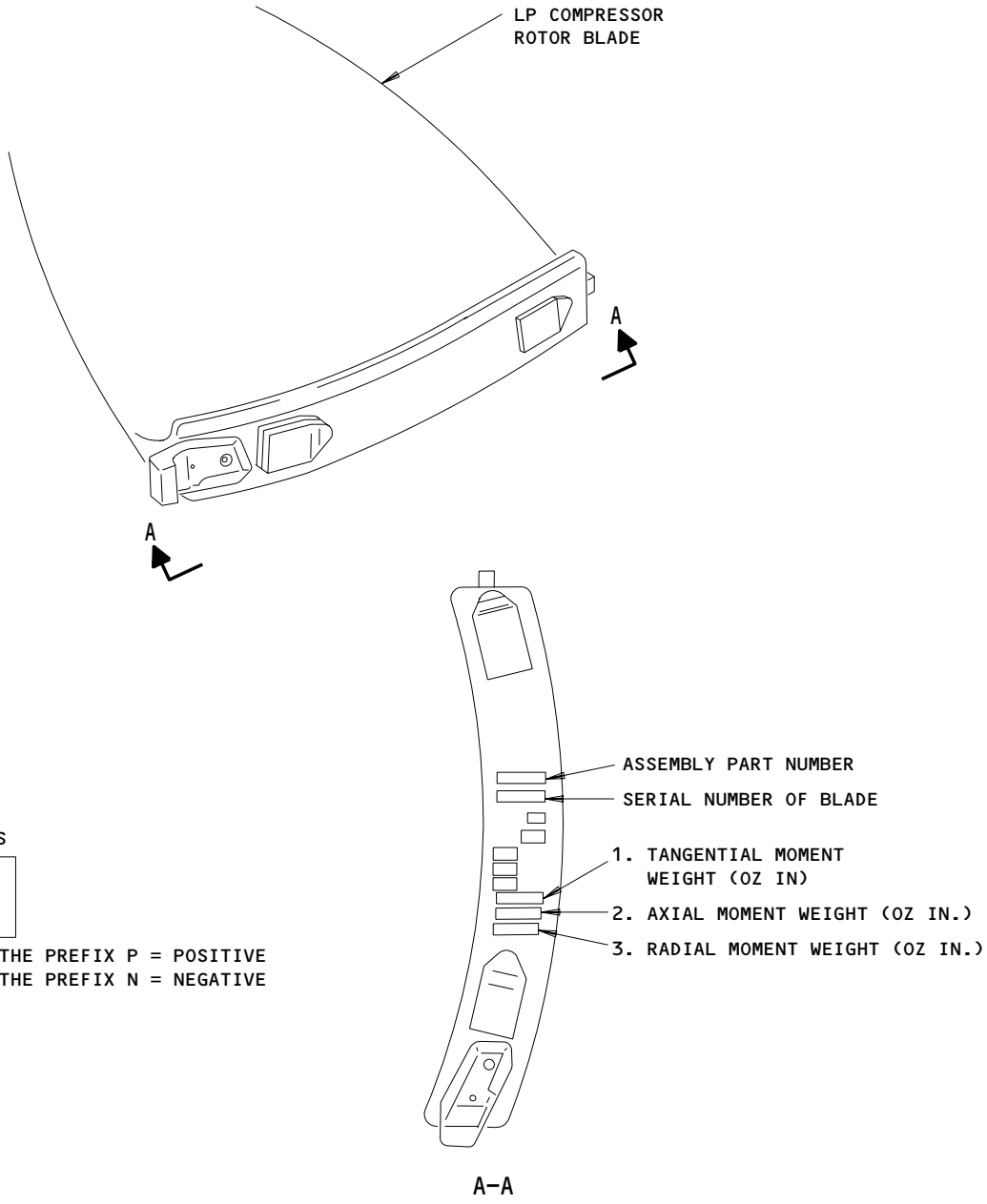
NOTE: This is to make sure the correct EPR trim code is used. The General paragraph at the top of the procedure gives information on how you can see the different aerodynamic standards of rotor blades.



1. ROTOR BLADE
2. ROTOR DISC
3. DRIVE CONE ASSEMBLY
4. ANNULUS FILLER
5. SEAL FINS
6. CHOCKING PADS (SB 72-8354)
7. PAINTED AREA - AERODYNAMIC STANDARD
   - WHITE - SB 72-9132
   - GOLD - SB 72-8342
   - SEA GREEN - SB 72-9513

C2951A

LP Compressor Rotor Blade - Installation
Figure 402



EXAMPLE OF
WEIGHT MARKINGS

1	P45.1 TAN
2	N40.5 AX
3	4574.8

NOTE: ITEM 1 THE PREFIX P = POSITIVE
ITEM 2 THE PREFIX N = NEGATIVE

A6712

Example of Blade Markings
Figure 403

F. Remove the Rotor Blade

S 034-016-R00

(1) Remove the annulus fillers (5) on the two sides of blades A and B.
  (a) Pull the fillers (5) forward to remove the rear retaining ring.
  (b) Turn the fillers counterclockwise.

S 024-017-R00

WARNING: THE ROTOR BLADE WEIGHS 14.8 POUNDS (6.8 KILOGRAMS). THE ROTOR BLADE MUST BE HELD TIGHTLY WHEN IT IS REMOVED FROM THE ROTOR DISC. INJURY TO PERSONS CAN OCCUR.

(2) Use the rotor blade extractor to move blade 'A' forward approximately 1.000 inch (25.40 mm).
  (a) Move the blade at an angle (radially) in the counterclockwise direction.

NOTE: This will permit blade 'A' to be clear of blade 'B' when it is removed.

S 024-018-R00

(3) Remove the blade B.

S 974-019-R00

(4) Make a record of the radial moment of weight of the blade that you removed.

NOTE: Make a mark on the blade of the radial moment of weight (Fig. 403). If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-204-020-R00

4. Examine the LPC Disc and Blades

A. Equipment
  (1) Protective work mat - 289200, Rolls Royce, Air intake

B. Access
(1) Location Zones
412 Left Nose Cowl
422 Right Nose Cowl

C. Examine the LPC Disc and Blades

S 494-021-R00
(1) Put the work mat in the air intake.

S 214-022-R00
(2) Examine the airfoil surface of the fan blade for these:
(a) If the airfoil surface of the fan blade that touches the sealing strip on the annulus filler is worn - Accept.
(b) loss of polyurethane paint from the airfoil surface of the blade, where applicable - Accept.

S 214-023-R00
(3) Examine the rear pin on the fan blade root, where applicable:
(a) Accept the rear pin if it is worn.

S 214-024-R00
(4) Make sure the two chocking pads at the root of the fan blade are there.
(a) If the chocking pads are gone - Accept (if you repair to FRS.5787). There is no limit to missing pads.
1) Do the repair to the chocking pads before the first of these limits (50 hours or 20 cycles).

S 214-025-R00
(5) Examine the panel segment to the rear seal on the LPC:
(a) Replace the panel segment if the frettage is more than 0.150 inch (3.81 mm) in depth.

S 214-026-R00
(6) Examine the dovetail slots on the LPC disc for these:
(a) Frettage in the dovetail slots that touch the front tang on the fan blade - Accept.

(b) If the chocking pads are gone - Accept (if you repair to FRS.5787). There is no limit to missing pads.
1) Do the repair to the chocking pads before the first of these limits (50 hours or 20 cycles).

S 214-027-R00

(7) Examine the front face on the LPC disc for this:
(a) Frettage on the front face of LPC disc adjacent to the dovetail slot that touches the front tang on the fan blade - Accept.

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-204-028-R00

5. Prepare to Install the Rotor Blade

A. Equipment
(1) Protective work mat - 289200, Rolls Royce, Air intake
(2) Rolls - Royce Supplied VX45 Blade Arrangment Program

B. Consumable Materials

C. Access
(1) Location Zones
412 Left Nose Cowl
422 Right Nose Cowl

D. Procedure

S 864-029-R00

(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 864-030-R00

(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 494-031-R00
(3) Put the work mat in the air intake.

S 864-100-R00
(4) You must know the type of rotor blades to be installed.

NOTE: AMM 72-31-13/201, 1) Re-Lubricate Blade Root and Disc Dovetail, 1. A. General (3), gives information on how you can see the different aerodynamic standards of rotor blades.

(a) ON RB211-535E4, E4-B AND E4-C ENGINES;
It is permitted to install 3 or less rotor blades pre RR SB 72-9513 on a rotor disc of RR SB 72-9513 blades with no restrictions. If more than 3 rotor blades pre RR SB 72-9513 are installed it is necessary to evenly distribute the blades to prevent vibration problems.
(b) It is permitted to install 3 or less rotor blades post RR SB 72-9513 on the same rotor disc as those shown general paragraph L with no restrictions. If 4 to 6 rotor blades post RR SB 72-9513 are installed it is necessary to evenly distribute the blades to prevent vibration problems.
(c) If 7 or more rotor blades post RR SB 72-9513 are installed on the same rotor disc they must be evenly distributed to prevent vibration problems. Do the following steps to re-distribute the rotor blades:
1) Do the EPR Trim Code Adjustment task to change the EPR task code.
2) Do the steps given in RR SB 72-9177, if not already done.
3) If you can not do RR SB 72-9177 immediately, you are permitted not more than 10 flights before you must do RR SB 72-9177.

S 224-032-R00
(5) Get a replacement blade with a radial moment of weight as near as possible to that of the damaged blade you removed.
(a) Make a record of the radial moment of weight.

S 974-033-R00

(6) Subtract the radial moment of weight of the damaged blade you removed from the radial moment of weight of the replacement blade.
  (a) Make a record of the difference of the radial moment of weight (MWD) that includes the sign (+ or -).
  (b) If the radial MWD is less than ±5 ounce-inches, install the rotor blades (Method 1).
  (c) If the radial MWD is between ±5 and ±60 ounce-inches, install the rotor blades (Method 2).
  (d) If the radial MWD is more than ±60 ounce-inches, install the rotor blades (Method 3).
  (e) As an alternative to Method 3 you can use the Rolls - Royce supplied VX45 blade arrangement program as follows:

    NOTE: If you do not have an Overhaul facility, you must contact Rolls Royce.

    1) If the radial MWD is more than plus or minus 60 ounce inches, put details of the moment weights into the VX45 program.
    2) Install the blades into the revised pattern.
    3) Make a record of the new installation pattern (Method 4).

S 644-034-R00

CAUTION: LUBRICATE THE ROTOR BLADES BEFORE YOU INSTALL THEM. DAMAGE TO THE CHOCKING PADS (7) CAN OCCUR.

(7) Do these steps:
  (a) Apply a thin layer of anti-seize compound to help in the assembly of the chocking pads (7) (front and rear) on the rotor blade.
    1) Remove the unwanted lubricant.
  (b) Apply anti-seize compound to help in the assembly of the dovetail in the disc.
    1) Remove the unwanted lubricant.

2) If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-404-036-R00

6. Install the Rotor Blade (Method 1)

A. Equipment

(1) Protective work mat - 289200, Rolls Royce, Air intake

B. References

(1) AMM 72-31-14/401, Annulus Fillers

C. Access

(1) Location Zones

412 Left Nose Cowl
422 Right Nose Cowl

D. Procedure (Fig. 402)

S 494-037-R00

(1) Put the work mat in the air intake.

S 434-038-R00

(2) Make sure you put blade 'A' in the forward position, approximately 1.0 inch (25.4 mm).

S 434-039-R00

(3) Put blade 'A' at an angle (radially) counterclockwise.
(a) Put the replacement blade 'B' in the dovetail disc.
(b) Push blade 'B' fully aft.

S 424-040-R00

(4) Push the blade 'A' fully aft.

S 434-111-R00

CAUTION: DO NOT INSTALL PRE-MOD SB 72-9177 ANNULUS FILLERS ON ENGINES POST-MOD SB 72-9177, THIS COULD EFFECT ENGINE OPERATION.

(5) Install the annulus fillers (5) (AMM 72-31-14/401).

S 434-042-R00

(6) Do the installation steps of the LPC fan retentin drive cone and the support ring on the nose cone.

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-404-043-R00

7. Install the Rotor Blade (Method 2)

A. Equipment

(1) Protective work mat - 289200, Rolls Royce, Air intake

B. References

(1) AMM 70-51-00/201, Torque Tightening Technique

(2) AMM 72-31-14/401, Annulus Fillers

C. Access

(1) Location Zones

412 Left Nose Cowl

422 Right Nose Cowl

D. Procedure (Fig. 401 and 402)

S 494-044-R00

(1) Put the work mat in the air intake.

S 974-045-R00

(2) Calculate the value of the balance plate assembly (BP) to attach the front flange of the drive cone assembly (9).

(a) Make allowances for the radial moment of weight difference (MWD) of the damaged and the replacement blade as follows:

Radial MWD X 0.0952 = BP (ounce)

NOTE: The BP includes the weight of the retaining bolts and the washers.

The weight for the three standards of the plate is shown in Fig. 404. It also shows how the weight of the plate can be changed by the removal of material.

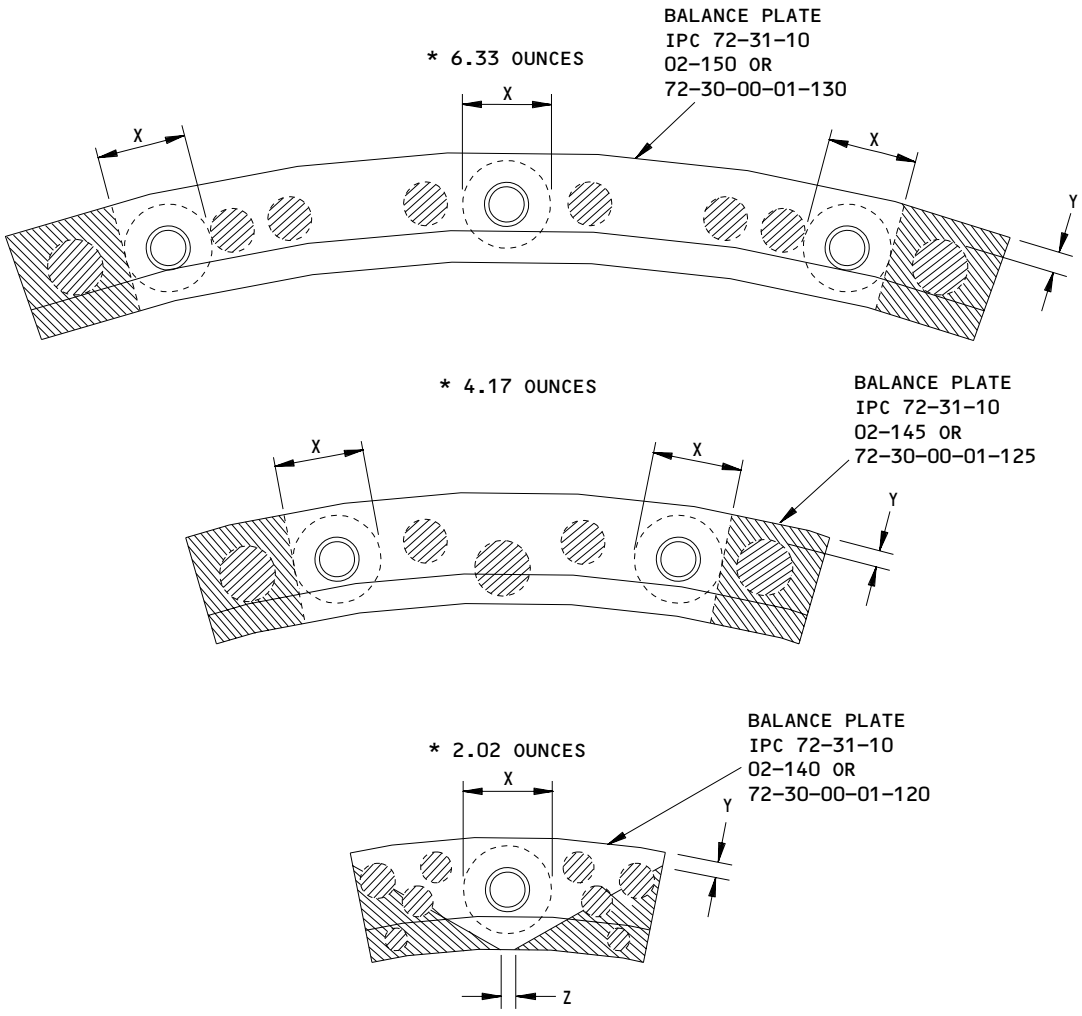
S 214-046-R00

(3) Find where you must install the balance plate assembly (BP) on the front flange of the drive cone assembly.

(a) If the value of the BP is positive (+), do this step:

1) Make allowances for the weight to be aft of the front flange of the drive cone assembly (9) at the nearest hole opposite the replacement blade.

2) Push the balance plate assembly radially out.



* NOMINAL WEIGHT INCLUDES NUTS AND BOLTS
X = 0.472 INCH (11.98 mm)
Y = 0.100 INCH (2.54 mm)
Z = 0.100 INCH (2.54 mm) SINGLE HOLE BALANCE PLATE ONLY

NOTE: MATERIAL MAY BE REMOVED BY FILING, SAWING OR DRILLING, IN ANY COMBINATION PROVIDED MATERIAL REMOVED IS SYMMETRICAL ABOUT THE CENTER OF THE PLATE, AND THE MINIMUM LIMITS ARE OBSERVED.

C2952A

Balance Plate - Material Removal Area
Figure 404

3) Attach the balance plate assembly with the bolts and the washers (AMM 70-51-00/201).

(b) If the value of the BP is negative (-), do this:

1) Make allowances for the weight to be aft of the front flange of the drive cone assembly (9) at the nearest hole position of the replacement blade.
2) Push the balance plate assembly radially out.
3) Attach the balance plate assembly with the bolts and the washers (AMM 70-51-00/201).

S 434-047-R00

(4) Make sure you put blade 'A' forward approximately 1.00 inch (25.4 mm).

S 434-048-R00

(5) Put blade 'A' at an angle (radially) counterclockwise.

(a) Put the replacement blade 'B' in the disc dovetail.
(b) Push the blade 'B' fully aft.

S 424-049-R00

(6) Push the blade 'A' fully aft.

S 434-112-R00

CAUTION: DO NOT INSTALL PRE-MOD SB 72-9177 ANNULUS FILLERS ON ENGINES POST-MOD SB 72-9177, THIS COULD EFFECT ENGINE OPERATION.

(7) Install the annulus fillers (5) (AMM 72-31-14/401).

S 434-051-R00

(8) Do the installation of the LPC fan retention drive cone and the support ring on the nose cone.

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-404-052-R00

8. Install the Rotor Blade (Method 3)

A. Equipment

(1) Protective work mat - 289200, Rolls Royce, Air intake

B. References

(1) AMM 70-51-00/201, Torque Tightening Technique

(2) AMM 72-31-14/401, Annulus Fillers

C. Access

(1) Location Zones

412 Left Nose Cowl

422 Right Nose Cowl

D. Procedure (Fig. 402)

S 494-053-R00

(1) Put the work mat in the air intake.

S 024-054-R00

(2) Remove the rotor blade that is on the opposite side to the initial blade you removed.

(a) Make a record of the radial moment of weight.

NOTE: This is the opposite blade.

S 974-055-R00

(3) Subtract the radial moment of weight of the opposite blade from the radial moment of weight of the initial blade you removed.

(a) Make a record of this value with the sign (+ or -) as the blades 'Out' difference (OD).

S 964-056-R00

(4) Get a replacement blade for the opposite blade you removed.

(a) Subtract the replacement blade's radial moment of weight from the radial moment of weight of the initial replacement blade.

1) Make sure the radial moment of weight of the replacement blade is ±60 ounce-inches or less of the OD value.

(b) Make a record of this value with the sign (+ or -) as the blades 'In' difference (ID).

S 974-057-R00

(5) Subtract the OD value from the ID value you wrote.

(a) If the difference in the radial moment of weight is ±5 ounce-inches or less, go to the step to set blade 'A'.

(b) If the difference is larger than ±5 ounce-inches, continue to the subsequent step.

S 974-058-R00

(6) Calculate the value of the balance plate assembly (BP) that is necessary to attach the front flange of the drive cone assembly (9).

(a) Make allowances for the difference in the radial moment of weight of the blade's 'Out' to the blade's 'In' as follows:

(ID - OD) X 0.0952 = BP (ounce)

NOTE: The BP includes the weight of the retaining bolts and the washers.

The weight for the three standards of the plate is shown in Fig. 404. It also shows how the weight of the plate can be changed by the removal of material.

S 214-059-R00

(7) Find where you must install the balance plate assembly (BP) on the front flange of the drive cone assembly.

(a) If the value of the BP you calculated is positive (+), do these steps:

1) Make allowances for the weight to be aft of the front flange of the drive cone assembly (9) at the nearest opposite hole to the blade.
2) Push the balance plate assembly radially out.
3) Attach the balance plate assembly blade with the bolts and the washers (AMM 70-51-00/201).

(b) If the value of the BP you calculated is negative (-), do these steps:

1) Make allowances for the weight to be aft of the front flange of the drive cone assembly (9) at the nearest hole position to the initial blade.
2) Push the balance plate assembly radially out.
3) Attach the balance plate assembly with the bolts and the washers (AMM 70-51-00/201).

S 434-060-R00

(8) Make sure you put the blade 'A' forward, approximately 1.00 inch (25.4 mm).

S 434-061-R00

(9) Put blade 'A' at an angle (radially) counterclockwise.

(a) Put the replacement blade 'B' in the disc dovetail.
(b) Push the blade 'B' fully aft.

S 424-062-R00

(10) Push the blade 'A' fully aft.

S 434-113-R00

CAUTION: DO NOT INSTALL PRE-MOD SB 72-9177 ANNULUS FILLERS ON ENGINES POST-MOD SB 72-9177, THIS COULD EFFECT ENGINE OPERATION.

(11) Install the annulus fillers (5) (AMM 72-31-14/401).

S 434-064-R00

(12) Do these steps again to set the opposite blade from blade 'A'.

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-404-065-R00

9. Install the LPC Fan Retention Shaft Drive Cone and Support Ring on the Nose Ring.

A. Equipment
   (1) Blade Clamping Tool, E2J60762, Rolls Royce
   (2) Extractor Bolt No. 10 UNF X 1.250 - commercially available.
   (3) Protective work mat - 289200, Rolls Royce, Air intake

B. Consumable Materials
   (1) Aeroshell grease 8
   British Spec/Ref - DTD394B
   OMat No. 432
   (2) Temporary Marker

C. References
   (1) AMM 70-51-00/201, Torque Tightening Technique

D. Access
   (1) Location Zones
   412 Left Nose Cowl
   422 Right Nose Cowl

E. Procedure (Fig. 401 and Fig. 401A).

S 494-066-R00

(1) Put the work mat in the air intake.

S 214-067-R00

(2) Identify the ident mark (1) on the offset dowel hole to the support ring (10) on the nose cone and the drive cone (8).
   (a) Make sure the support ring (10) on the nose cone is correctly aligned with the ident marks.
   (b) Put the ring (10) on the three headless pins (16) attached to the support ring on the drive cone (8).
   (c) Put the ring on the headless pins (6) on the blade annulus fillers (5).

NOTE: If you have problems when you install the support ring on the nose cone, heat the ring in an oven to 302°F (150°C) before you install the ring.

S 434-068-R00

CAUTION: ON ENGINES WITHOUT RR SB 72-7735, YOU CAN INSTALL THE HEADLESS PINS IN THE CLEARANCE HOLES OF THE EXTRACTOR IN PLACE OF THE OFFSET DOWEL HOLES. IF YOU INSTALL THE PINS INCORRECTLY, ENGINE DAMAGE CAN OCCUR.

(3) Identify the ident mark (1) on the offset dowel hole to the carrier ring (15) on the balance weight and the support ring (10) on the nose ring.
   (a) Make sure you correctly align the carrier ring (15) on the balance weight with the ident marks.
   (b) Put the ring (15) on the three headless pins (16) attached to the support ring on the drive cone (8).

S 434-070-R00

(4) Install the bolts and washers (11) through the carrier ring (15) on the balance weight and support ring (10) on the nose cone in the rotor disc (3).
   (a) Connect the bolts and washers (11) through the carrier ring (15) on the balance weight and support ring (10) on the nose cone in the rotor disc (3).

S 434-071-R00

(5) Install the bolts and washers (12) through the support ring (10) on the nose cone in the blade annulus fillers.
   (a) Connect the bolts and washers (12) through the support ring (10) on the nose cone in the blade annulus fillers.

S 424-072-R00

(6) Tighten the bolts (11) and (12) on opposite sides in increments (AMM 70-51-00/201).

(a) Install the drive cone to the retention shaft for the LPC fan.

1) Put the drive cone (7) on the retention shaft in the LPC disk.

a) Find the rear face of the drive cone (7) on the front face of the shaft for the LPC fan.

2) Install the bolts (6) and washers (5) six locations to attach the drive cone to the shaft for the LPC fan.

a) Tighten the bolts (AMM 70-51-00/201).

3) Turn the drive cone to align slot A (between the two yellow marks) with a yellow mark on the drive cone to the support ring.

a) The right edge of the 3 slots must align opposite the bolt holes.

b) Install the bolts (1) and the spread washers(2).

c) Tighten the bolts (1) that attach the drive cone to the support ring on the drive cone (AMM 70-51-00-201).

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

S 734-117-R00

(7) Examine the annulus filler clearance (AMM 72-31-14/401).

NOTE: The steps to examine the clearance of the annulus filler are found in the installation task of the referenced procedure.

TASK 72-31-13-354-102-R00

10. Put the Annulus Sealing Strips in the Correct Position

A. Equipment

(1) 289200 Protective work mat, air intake, Rolls-Royce

B. Access

(1) Location Zones

412 Left Nose Cowl

422 Right Nose Cowl

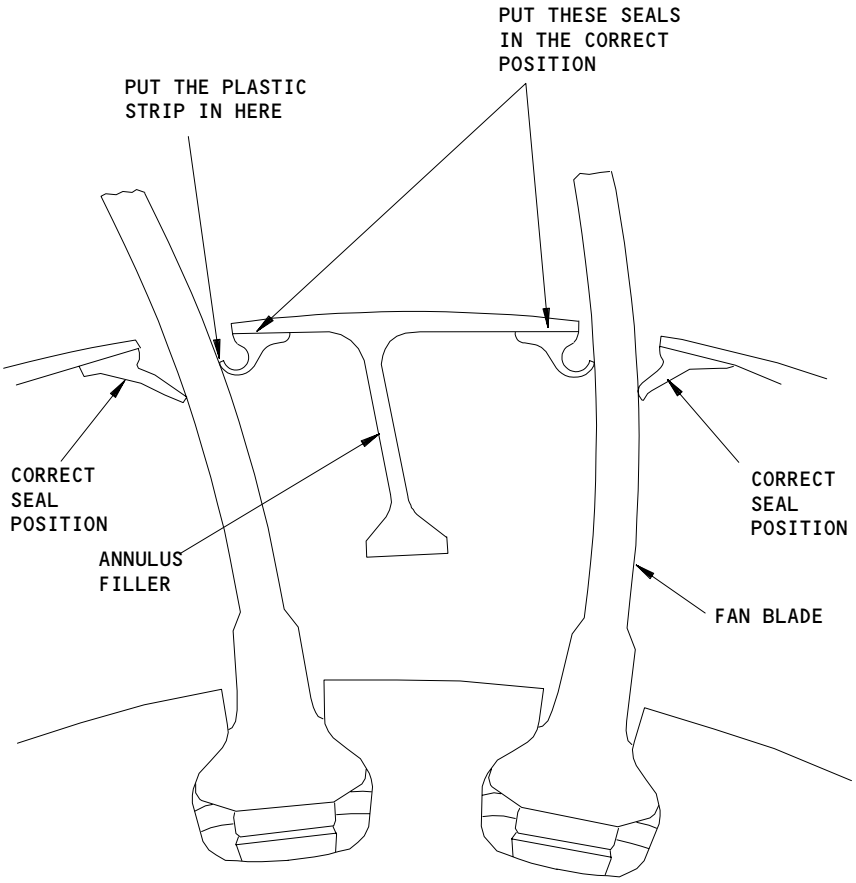
C. Procedure

S 494-103-R00

(1) Put the work mat in the air intake.

S 354-104-R00

(2) Do this procedure along the full chordal length at each side of each fan blade (Fig. 404A).



SECTION THROUGH BLADE ROOT

C8409

Fan Annulus Filler Sealing Strips
Figure 404A

(a) To do this procedure, use a strip of stiff plastic with these dimensions:
1) Length: 3.150 to 4.724 inches (80.00 to 120.00 mm)
2) Width: 1.575 to 2.362 inches (40.00 to 60.00 mm)
3) Thickness: approximately 0.039 inch (1.00 mm)

CAUTION: MAKE SURE THAT THE PLASTIC STRIP HAS A SMOOTH SURFACE AND EDGES. IF YOU USE A STRIP WITH A ROUGH SURFACE OR EDGES, DAMAGE TO THE RUBBER SEAL CAN OCCUR.

MAKE SURE THAT YOU DO NOT BREAK THE PLASTIC STRIP AND LEAVE PIECES OF IT IN THE FAN. PIECES OF PLASTIC CAN CAUSE DAMAGE TO THE RUBBER SEAL.

(b) Push the plastic strip between the fan blade and the annulus filler at the rear of the fan.

NOTE: If this is not easy to do then it could be an indication that the seal is caught.

(c) Use the plastic strip to move the seal into the correct position.

NOTE: When the seal is in the correct position you can easily move the plastic strip from the front to the rear of the fan blade.

S 094-105-R00

(3) Remove the work mat in the air intake if it is not necessary to do other maintenance.

TASK 72-31-13-204-079-R00

11. Examine the Minimum Clearance of the Rotor Blade Tip

A. Equipment

(1) Extractor Bolt No. 10 UNF X 1.250 - commercially available.

(2) Protective work mat - 289200, Rolls Royce, Air intake

B. Consumable Materials

(1) Aeroshell grease 8
British Spec/Ref - DTD394B
OMat No. 432

(2) Temporary Marker

C. Access

(1) Location Zones
412 Left Nose Cowl
422 Right Nose Cowl

D. Procedure

S 494-080-R00

(1) Put the work mat in the air intake.

S 584-081-R00

CAUTION: DO NOT USE THE CASING TO HOLD PERSONS OR EXTERNAL OBJECTS. THE CASING CAN DEFORM AND INVALIDATE ALL DIMENSIONS THAT YOU GET.

(2) Put the replacement blade at the BDC.
(a) Make sure you put a load on the blade radially in the outer direction.

S 974-084-R00

(3) Measure and write the tip clearance of the leading and trailing edge to the replacement blade.
(a) You must measure the clearance 0.500 inch (12.7 mm) from the radii of the blade edge.

S 214-085-R00

(4) Look at the LPC case clockwise from the front and do this:
(a) Turn the blade.

(b) Measure the tip clearance of the leading and trailing edge to the replacement blade in 45 degree increments around the LPC case, again.
(c) Write the tip clearance of the leading and trailing edge to the replacement blade in 45 degree increments around the LPC case, again.

S 224-086-R00
(5) Examine the tip clearance of the blade.
(a) Minimum clearance of the blade leading edge:

Blade pre RR SB 72-8154	0.033 inch (0.844 mm)
Blade post RR SB 72-8154	0.020 inch (0.508 mm)

(b) Minimum clearance of the blade trailing edge:

Blade pre RR SB 72-8154	0.084 inch (2.134 mm)
Blade post RR SB 72-8154	0.071 inch (1.803 mm)

S 034-087-R00
(6) Remove the blade clamping tool.

S 214-088-R00
(7) If the replacement blade is out of the limits, do this:
(a) Replace the blade.
(b) Do the tip clearance procedure again.

NOTE: If you continue with this procedure, do not remove the work mat from the air intake.

TASK 72-31-13-804-095-R00
12. Engine Pressure Ratio (EPR) Trim Code Adjustment
A. General
(1) For this procedure the Engine Pressure Ratio Trim Code will be referred to as the EPR Trim Code.

B. Access
(1) Location Zones
410 Left Engine
420 Right Engine

(2) Access Panels
414AR Fan Cowl Panel (RH)
424AR Fan Cowl Panel (RH)

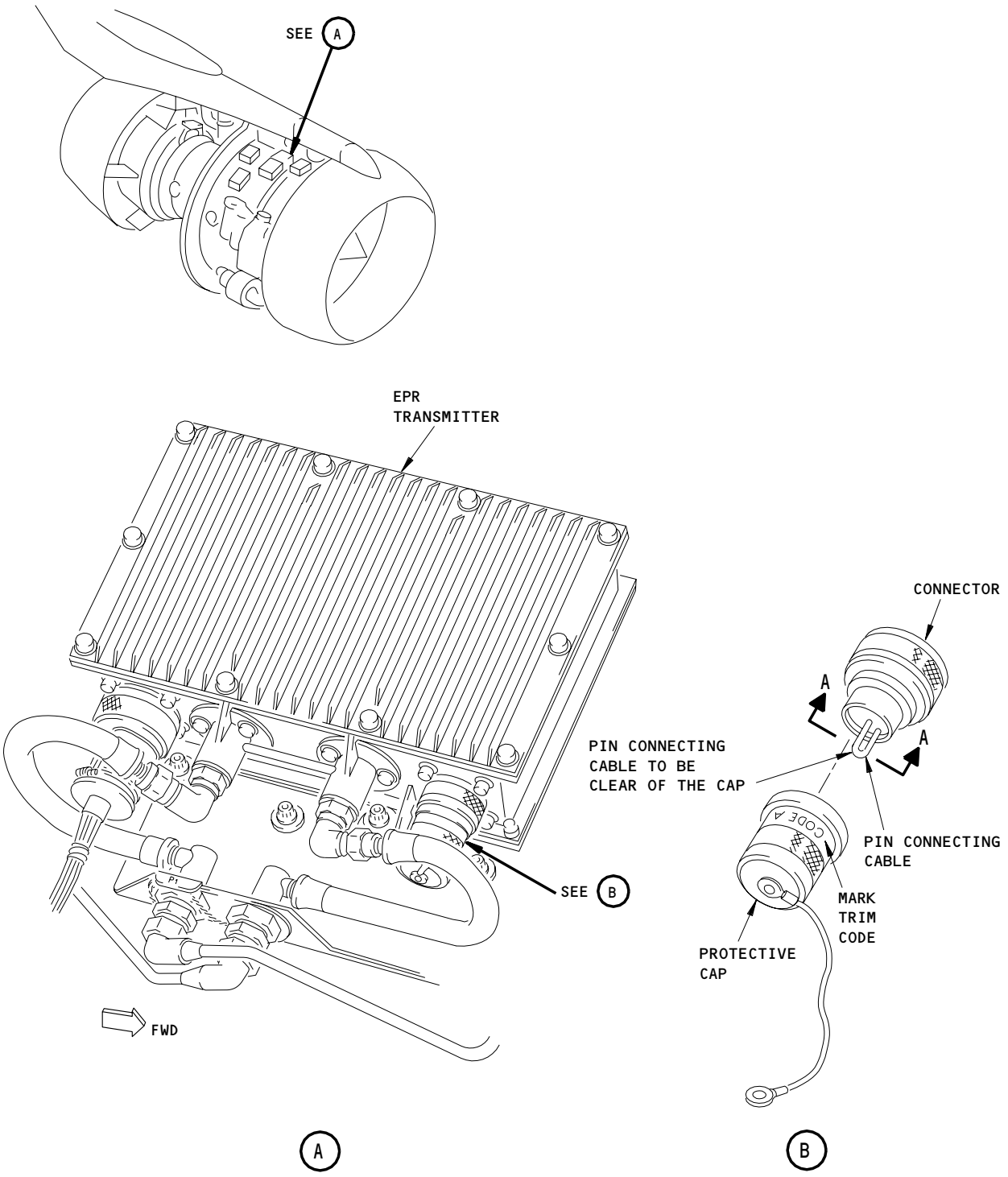
C. Procedure (Fig. 405)

S 014-096-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the right fan cowl panel (AMM 71-11-04/201).

S 214-098-R00
(2) Do a check of the installed rotor blades post RR SB 72-9513 for these conditions:
(a) The number of rotor blades you removed post RR SB 72-9513.
(b) The number of rotor blades you installed post RR SB 72-9513.
1) If the total number of rotor blades post RR SB 72-9513 has increased to 7 or more, the EPR trim code must be decreased by 3 steps.
a) Remove the protective caps from the EPR trimmer plug (Fig. 405, Sheet 1).
b) Do an inspection check of the current trim code (Fig. 405, Sheet 2).
c) Get the new trim code (Fig. 405, Sheet 2).
d) Install the pin connecting cable in the correct position for the new trim code (Fig. 405, Sheet 2).
e) Install the protective caps from the EPR trimmer plug (Fig. 405, Sheet 1).
f) Make a mark of the new trim code on the cap of the EPR trimmer plug, the engine data slip plate and in the engine test records.
2) If the total number of rotor blades post RR SB 72-9513 has decreased to 6 or less, then the EPR trim code must be increased by 3 steps.
a) Remove the protective caps from the EPR trimmer plug (Fig. 405, Sheet 1).
b) Do an inspection check of the current trim code (Fig. 405, Sheet 2).
c) Get the new trim code (Fig. 405, Sheet 2).
d) Install the pin connecting cable in the correct position for the new trim code (Fig. 405, Sheet 2).
e) Install the protective caps from the EPR trimmer plug (Fig. 405, Sheet 1).

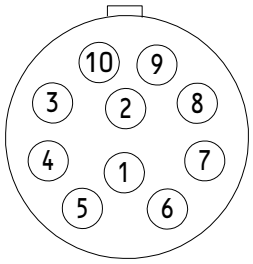


EPR Trimmer Plug Dust Cover Installation
Figure 405 (Sheet 1)

TRIM CODE	CONNECTION OF PINS				
	1	2	3	4	7
F	10	6	–	8	–
G	10	6	–	–	5
H	10	6	–	–	–
I	10	–	9	8	5
J	10	–	9	8	–
K	10	–	9	–	5
L	10	–	9	–	–
M	10	–	–	8	5
N	10	–	–	8	–
O	10	–	–	–	5
P	10	–	–	–	–
Q	–	6	9	8	5
R	–	6	9	8	–
S	–	6	9	–	5
T	–	6	9	–	–
U	–	6	–	8	5
V	–	6	–	8	–
W	–	6	–	–	5
X	–	6	–	–	–
Y	–	–	9	8	5
Z	–	–	9	8	–
AA	–	–	9	–	5
BB	–	–	9	–	–
CC	–	–	–	8	5
DD	–	–	–	8	–
EE	–	–	–	–	5

STEPPED INCREASE

STEPPED REDUCTION



VIEW OF CONNECTOR WITH PROTECTIVE CAP REMOVED
A–A

C3824

EPR Trimmer Plug Dust Cover Installation
Figure 405 (Sheet 2)

f) Make a mark of the new trim code on the cap of the EPR trimmer plug, the engine data slip plate and in the engine test records.

3) If the total number of rotor blades post RR SB 72-9513 stays at 7 or more blades, then the EPR trim code is acceptable.

4) If the total number of rotor blades post RR SB 72-9513 stays at 6 or less blades, then the EPR trim code is acceptable.

S 014-097-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(3) Close the right fan cowl panel (AMM 71-11-04/201).

TASK 72-31-13-804-089-R00

13. Put the Engine to Its Usual Condition

A. Equipment

(1) Protective work mat - 289200, Rolls Royce, Air intake

B. References

(1) AMM 71-00-00/501, Power Plant

(2) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing

C. Access

(1) Location Zones

412 Left Nose Cowl

422 Right Nose Cowl

D. Procedure

S 434-090-R00

(1) Install the LPC rotating fairing (AMM 72-35-01/401).

S 094-091-R00
(2) Remove the work mat from the air intake.

S 864-092-R00
(3) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 864-093-R00
(4) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 714-094-R00
(5) Do a test of the engine in accordance to the Power Plant Vibration Survey (AMM 71-00-00/501).

LOW PRESSURE (LP) COMPRESSOR ROTOR BLADES - INSPECTION/CHECK

TASK 72-31-13-206-001-R00

1. Do an Inspection of the LP Compressor Rotor Blades

A. Equipment
   (1) 289200 Protective Work Mat, Rolls-Royce
   (2) 1017815 TAP Tester Model - TH100-B or TH100-C, Rolls-Royce
   (3) QC6756 TAP Test Block, Rolls-Royce

B. Consumable Materials
   (1) Ultrasonic Couplant
       British Spec - Sonotrace
       American Spec - Sonotrace
       OMat Item No.- 655

C. References
   (1) AMM 71-00-00/501, Power Plant
   (2) AMM 72-31-13/401, LP Compressor Rotor Blades
   (3) AMM 72-31-13/801, LP Compressor Rotor Blades

D. Access
   (1) Location Zones
       412/422 Nose Cowl

E. Prepare for the Inspection

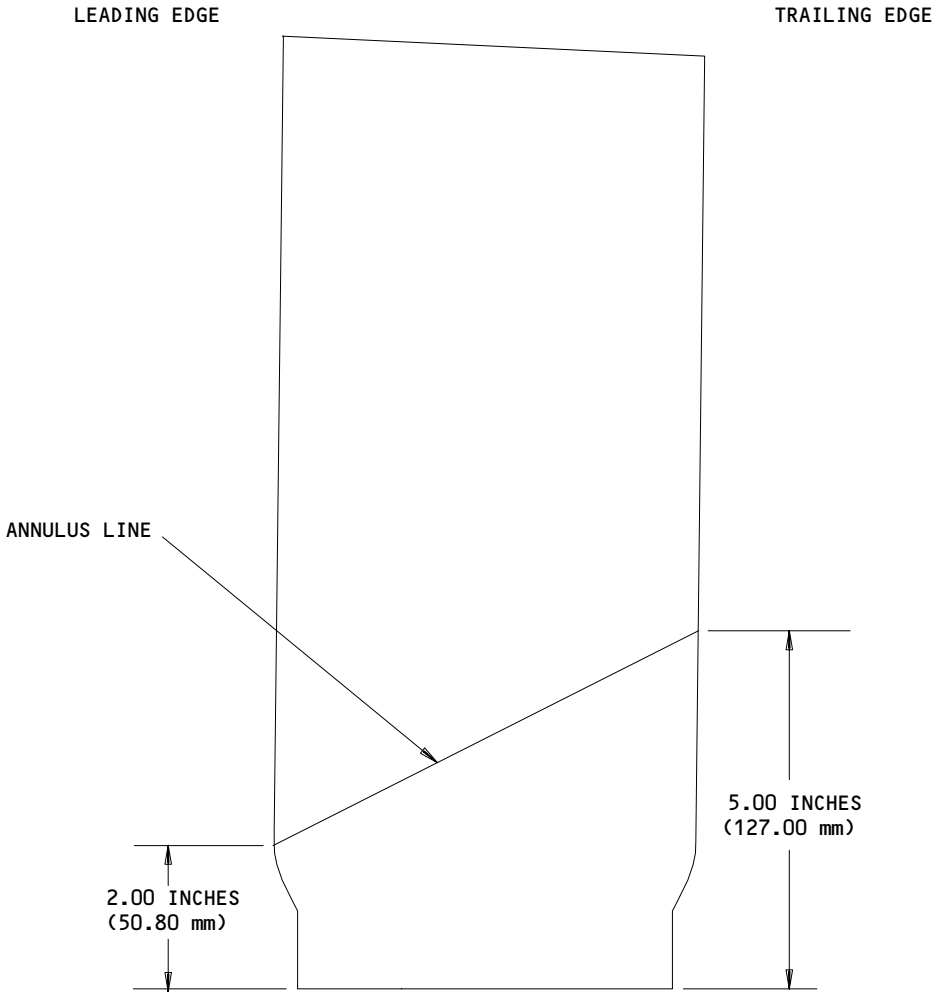
   S 866-002-R00
   (1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
       (a) P11-2 Overhead Circuit Breaker Panel
           1) 11D19, ENGINES START CONT LEFT

   S 866-003-R00
   (2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
       (a) P11-2 Overhead Circuit Breaker Panel
           1) 11D20, ENGINES START CONT RIGHT

   S 946-004-R00
   (3) Put the protective work mat in the inlet cowl.

F. Do an Inspection of the LP Compressor Rotor Blades

   S 216-005-R00
   (1) Examine the LP compressor rotor blades for cracks (Fig. 601).
       (a) Replace the blade if cracks are found in the airfoil surface (AMM 72-31-13/401).



68996C

LP Rotor Blade - Surface Damage
Figure 601

S 216-006-R00

(2) Examine the tip and the adjacent airfoil surface of the LP compressor rotor blade for heat discoloration. This shows as a blue color.

NOTE: The heat discoloration occurs when the rotor blade touches the rotor path.

(a) Accept discoloration of the blade tip and not more than 0.250 inch (6.35 mm) of the adjacent airfoil surface.
(b) Replace the rotor blade if the discoloration extends more than the above limits (AMM 72-31-13/401).
(c) Accept cracking from the blade tip radially into the airfoil surface up to 0.20 inch (5.00 mm) maximum length.
(d) Replace the rotor blade within 25 cycles or 125 hours if the cracking is in excess of the above limits. Use the first limit to occur.

S 216-007-R00

(3) Examine the concave and the convex surfaces of the LP compressor rotor blades for nicks.
(a) Accept nicks not more than 0.008 inch (0.203 mm) in depth in the area above the annulus line.
(b) Use FRS.5025 to repair the rotor blade if you find nicks more than 0.008 inch (0.203 mm) in depth in the area above the annulus line (AMM 72-31-13/801).
(c) Replace the rotor blade if you find nicks below the annulus line (AMM 72-31-13/401).

S 216-008-R00

(4) Examine the leading edge of the LP compressor rotor blades for nicks.
(a) Accept nicks not more than 0.008 inch (0.203 mm) in depth from the blade root to 3.000 inches (76.20 mm) above the annulus line.
(b) Accept nicks not more than 0.025 inch (0.635 mm) in depth from 3.000 inches (76.20 mm) above the annulus line to the blade tip.
(c) Use FRS.5025 to repair the rotor blades if you find nicks which are larger than the above limits (AMM 72-31-13/801).

S 216-009-R00

(5) Examine the LP compressor rotor blades for damage to the concave and convex airfoil surface.
   (a) Replace the rotor blade if you find signs of arc-burn (AMM 72-31-13/401).

      NOTE: A small circular or semicircular area of heat discoloration (dark blue) on the blade surface is a sign of arc-burn. The damaged area can have pits, cracks or be melted. This condition is not the same as the blue identification spot etched on the fan blades introduced by RR SB 72-C138.

   (b) Accept the rotor blade if the surface is worn where it touches the sealing strip on the annulus filler.
   (c) ROTOR BLADES WITH RR SB 72-8354;
   Accept a decreased amount of the polyurethane paint on the airfoil surface of the rotor blade.
   (d) Discoloration of the panel bond line is permitted.

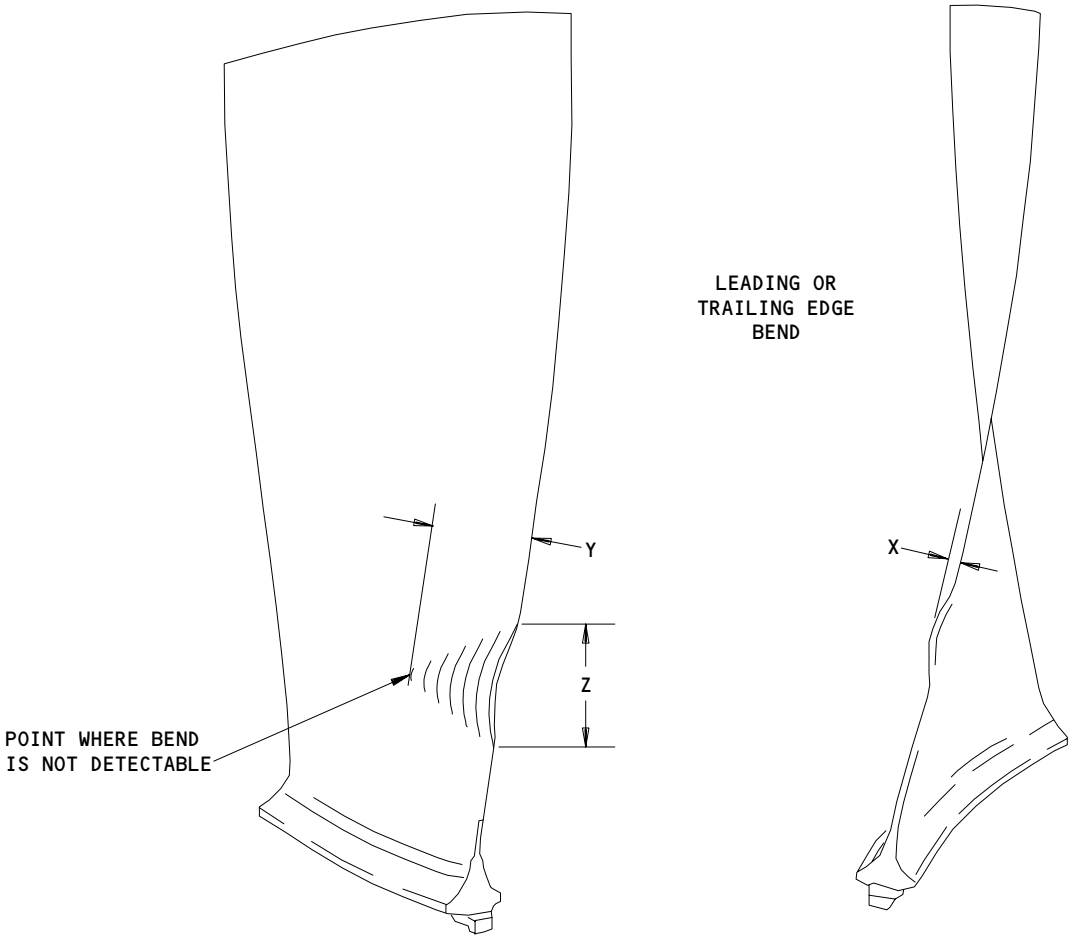
      NOTE: The panel bond line can have discoloration after the fan blade is cleaned. The discoloration shows as a thin blue/grey line along the length of the blade. The line is at a distance of approximately 1 to 2 inches (25.4 to 50.8 mm) from the leading edge, on the convex panel.

S 216-010-R00

(6) Examine the LP compressor rotor blades for general bends.
   (a) Damage which can be completely removed by dressing within the limits of FRS 5025-Repair.
   (b) Accept not more than three bent blades in each fan rotor assembly.
   (c) Accept not more than one bend in each rotor blade.
   (d) Accept bends if they are smooth and do not have related damage.
   (e) Replace the rotor blade if the bends are more than the above limits (AMM 72-31-13/401).
   (f) Replace the rotor blade if the amount of twist in the blade is decreased (AMM 72-31-13/401).

S 216-011-R00

(7) Examine the leading and trailing edges of the LP compressor rotor blades for bends (Fig. 602).
   (a) Accept a circumferential deviation (X) of not more than 0.20 inch (5.08 mm) if you find these conditions:
      1) The axial dimension (Y) of the bend is not less than 8 times the circumferential deviation (X).
      2) The radial dimension (Z) of the bend is not less than 15 times the circumferential deviation (X).
      3) The bend does not extend into the panel.



X CIRCUMFERENTIAL DEVIATION

Y AXIAL EXTENT

Z RADIAL EXTENT

99773A

LP Rotor Blade – Bends
Figure 602

(b) Accept a circumferential deviation (X) of more than 0.20 inch (5.08 mm) but not more than 0.50 inch (12.7 mm) if you find these conditions:
1) The replacement of the rotor blade is scheduled to occur before the aircraft completes the first of these conditions: 125 hours or 25 flights.
2) The axial dimension (Y) of the bend is not less than 8 times the circumferential deviation (X).
3) The radial demension (Z) of the bend is not less than 15 times the circumferential deviation (X).

(c) Replace the rotor blade if the bends are more than the limits for the leading and trailing edges of the LP compressor rotor blades (AMM 72-31-13/401).

S 216-017-R00

(8) Examine the rotor blade leading edge for tip bends (Fig. 602).

NOTE: You can repair the tip bends at the leading edge which are outside the limits of FRS 5025 with FRS.5186. FRS.5186 is not a permanent repair.

(a) The rotor blades with tip bend damage at the leading edge must not be operated for more than 125 hours or 25 flights.
1) You must replace the rotor blade when it gets to one of these two conditions.

(b) You can use FRS.5186 only if the damaged blade condition is not more than the limits that follow:
1) The initial shape of the rotor blade did not change more than 0.200 inch (5.08 mm) in the circumferential direction (X).
2) The change in the axial direction of the bend (Y) of the rotor blade is not less than 8 times the change in the blade shape in the circumferential direction (X).
3) The change in the radial direction of the bend (Z) of the rotor blade is not less than 15 times the change in the blade shape in the circumferential direction (X).
4) The bend in the rotor blade does not go into the panel area.
a) Damage outside the limits above for leading edges of the LP compressor rotor blades - Reject.

S 216-012-R00

(9) Examine the annulus fillers of the LP compressor rotor.
(a) Examine the outer surface of the annulus filler.
1) Accept nicks, scores or dents not more than 0.010 inch (0.25 mm) in depth.
2) Reject the annulus filler if the damage is more than the outer surface.
3) Reject the annulus filler if you find bends or distortion.
4) Reject the annulus filler if you find cracks in the outer surface or the body.

(b) Examine the rubber air seals on the annulus filler for material that is gone. Repair damaged air seals to FRS.5135 (AMM 72-31-13/801).
1) Accept not more than 6 seals disengaged or not fully disengaged from the annulus fillers if you do these steps:
a) Cut the pieces that are prepared to disengage from the seals that are not fully disengaged.
b) Remove the pieces from the rotor assembly.
2) Accept not more than 6 seals disengaged or not fully disengaged from the rotor assembly.
3) Reject the annulus filler if more than 6 seals are disengaged or not fully disengaged from the annulus filler or rotor assembly (AMM 72-31-14/401).

CAUTION: DO NOT INSTALL PRE-MOD SB 72-9177 ANNULUS FILLERS ON ENGINES POST-MOD SB 72-9177, THIS COULD EFFECT ENGINE OPERATION.

(c) Where possible, replace each rejected annulus filler with a filler of the same weight to keep the light/heavy balanced configuration (AMM 72-31-13/401). Where this is not possible, the difference in weight between the original and the replacement part must not be more than 4g (0.14 oz).

NOTE: For Post SB 72-C901, if you cannot get the 4g difference in weight, you can install two annulus fillers of the same weight, 180 degrees apart from each other.

NOTE: The weight of an annulus filler is identified on the side of the filler body at the lower rear.

S 216-018-R00

(10) TAP inspection of the LP compressor rotor blade

CAUTION: USE THE TAP TESTER WITH CARE TO MAKE SURE YOU CAN GET CONTINUOUS SATISFACTORY OPERATION. THE TESTER IS A SENSITIVE ACOUSTIC INSTRUMENT.

EACH TAP TESTER IS SUPPLIED WITH AN ELECTRONICALLY ADJUSTED PROBE. DO NOT CHANGE THE PROBE FROM ONE TAP TESTER TO A DIFFERENT TESTER. DO NOT CHANGE THE CALIBRATION BLOCK FROM ONE TAP TESTER TO ANOTHER. IF YOU DO, YOU CAN FAIL TO REJECT BLADES THAT MUST BE REJECTED.

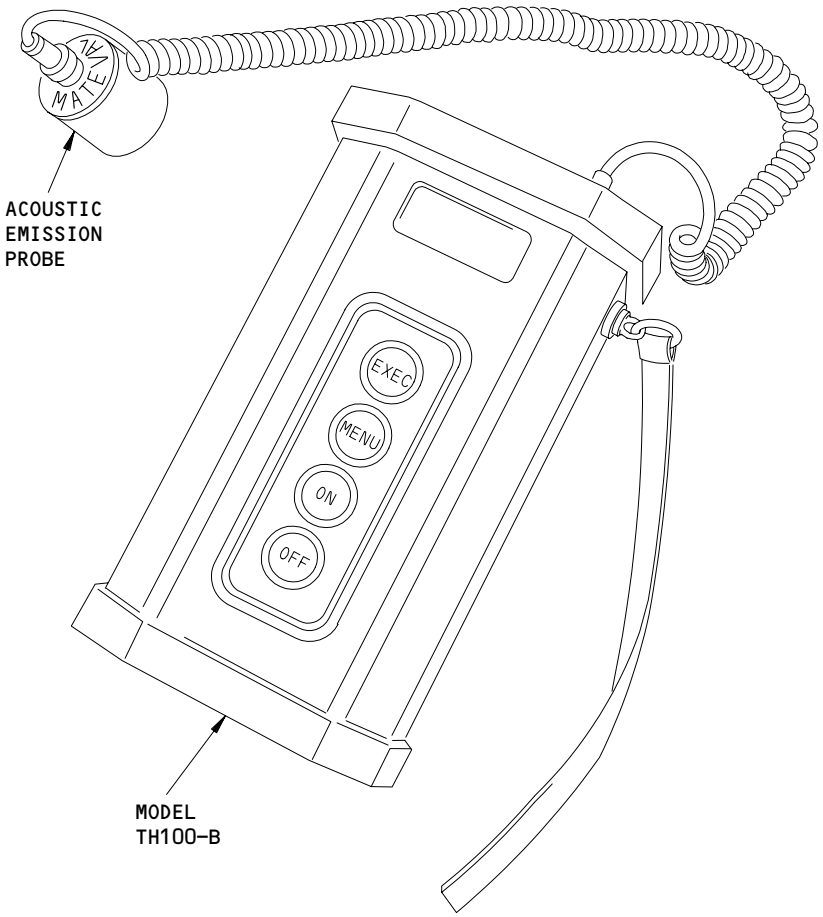
CAUTION: FOR USE AT TEMPERATURES BETWEEN -10 DEGREES C AND 35 DEGREES C, IT IS RECOMMENDED THAT THE UNIT IS STORED AT A TEMPERATURE ABOVE +10 DEGREES C, AND THE UNIT IS EXPOSED TO TEMPERATURES BELOW -10 DEGREES C FOR A MAXIMUM OF 30 MINUTES. DO NOT USE THE UNIT IN TEMPERATURES BELOW -35 DEGREES C.

(a) Do the TAP tester system check (Fig. 603).
  1) Connect the probe to the TAP tester.
  2) Push the ON switch, the display should read RRM THOR UNIT.

    NOTE: This shows that no pass/fail value has been preprogrammed into the unit.

  3) Push the MENU switch, the display should read SYSTEM TEST.
  4) Push the EXEC switch, the display should read SYSTEM OK.

    NOTE: The probe must not touch the rotor blades during the system check. If a value is shown on the TAP tester, the probe is damaged and you must replace the probe as soon as possible.



C3605

LP Rotor Blades - TAP Tester
Figure 603

5) Push the OFF switch to turn the TAP tester off.

NOTE: This is necessary to disable the system test.

(b) Do the function check.

1) Put a small quantity of ultrasonic couplant (OMat 655) to the plastic area on the TAP test block.
2) Put the TAP test block on a table or flat surface.
   a) Connect the probe.
   b) Make sure the probe is in the center of the plastic area.
   c) Make sure the metal around the plastic area is free from the ultrasonic couplant.
3) Push the ON switch on the TAP tester, the display should read RRM THOR UNIT.

CAUTION: DO NOT HOLD THE TAP TEST BLOCK WHEN IT IS NECESSARY TO READ THE DISPLAY. YOUR HAND WILL ABSORB SOME OF THE SOUND PULSES AND WILL GIVE A FASTER DECAY RATE THAN THE VALUES IDENTIFIED ON THE SIDE OF THE TAP TEST BLOCK.

4) Push the EXEC switch.
   a) The value on the display must be between the values shown on the side of the TAP test block.
   b) If the value on the display is more than or less than the values on the side of the TAP test block, you must do these steps:
      1. Clean the test block and,
      2. Do the function test again.
   c) If other error codes are shown, you must refer to the manufacturer's maintenance manual.

      NOTE: If the display values are more than the values shown on the side of the test block, make sure the test block is free to turn in the base. If the test block cannot turn, it absorbs some of the sound pulses from the base and gives incorrect values.

      NOTE: If the displayed value is up to 250 dB/sec more than the upper value on the side of the test block, the tap tester can be used but must be returned to the manufacturer at the first opportunity.

(c) Do the inspection of the lower convex airfoil (Fig. 604).
1) Put a small quantity of ultrasonic couplant (OMat 655) to the lower convex airfoil adjacent to the annulus filler.

CAUTION: DO NOT HOLD THE BLADES WHEN YOU READ THE DISPLAY VALUES. YOUR HAND WILL ABSORB SOME OF THE SOUND PULSES AND GIVE A FASTER DECAY RATE.

2) Put the probe on the fan blade.
a) Push the ON switch, then the EXEC switch.

NOTE: You will see a value for approximately 4 seconds.

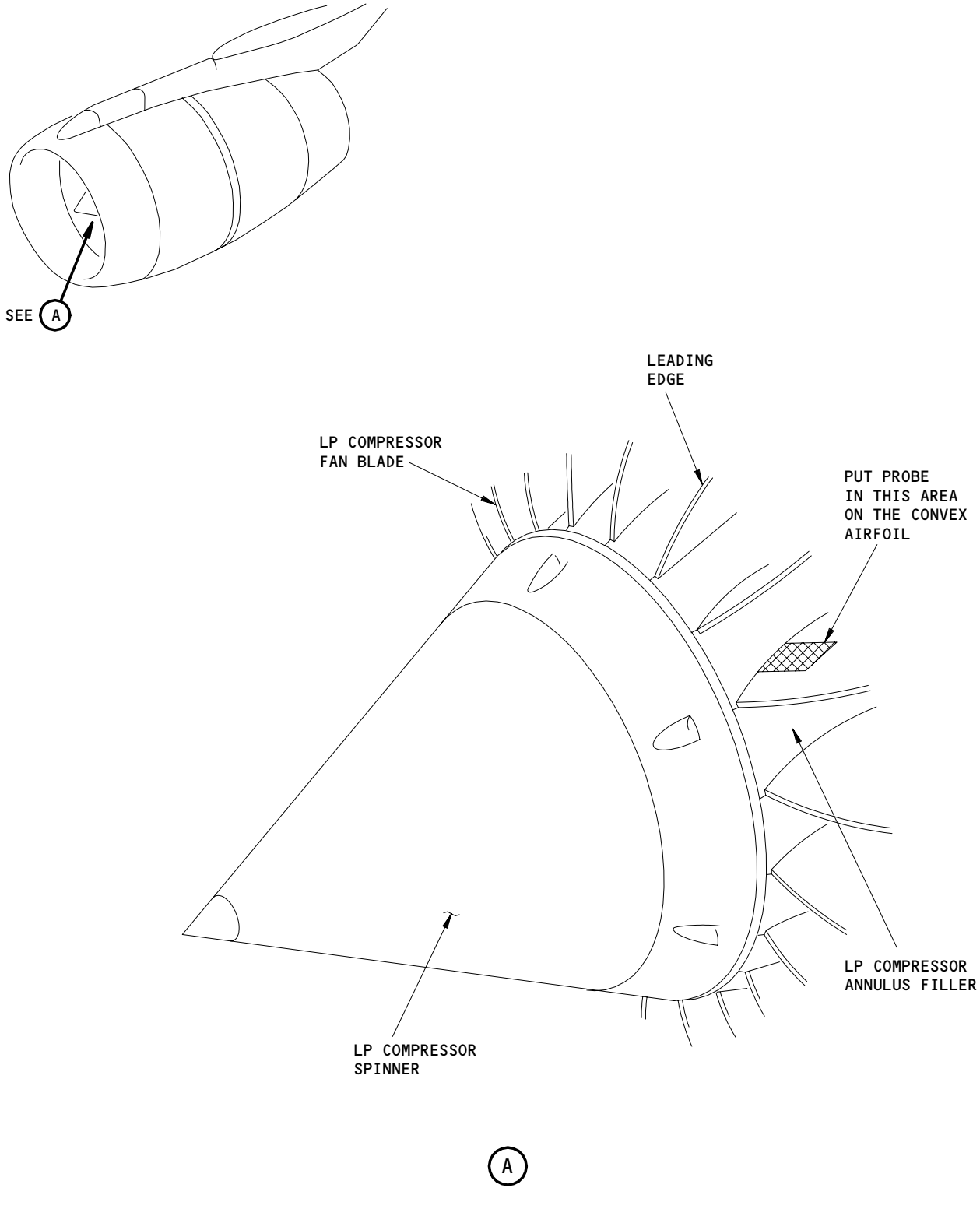
(d) Inspection Standards
1) Reject the rotor blades if the TAP display value is more than 600 dB/sec.
2) The rotor blades can stay in use for five more flight cycles if the TAP display value is more than 500 dB/sec but not more than 600 dB/sec.
a) Reject the rotor blades after the five flight cycles.

G. Put the Airplane Back to its Initial Condition

S 416-020-R00
(1) Any blades that have been removed must be replaced (AMM 72-31-13/401).

S 946-013-R00
(2) Remove the protective work mat from the inlet cowl.

S 866-014-R00
(3) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT



LP Rotor Blade - Location of Probe
Figure 604

S 866-015-R00

(4) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D20, ENGINES START CONT RIGHT

S 726-016-R00

(5) Do this test before the subsequent flight after the replacement of a rotor blade or annulus filler or the repair of a rotor blade:
   (a) Do the test of the LP compressor blade that is shown in the Power Plant Test Reference Table (AMM 71-00-00/501).

LP COMPRESSOR ROTOR BLADES - APPROVED REPAIRS

1. General
   A. This section contains five tasks. The tasks contain the procedures to complete the five repair schemes (FRS) in the list that follows:

Paragraph Number	Repair Number	Title
2	FRS.5025	LP Compressor (Fan) Blades - Repair of the Wide Chord Airfoil
3	FRS.5787	LP Compressor (Fan) Blades - Replacement of the Chocking Pads and the dry film lubricant
4	FRS.5789	LP Compressor (Fan) Blades - Replacement of the Chocking Pads and the dry film lubricant
5	FRS.5186	LP Compressor Wide Chord Fan Blades - Leading Edge Cropping - Fly Back Limits
6	FRS.5135	Annular Filler Assembly - Renew Air Sealing Strips and Buffer Pad

LP Compressor (Fan) Blades - Repair of the Wide Chord Airfoil

TASK 72-31-13-358-001-R00

2. LP Compressor (Fan) Blades - Repair of the Wide Chord Airfoil

A. General

(1) Use this procedure (FRS.5025) for the fan blades with these part numbers:

RB211-535E4 and E4-B Engines

UL16135	UL16171
UL16182	UL19643 SB 72-7917
UL20044 SB 72-7993	UL20132 SB 72-7993
UL20616 SB 72-8377	UL21345 SB 72-8354
UL24528 SB 72-8354	UL24530 SB 72-8354
UL24532 SB 72-8354	UL24534 SB 72-8354
UL24525 SB 72-8354	UL22286 SB 72-8342
UL23122 SB 72-8742	UL27992 SB 72-9132
UL29556 SB 72-9485	UL29511 SB 72-9513
UL37090 SB 72-9751	UL36992 SB 72-9751
UL28601 SB 72-9295	UL28602 SB 72-9295
UL30817 SB 72-9295	UL30933 SB 72-9295
UL33707 SB 72-9295	UL37272 SB 72-9295
UL33709 SB 72-9295	UL37272 SB 72-9295
UL37274 SB 72-9295	UL37276 SB 72-9295
UL37278 SB 72-9295	UL38373 SB 72-9295
UL38377 SB 72-9295	UL38029 SB 72-C138
UL38032 SB 72-C138	FW12308 SB 72-C946
FW12529 SB 72-C946	FW12378 SB 72-C946
FW12377 SB 72-C946	FW12376 SB 72-C946
FW12309 SB 72-C946	FW12379 SB 72-C946
FW12375 SB 72-C946	FW12374 SB 72-C946
FW12373 SB 72-C946	FW12372 SB 72-C946
UL30818 SB 72-9295	UL30935 SB 72-9295
UL38375 SB 72-9295	UL38379 SB 72-9295
FW12367 SB 72-C946	FW12366 SB 72-C946
FW12368 SB 72-C946	FW12368 SB 72-C946
FW12371 SB 72-C946	FW12396 SB 72-C946

(2) If you repair the fan blades with the engine installed, the blades must be glass bead peened at the next shop visit.

(3) Repair of the fan blades will change the performance and the balance of the engine.

NOTE: Thus, the quantity of material that can be removed is kept to a limit.

LP Compressor (Fan) Blades - Repair of the Wide Chord Airfoil

(4) The maximum quantity of material that can be removed from a specified number of blades, given a nominal blade chord of 13.00 inches (330.2 mm), is as follows:

3 blades - 0.500 inch (12.7 mm) x 8.00 inches (203.2 mm)
6 blades - 0.250 inch (6.35 mm) x 8.00 inches (203.2 mm)
12 blades - 0.125 inch (3.17 mm) x 8.00 inches (203.2 mm)

The remaining blades must have no material removed.

(5) If you use scalloping and cropping to remove material, the total quantity for the procedures together must not be more than the limits for one procedure.
(6) The fan blades are a titanium alloy (RR symbol TBQ).
(7) Dressing repairs in zone B only (Fig. 801, Sheet 1); Do a binocular inspection (x10 magnification) of the blades before and after the repair if you do not do a penetrant crack detection test, but you must do a penetrant crack detection test within 50 flight cycles after the repair.

B. Equipment
(1) Penetrant crack test equipment
(2) Portable grinding equipment
(3) Glass-bead peening cabinet
(4) Binocular inspection equipment (x10 magnification)

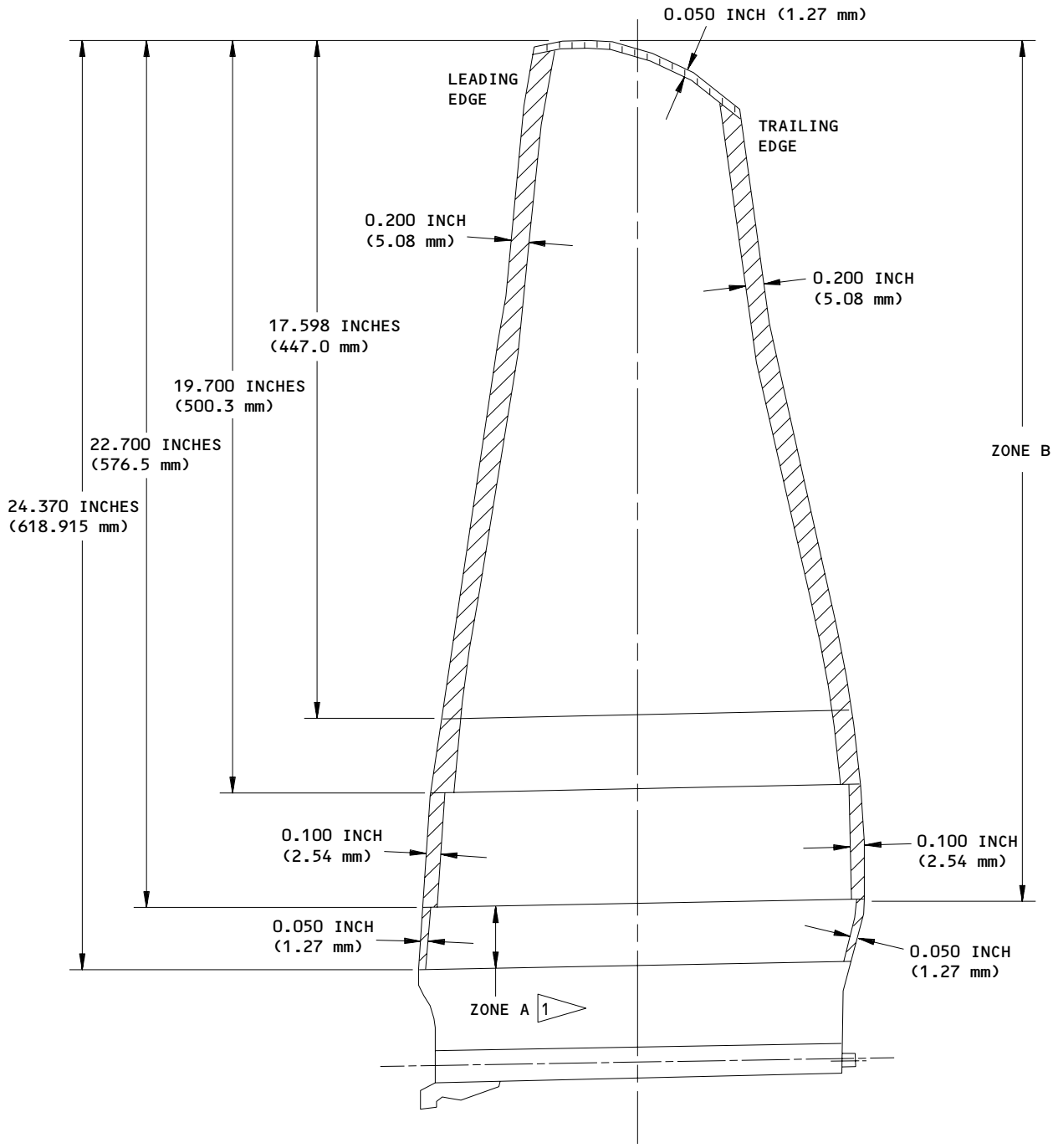
C. Consumable Materials
(1) Abrasive paper (Silicon Carbide)
OMat No. 5/28, 5/42

D. Access
(1) Location Zones
412 Left Nose Cowl
422 Right Nose Cowl

E. Repair the Fan Blades on the LP Compressor (Fig. 801)

S 238-057-R00
(1) Do a penetrant crack test to find the level of damage.
(a) If damage is in zone B (Fig. 801, Sheet 1), do a binocular inspection (x10 magnification) to find the full length of damage.
(b) If damage is in zone B (Fig. 801, Sheet 1), do a binocular inspection (x10 magnification) to find the full length of damage.

NOTE: Penetrant crack test can be deferred in zone B only, for a maximum of 50 flight cycles.

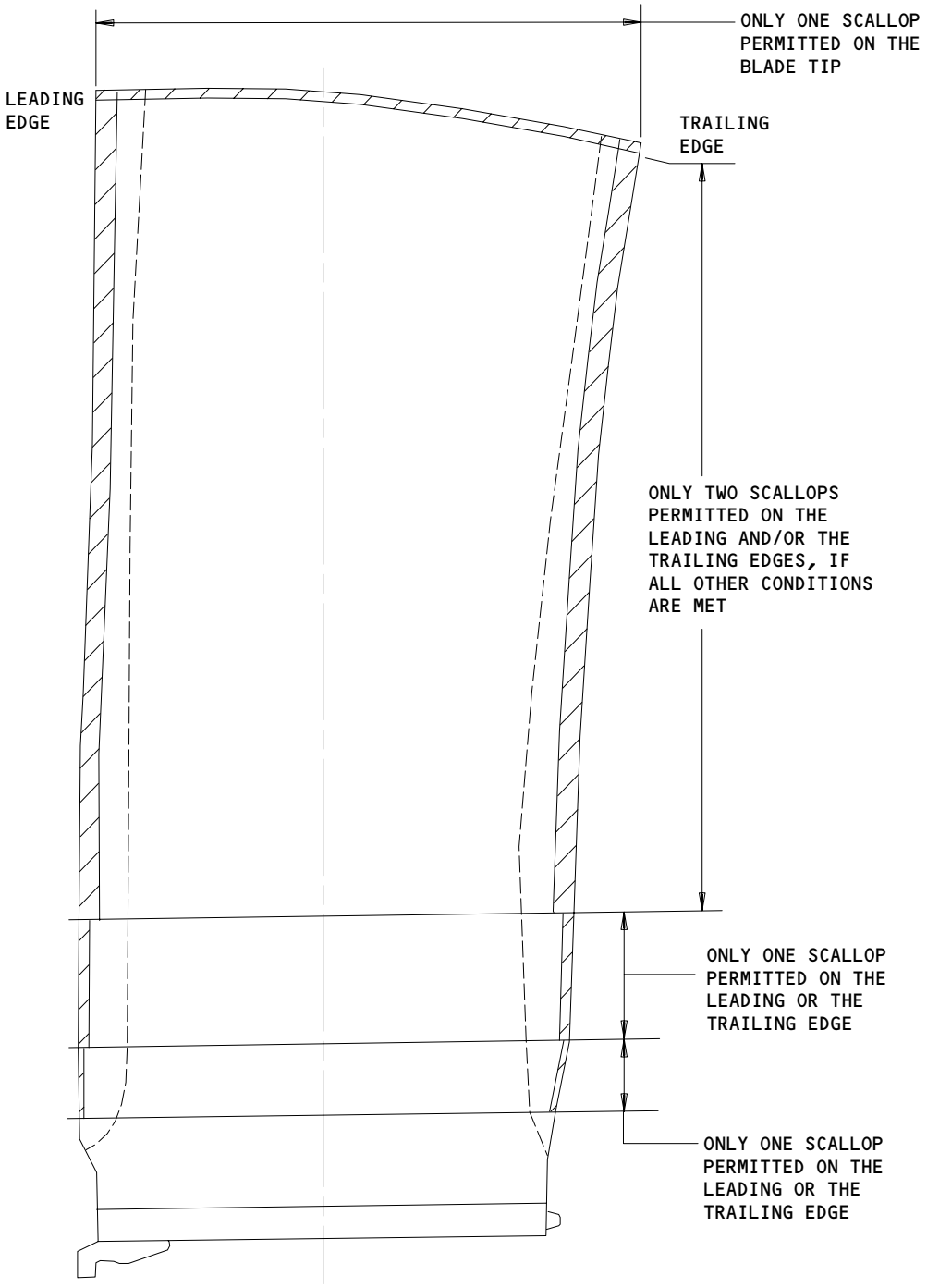


FAN BLADE SCALLOPING LIMITS

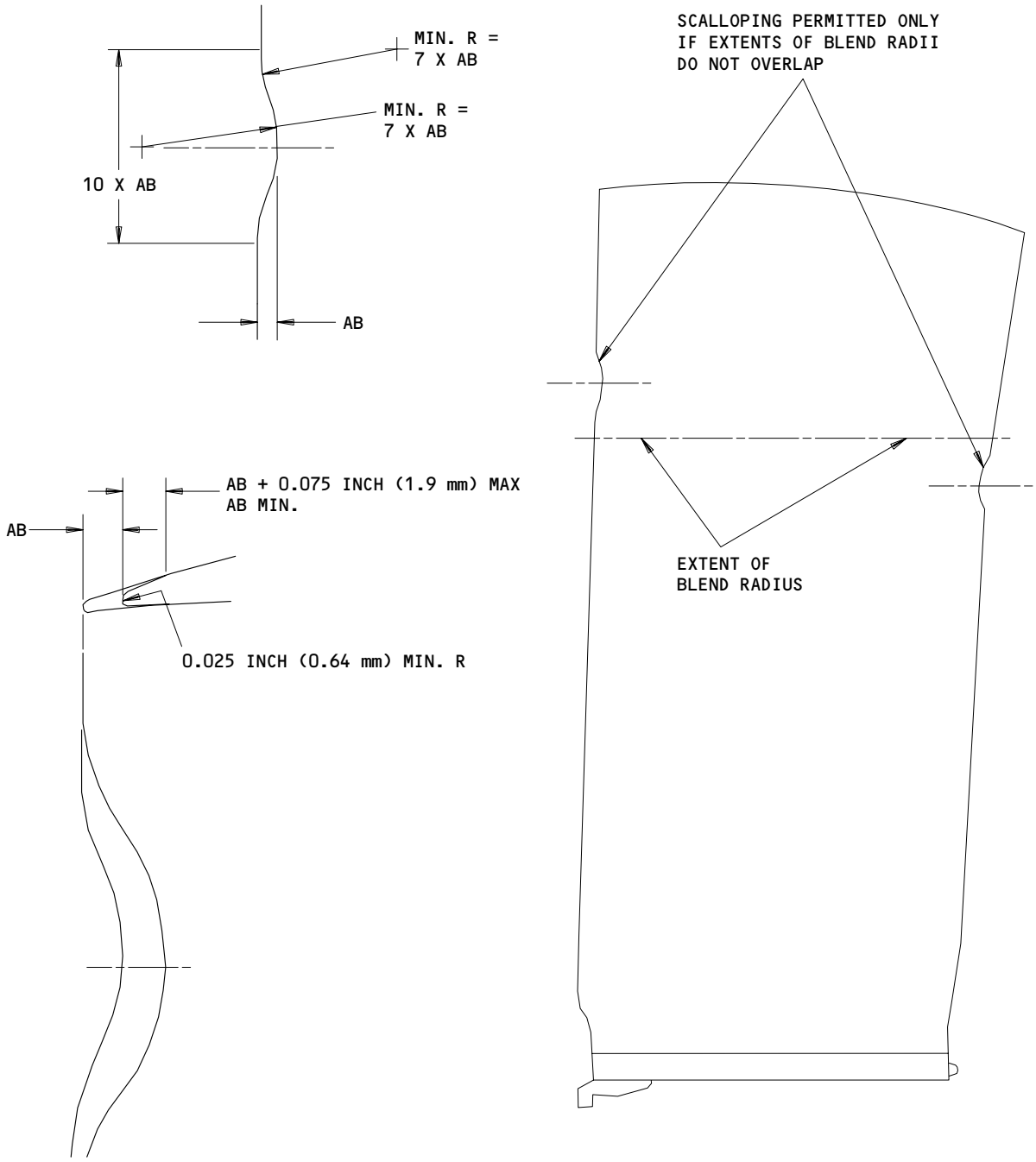
1 DRESS 0.020 INCH (0.5 mm) BELOW THE DAMAGE ON THE LEADING EDGE
MAXIMUM DEPTH OF DAMAGE IS 0.030 INCH (0.76 mm)

DE00066333C

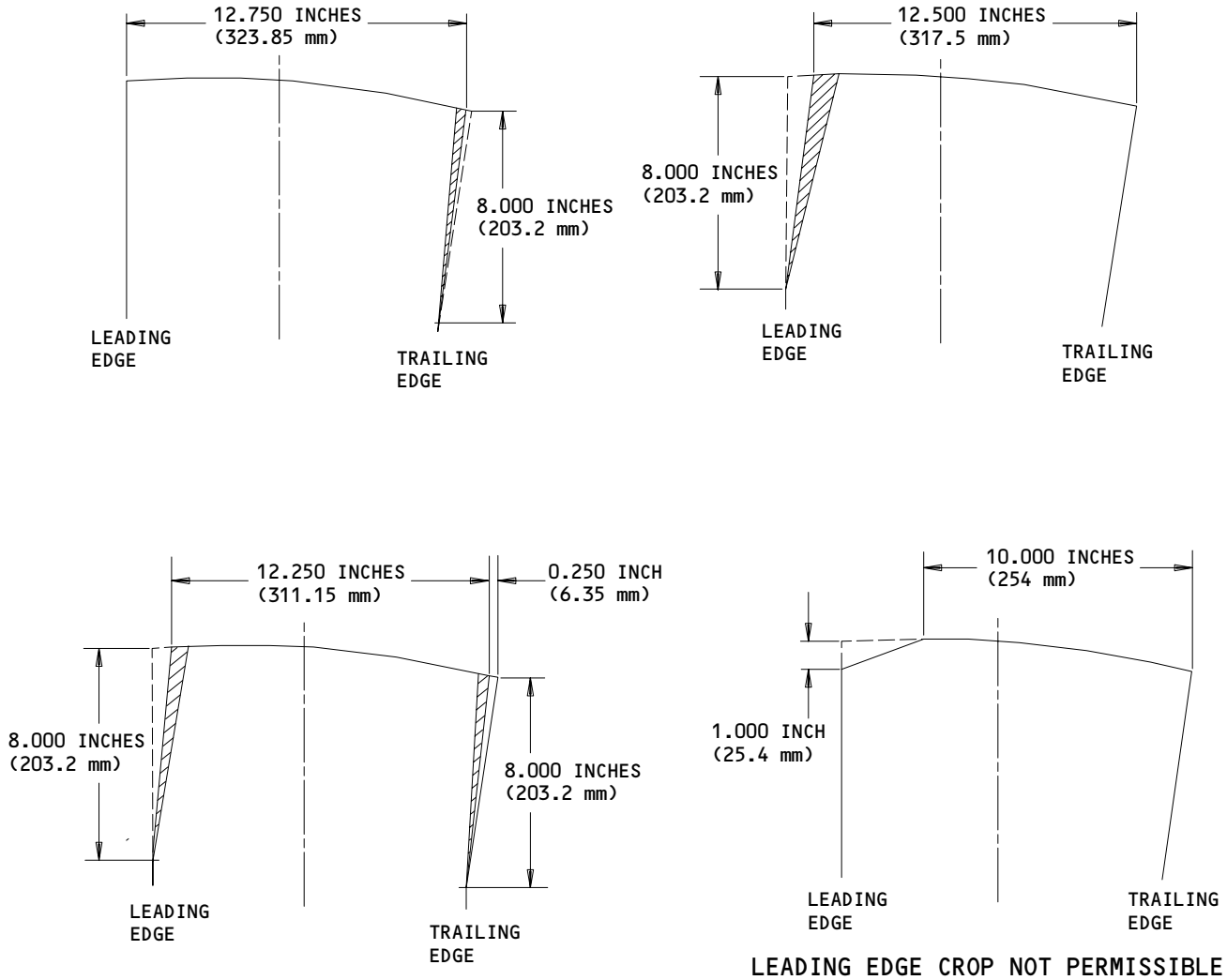
LP Compressor Rotor Blade Airfoil Repair
Figure 801 (Sheet 1)



LP Compressor Rotor Blade Airfoil Repair
Figure 801 (Sheet 2)



LP Compressor Rotor Blade Airfoil Repair
Figure 801 (Sheet 3)

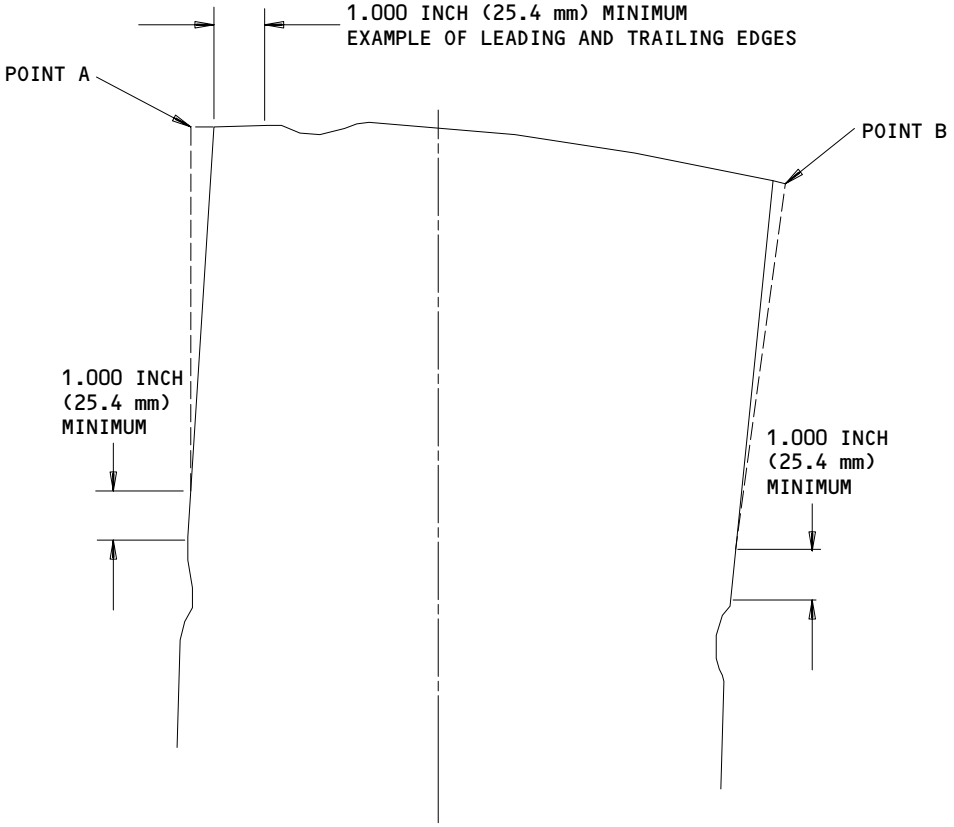


LEADING EDGE CROP NOT PERMISSIBLE WITH TIP CROP

FAN BLADE CROPPING LIMITS

66332A

LP Compressor Rotor Blade Airfoil Repair
Figure 801 (Sheet 4)

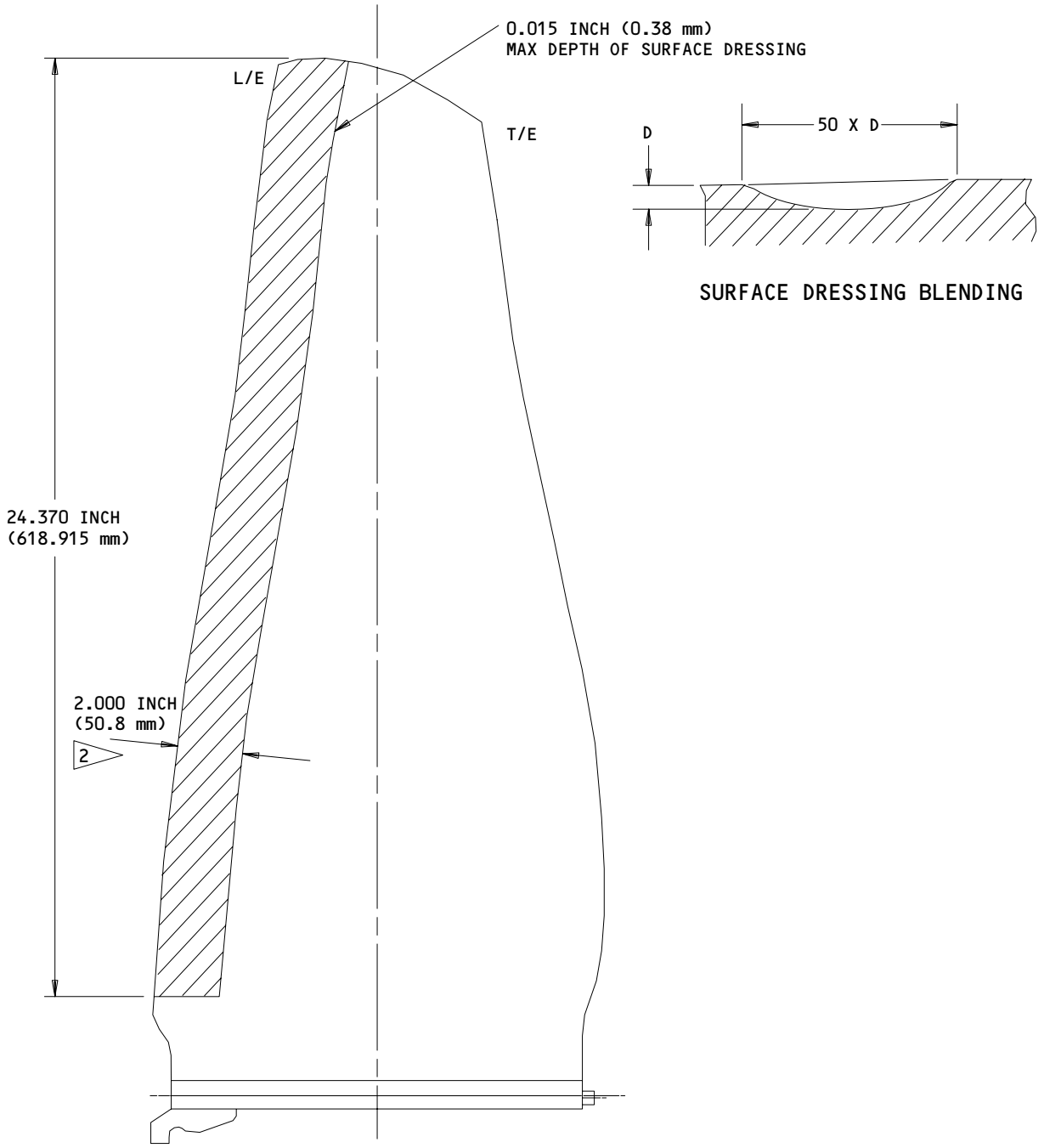


FAN BLADE MINIMUM ACCEPTABLE LIMITS
BETWEEN TIP CROPPING AND SCALLOPING

MINIMUM DIMENSIONS APPLY TO ALL COMBINATION
OF CROPPING AND SCALLOPING IN THE BLADE TIP AREA.
IF THE TIP CROPPING HAS NOT BEEN DONE,
DIMENSIONS APPLY FROM BLADE TIP POINTS A AND B.

66010

LP Compressor Rotor Blade Airfoil Repair
Figure 801 (Sheet 5)



SURFACE DRESSING BLENDING

FAN BLADE SURFACE DRESSING

2 MEASURE DIMENSION ON THE BLADE SURFACE. DRESSING (INCLUDES BLENDING) NOT MORE THAN THIS BOUNDARY.

82507

LP Compressor Rotor Blade Airfoil Repair
Figure 801 (Sheet 6)

LP Compressor (Fan) Blades - Repair of the Wide Chord Airfoil

S 358-003-R00

(2) Do these steps to repair the damaged area of the fan blade:

CAUTION: USE ONLY WHEELS, STONES AND ABRASIVE PAPERS OF THE SILICONE CARBIDE TYPE TO REMOVE MATERIAL FROM THE FAN BLADES. IF YOU USE THE ALUMINUM OXIDE TYPES, ALUMINUM PARTICLES CAN STAY ON THE FAN BLADES. THIS CAN CAUSE GALVANIC CORROSION OF THE FAN BLADES.

MAKE LIGHT CUTS IF YOU USE A MECHANICAL CUTTER. IF NOT, THE FAN BLADES CAN OVERHEAT AND BE DAMAGED.

(a) Apply light pressure with a wheel, stone or abrasive paper to remove cracks or damaged material from the fan blade.

NOTE: Remove material until all of the damage is gone.

(b) Do these steps to repair the finish on the fan blade (Sheets 3, 4 and 6):
1) Use abrasive paper to smooth and polish the area where you removed the damaged material.
2) Make sure all marks caused by the abrasive paper are in a radial direction from the blade root to the blade tip.
3) After you polish the repair area, the finish must be equivalent to the finish of the area around the repair area.

(c) Do these steps to repair the radius on the leading edge of the fan blade (Sheet 3):
1) Use abrasive paper to remove the minimum quantity of material to repair the leading edge radius.
2) Use abrasive paper to lightly polish the leading edge of the blade.
3) Make sure the blade is smooth between the leading edge radius and the airfoil surface.
4) Make sure all marks caused by the abrasive paper are in a radial direction from the blade root to the blade tip.
5) After you polish the leading edge, the finish must be equivalent to the finish of the adjacent area.

S 218-004-R00

(3) Do a visual check of the fan blade.

S 228-005-R00

(4) Do a dimensional check of the blade.

LP Compressor (Fan) Blades - Repair of the Wide Chord Airfoil

S 238-006-R00

(5) Do a penetrant crack test on the repair area.
   (a) If damage is in zone B (Fig. 801, Sheet 1), do a binocular inspection (x10 magnification) and then do a penetrant crack detection test within 50 flight cycles.

S 978-007-R00

(6) Write the repair number (FRS.5025) in the engine log book until you can do these steps at the next shop visit:
   (a) Glass bead peen the repair area.
   (b) Vibro-engrave FRS.5025 adjacent to the blade part number.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

TASK 72-31-13-968-008-R00

3. LP Compressor Blades - Replacement of the Chocking Pads and the Dry Film Lubricant

A. General

(1) Use this procedure (FRS.5787) to replace the chocking pads and the dry film lubricant on the LP compressor blades which have these part numbers:

RB211-535E4 and E4-B Engines

PART NO.	MOD NO.	ASSY	PART NO.	MOD NO.	ASSY
UL21345	SB72-8354	B	UL24528	SB72-8354	B
UL24530	SB72-8354	B	UL24532	SB72-8354	B
UL24534	SB72-8354	B	UL24525	SB72-8354	B
UL22286	SB72-8354	B	UL23122	SB72-8742	B
UL27992	SB72-9132	B	UL29556	SB72-9485	B
UL29511	SB72-9513	C	UL37090	SB72-9751	B
UL36992	SB72-9751	B	UL38029	SB72-C138	B
UL38032	SB72-C138	B	FW12308	SB72-C946	A
FW12529	SB72-C946	A	FW12377	SB72-C946	A
FW12376	SB72-C946	A	FW12309	SB72-C946	A
FW12379	SB72-C946	A	FW12378	SB72-C946	A
FW12375	SB72-C946	A	FW12374	SB72-C946	A
FW12373	SB72-C946	A	FW12372	SB72-C946	A
FW12367	SB72-C946	A	FW12366	SB72-C946	A
FW12368	SB72-C946	A	FW12371	SB72-C946	A
FW12396	SB72-C946	A	UL28601	SB72-9295	B
UL28602	SB72-9295	B			
UL30817	SB72-9295	B	UL30933	SB72-9295	B
UL33707	SB72-9295	C	UL37272	SB72-9295	
UL37276	SB72-9295		UL38373	SB72-9295	B
UL37277	SB72-9295		UL30819	SB72-9295	B
UL28602	SB72-9295	B	UL33709	SB72-9295	C
UL30935	SB72-9295	B	UL37278	SB72 9295	
UL37274	SB72-9295				
UL38377	SB72-9295	B	UL38379	SB72-9295	B
UL38375	SB72-9295	B			
UL16171		D	UL20132		D
UL19643		D	UL20616		D
UL20044		D	UL30933		B

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

(2) It is recommended that this repair be used with FRS5789. Re-apply the dry film lubricant on the LP Compressor Fan Disc.
(3) If a batch or set of fan blades are to be repaired with dry film lubricant, it is recommended that the fan blades be laid on a flat surface. Then apply the dry film lubricant to one side of the fan blades. Once the coat is touch dry, the batch of fan blades are turned over and the dry film lubricant applied to the other side.
(4) Two alternative methods for the replacement of the chocking pads again are provided in this repair scheme. Option 1 uses OMat 872 Silicoset compound and option 2 uses OMat 2/117 double-sided tape. The two methods used in any order on any blade.
(5) Two alternative methods for the replacement of the dry film lubricant are provided in this repair scheme. Method 1 is the Rapid Relube System and Method 2 is a spray application. Method 1 is the recommended application of the dry film lubricant, both are acceptable.
(6) The Rapid Relube System uses a purposely-designated Rapid Relube Kit that contains cleaning and applicator tools for the relubrication of one fan blade set and fan disc. The Rapid Relube Kit is a disposable kit. This must be disposed of accodingly after the fan blade set and fan disc have been relubricated.
(7) A video has been made in support of the new Rapid Relube method. It is recommended that the video be viewed for training purposes - Trent fan blade removal, root repair and refit DV3194. This video is for reference only. The relubrication must be carried out in accordance with the procedure given in this document.
(8) Clean cotton or polythene gloves must be worn at all times in this repair.

B. Equipment
(1) Standard Equipment
(2) Inspection Equipment
(3) Corrugated non-metallic scraper
(4) Non-metallic scraper
(5) Non-metallic stiff bristle brush

C. Consumable Materials
(1) Masking tape, Zinc Oxide (PE.30) - OMat 230
(2) Acetone - OMat 150
(3) Isopropyl Alcohol - OMat 1/40
(4) Cleaning Solvent - OMat 1/257
(5) Cold Curing Silicone Compound (White) - OMat 872
British Spec/Ref - Silcoset 152
(6) Double-sided adhesive tape - OMat 2/117
(7) Cloth, Lint-free - OMat 2/101
(8) Lubricant, Dry Film - OMat 4/70
(9) Rapid Relube Kit - OMat 4/72

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

(10) Scotchbrite - OMat 583
(11) Scotchbrite - OMat 584
(12) Primer - OMat 8/221
(13) Primer - OMat 8/222
(14) Primer - OMat 8/223

D. Parts

(1)

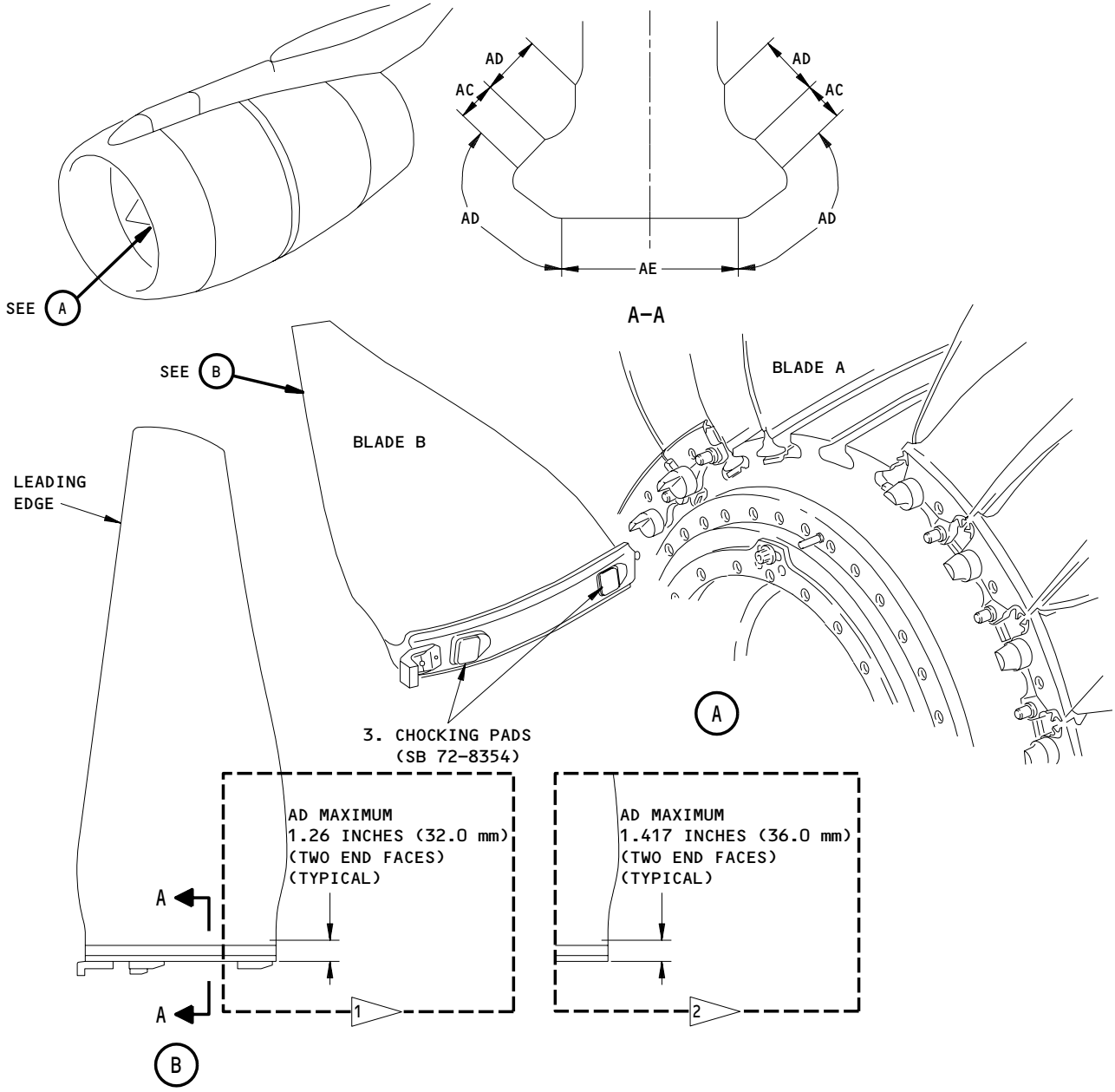
ITEM	PART NO.	PART IDENT	ASSY	QTY
1	FW11180	Front Chocking Pad	A	As Necessary
1	UL21349	Front Chocking Pad	B, C	As Necessary
2	FW11185	Rear Chocking Pad	A	As Necessary
2	UL21346	Rear Chocking Pad	B, C	As Necessary
3	FW11218	Front Chocking Pad	A	As Necessary
3	UL33592	Front Chocking Pad	B	As Necessary
4	FW11188	Rear Chocking Pad	A	AS Necessary
4	UL33588	Rear Chocking Pad	B	As Necessary

E. Method 1 - Replacement of the Dry Film Lubricant by Rapid Relube and Replace The Chocking Pads.

S 018-168-R00

(1) Remove the loose Chocking Pad(s) (if necessary) (Fig. 803).
  (a) Use a non-metallic scraper to remove the loose chocking pad from the fan blade. Chocking pads attached with adhesive can be used again if the chocking pad is not damaged.
  (b) Use a non-metallic scraper to clean the adhesive that remains from the chocking pad.
    1) Use OMat 2/101 lint-free cloth and OMat 150 Acetone, or OMat 1/40 Isopropyl alcohol, or OMat 1/257 Cleaning Solvent.
    2) Take care not to damage the chocking pad, reject if damaged.

NOTE: Pour the cleaning solvent into a container to prevent cantamination of the primary container.



NOTE: APPLY THE DRY FILM LUBRICANT TO THE AREAS IDENTIFIED AC FOR THE FULL LENGTH OF THE FAN BLADE DOVETAIL ROOT TO THE INSTRUCTIONS.

DRY FILM LUBRICANT IS PERMITTED ON THE AREAS IDENTIFIED AD.

DRY FILM LUBRICANT IS NOT PERMITTED ON THE AREAS IDENTIFIED AE.

DRY FILM LUBRICANT IS NOT PERMITTED IN AMY OTHER AREAS UNLESS SPECIFIED DIFFERENTLY.

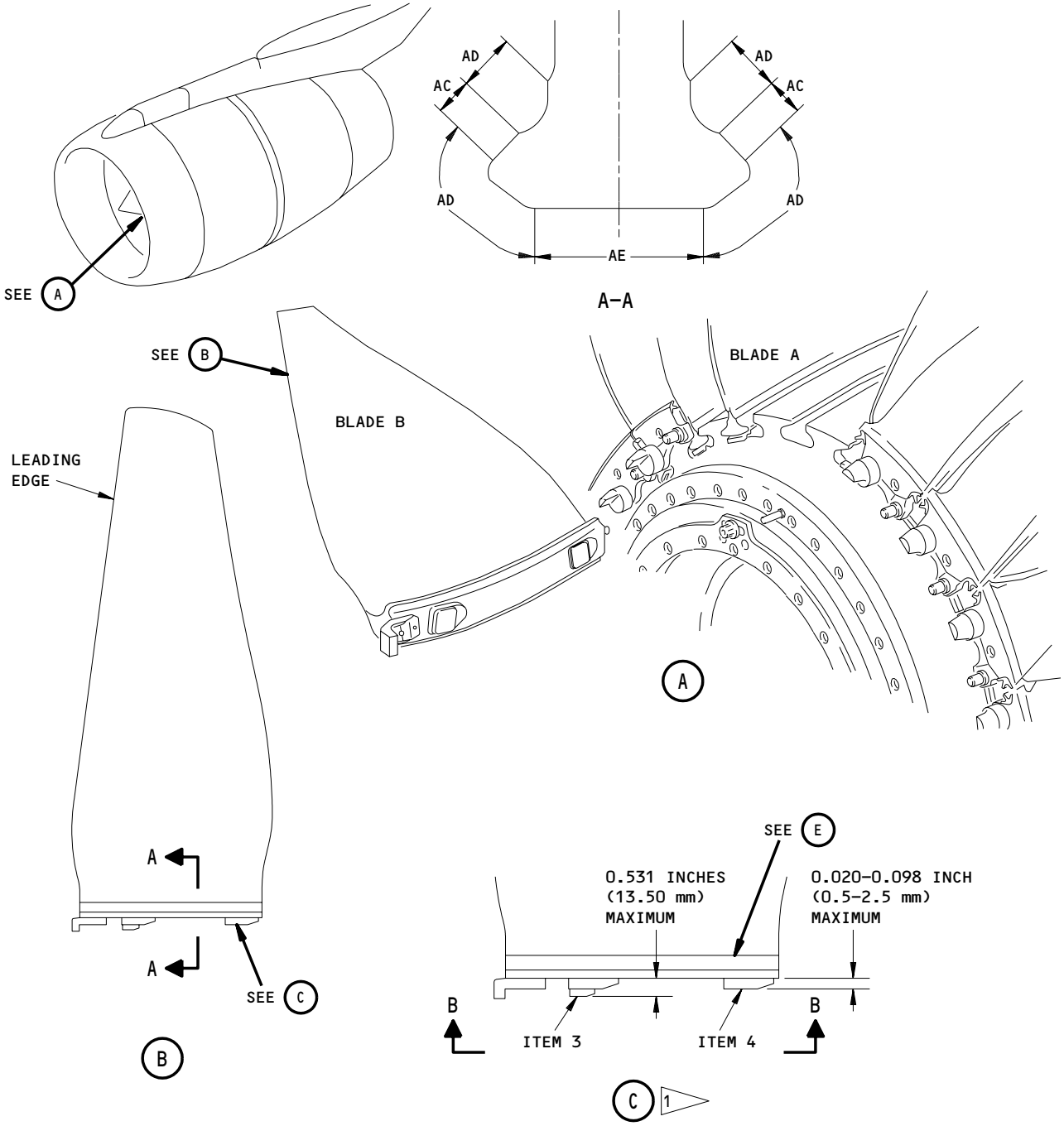
UNWANTED DRY FILM LUBRICANT MUST BE REMOVED TO THE INSTRUCTIONS.

1 ASSEMBLY A, B, AND C

2 ASSEMBLY D

DER0009550A, DER0009551A

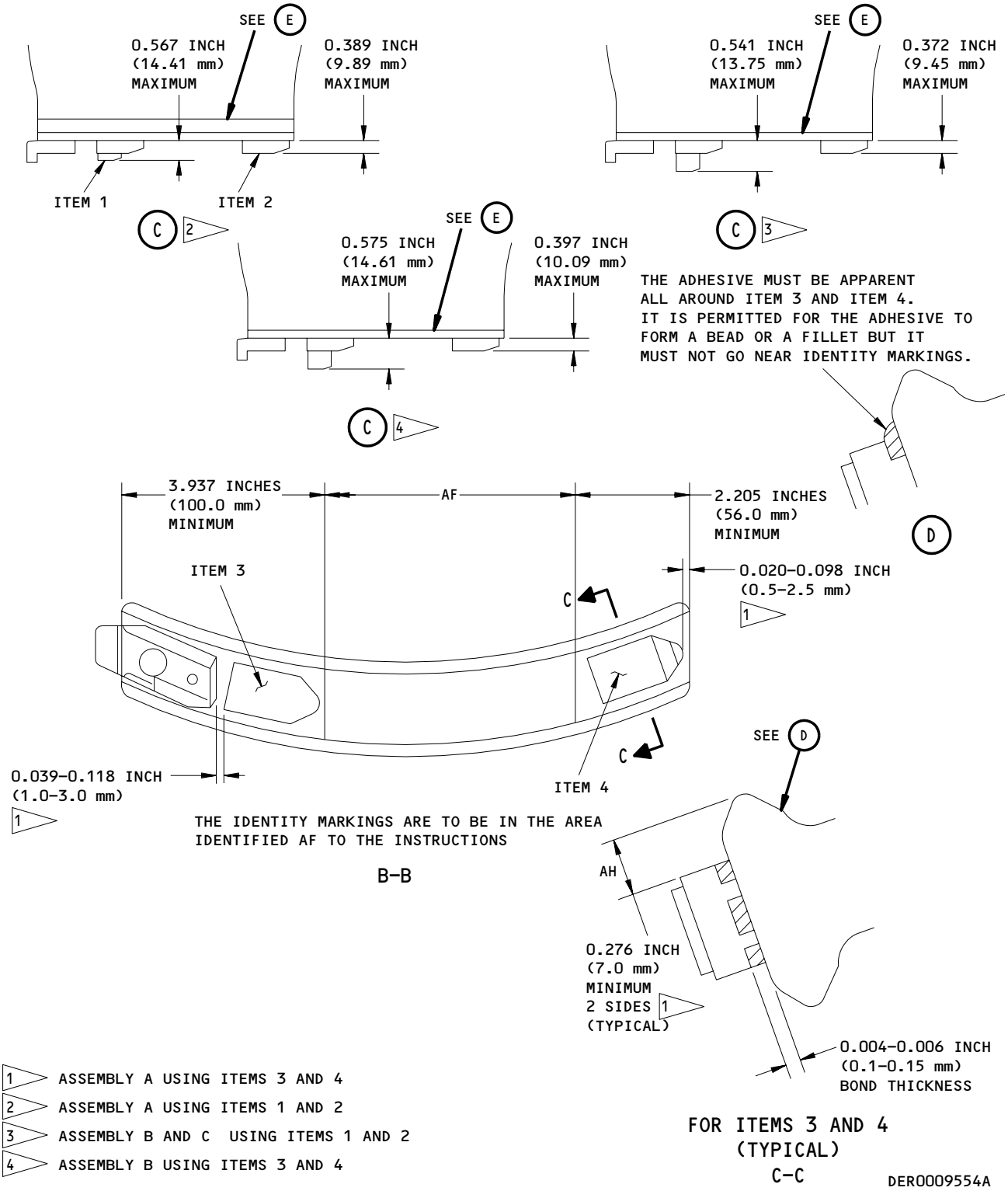
Repair Details and Dimensions (Assembly A, B, C and D)
Figure 802



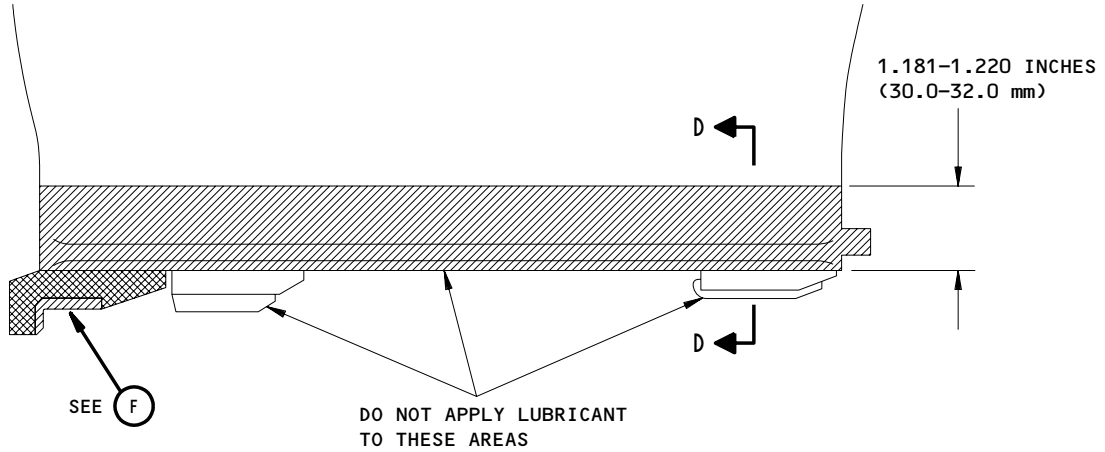
NOTE: VIEW ON THE LP COMPRESSOR ROTOR BLADE TO SHOW THE REPLACEMENT OF THE CHOCKING PADS WHEN USING ITEM 3 AND ITEM 4 AS ALTERNATIVES TO ITEM 1 AND ITEM 2

DER0009550A,
DER0009552A

Repair Details and Dimensions
Figure 803 (Sheet 1)



Repair Details and Dimensions
Figure 803 (Sheet 2)



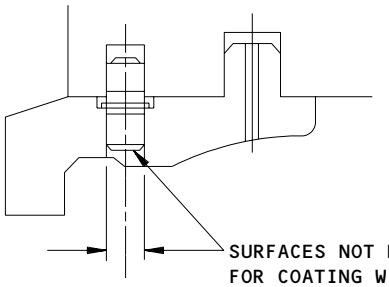
LEGEND:

APPLY DRY FILM LUBRICANT TO THESE AREAS

OVERSPRAY IS ALLOWED IN THESE AREAS

UNMARKED AREA: NO DRY FILM LUBRICANT PERMITTED

E



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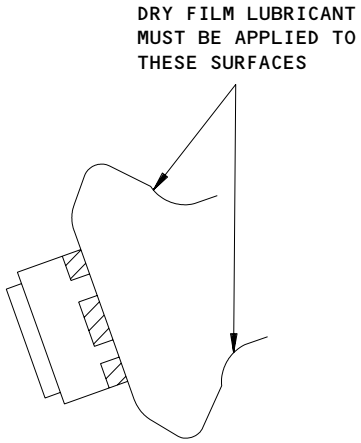


D–D

DE000J3329A

Repair Details and Dimensions
Figure 803 (Sheet 3)

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

(c) Use a non-metallic scaper to clean the adhesive that remains from the fan blade surface.
1) Use OMat 2/101 lint-free cloth and OMat 150 Acetone, or OMat 1/40 Isopropyl Alcohol, or OMat 1/257 Cleaning Solvent.
2) Take care not to damage the fan blade.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary container.

S 128-169-R00

(2) Abrade the bonding area of the chocking pad.
(a) Use OMat 583 Scotchbrite or OMat 584 Scotchbrite to abrade the chocking pad bonding area (mating surface).
(b) Use a non-metallic scraper to clean the chocking pad.
1) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl Alcohol or 1/257 Cleaning Solvent.
2) Take care not to damage the chocking pad, reject if damaged.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary container.

S 118-197-R00

CAUTION: DO NOT USE SCOTCHBRITE OR AN EQUIVALENT MATERIAL TO CLEAN THE THE FAN BLADE. THIS WILL CAUSE DAMAGE TO THE METCO COATING OF THE FAN BLADE.

(3) Clean the fan blade.
(a) Use an aqueous wash or use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl Alcohol or OMat 1/257 Cleaning Solvent to remove the grease from the fan blade.

S 118-198-R00

CAUTION: DO NOT USE SCOTCHBRITE OR EQUIVALENT MATERIAL TO CLEAN THE FAN BLADE. THIS WILL CAUSE DAMAGE TO THE METCO COATING OF THE FAN BLADE.

(4) Clean the Fan Blade Root.
(a) Use OMat 4/72 Rapid Relube Kit and fan blade cleaning pads to remove the loose dry film lubricant from the dovetail root.
1) Regularly change the fan blade cleaning pad.
2) Use all of the six cleaning pads on a set of fan blades.
3) Discard the cleaning pads after use.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

(b) Use OMat 2/101 lint-free cloth and OMat 150 Acetone, or OMat 1/40 Isopropyl Alcohol, or OMat 1/257 Cleaning Solvent.

NOTE: Only remove the loose Dry Film Lubricant.

(c) Let the Fan Blade Root dry.

S 228-193-R00

(5) Examine the Fan Blade Root (AMM 72-31-13/601).

S 648-194-R00

(6) Apply the Dry Film lubricant to the Fan Blade Root (Fig. 802, and Fig. 803).

(a) Assemble the fan blade applicator tool. Use OMat 4/72 Rapid Relube Kit, Fan Blade Applicator Handle (2 each) and Paint Pads (6 each).

1) Assemble the fan blade applicator handle and paint pad.

NOTE: The applicator paint pad must be replaced after every eight single-sided fan blade root applications, as the paint pad becomes tacky and the pad deteriorates.

NOTE: Loose fibers must be removed from the paint pads, as the fibers may be applied to the blade root within the dry film lubricant. If possible, do not apply fibers to the coating.

(b) Prepare the dry film lubricant.

1) Use OMat 4/70 Dry Film Lubricant and OMat 4/72 Rapid Relube Kit, paint tray.
2) Shake for one minute before you open the container.
3) Remove any congealed dry film lubricant from the Container.
4) Pour a small amount of dry film lubricant into the paint tray, approx. dia. 1.0 inch (25.4 mm).

NOTE: It is important to pour a small amount of dry film lubricant into the paint tray, as the dry film lubricant dries quickly.

NOTE: Before you put more Dry Film Lubricant into the paint tray, remove any dried lubricant from the paint tray.

(c) Apply dry film lubricant to the applicator paint pad.

1) Make sure all the paint pad fibers are coated with dry film lubricant.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

2) Remove any unwanted dry film lubricant on the edge of the paint tray.
3) The paint pad must be a flat dry gray color.

NOTE: Do not apply too much dry film lubricant to the the paint pad. This will cause drips.

(d) Apply the dry film lubricant to the fan blade root.
1) Put the applicator paint pad on one end of the fan blade root, and carefully press down.
2) Apply the dry film lubricant along the fan blade root and back. For example, apply the dry film lubricant from the left to right of the fan blade root, and then from the right to left.

NOTE: Do not apply more dry film lubricant to the paint pad during this application.

NOTE: The applicator paint pad must be replaced when the the fibers become tacky or every eight single sided fan blade root applications.

(e) Visually inspect the dry film lubricant coating to make sure the surface coating is flat.
1) If an area in AC is uncoated and the dry film lubricant is not dry, then apply the dry film lubricant to the fan blade root.
a) Continue from "visually inspect the dry film", above.
2) If an area in AC is uncoated and the dry film lubricant is dry, then remove the coating.
a) Use OMat 2/101 lint-free cloth with OMat 150 or OMat 1/40 Isopropyl Alcohol or OMat 1/257 cleaning solvent.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

b) Continue from "prepare dry film lubricant", above.

(f) Visually inspect the dry film lubricant coating for fibers.
1) If the coating contains more than 5 fibers per sq. cm (0.155 sq. in.) then remove the coating. Use OMat 2/101 lint-free cloth with OMat 150 Acetone or OMat 1/40 isopropyl alcohol or Omat 1/257
2) Continue from "prepare the dry film lubricant", above.

(g) Visually inspect the fan blade root for drips.
1) Use OMat 2/101 lint-free cloth with OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent to remove all drips.

(h) Let the dry film lubricant dry then turn over the fan blade. Dry for a minimum of ten minutes at room temperature.

(i) Apply the dry film lubricant to the fan blade dovetail roots that remain.

(j) Let the dry film lubricant cure.
1) Let the dry film lubricant dry in the air for a minimum of 30 minutes before you assemble the chocking pads.

S 908-195-R00

(7) Replace the chocking pads (Fig. 803).

(a) Locally remove the grease from the fan blade and chocking pad.
1) Use OMat 2/101 lint-free cloth with OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent. Use the cocking pad that was removed or use:

ITEM	PART NO.	PART IDENT	ASSY	
1	FW11180	Front Chocking Pad	A	As Necessary
1	UL21349	Front Chocking Pad	B, C	As Necessary
2	FW11185	Rear Chocking Pad	A	As Necessary
2	UL21346	Rear Chocking Pad	B, C	As necessary
3	FW11218	Front Chocking Pad	A	As necessary
3	UL33592	Front Chocking Pad	B	As Necessary
4	FW11188	Rear Chocking Pad	A	As Necessary
4	UL33588	Rear Chocking Pad	B	As Necessary

2) Let the chocking pad dry.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

(b) Bond the chocking pad to the fan blade (Option 1 - Sicoset compound) (Fig. 803).

NOTE: You must not bond the fan blade and the chocking pad until the preparation is completed.

NOTE: This method is an alternative to Option 2 - Double sided adhesive tape.

1) Apply a thin coat of primer to the chocking pad and the fan blade area.
   a) Use OMat 8/221 or OMat 8/222 or OMat 8/223 primer.
2) Dry in the air for 30 minutes at room temperature.
   a) Apply the Silcoset compound to the chocking OMat 872 Cold Curing Silcoset Compound. Use a corrugated non-metallic scraper or an applicable alternative.
   b) Use OMat 230 masking tape or an applicable OMat alternative to set the chocking pad and hold in position with masking tape.
   c) Dry in the air for 48 hours at room temperature.

(c) Bond the chocking pad to the fan blade (Option 2 - Double sided adhesive tape) (Fig. 803).

NOTE: You must not bond the fan blade and the chocking pad until the preparation is completed.

NOTE: This method is an alternative to Option 1 - Silcoset compound.

1) Apply the adhesive tape to the chocking pad. Use OMat 2/117 double sided adhesive tape.
   a) Remove the backing tape and apply to the chocking pad.
   b) Air bubbles, creases, and wrinkles are not permitted.
   c) Cut the tape to the contour of the chocking pad.
   d) Make sure that the tape is flush or 0.039 (1.00 mm) more than the edge of the chocking pad.
2) Apply the chocking pad to the fan blade.
   a) Remove the backing tape from the adhesive tape.
   b) Position the chocking pad and attach to the fan blade. Apply the same amount of pressure on the chocking pad and the fan blade.

(d) Examine the part.
   1) Examine and measure the dimensions of the part.
   2) Use inspection equipment.
   3) Make sure the chocking pad is in the correct position.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

4) Make sure the chocking pad is securely fixed to the fan blade. If not, remove and replace the chocking pad.

S 938-196-R00

(8) Identify the repair.

(a) Record FRS5787/2 in the log book.

F. Method 2 - Replacement of the Dry Film Lubricant by spray application and replace the chocking pads

S 018-170-R00

(1) Remove the loose chocking pads (if necessary) (Fig. 803).

(a) Use a non-metallic scraper to remove the loose chocking pad from the fan blade.

1) Chocking pads attached with adhesive can be used again if the chocking pad is not damaged.

(b) Clean adhesive that remains from the chocking pad.

1) Use a non-metallic scraper, OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

2) Take care not to damage the chocking pad, reject if damaged.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary containaer.

(c) Clean the adhesive that remains from the fan blade surface.

1) Use a non-metallic scraper, OMat 2/101 lint-free cloth and OMat 1/40 Isopropyl alcohol or OM1/257 cleaning solvent.

2) Take care not to damage the fan blade.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary container.

S 128-171-R00

(2) Abrade the bonding area of the chocking pad (Fig. 803).

(a) Abrade the chocking pad bonding area (mating surface). Use OMat 583 Scotchbrite or OMat 584 Scotchbrite.

(b) Clean the chocking pad.

1) Use a non-metallic scraper, OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

2) Take care not to damage the chocking pad, reject if damaged.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary container.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

S 118-173-R00

CAUTION: DO NOT USE SCOTCHBRITE OR AN EQUIVALENT MATERIAL TO CLEAN THE THE FAN BLADE. THIS WILL CAUSE DAMAGE TO THE METCO COATING OF THE FAN BLADE.

(3) Clean the fan blade.
  (a) Remove the grease from the fan blade.
    1) Use a aqueous wash or use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

S 118-172-R00

CAUTION: DO NOT USE SCOTCHBRITE OR AN EQUIVALENT MATERIAL TO CLEAN THE N THE FAN BLADE. THIS WILL CAUSE DAMAGE TO THE METCO COATING OF THE FAN BLADE.

(4) Clean the Fan Blade Root.
  (a) Remove the loose dry film lubricant from the dovetail root.
    1) Use OMat 4/72 Rapid Relube Kit, fan blade cleaning pads.
    2) Regularly change the fan blade cleaning pad.
    3) Use all six of the cleaning pads on a set of fan blades.
    4) Dicard the cleaning pads after use.
  (b) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

    NOTE: Only remove the loose dry film lubricant.

  (c) Let the fan blade root dry.

S 218-174-R00
(5) Examine the fan blade root (AMM 72-31-13/601).

S 648-175-R00
(6) Apply the dry film lubricant to the fan blade root.
  (a) Apply masking tape to adjacent areas where it is not necessary to apply the dry film lubricant. Use OMat 230 adhesive masking tape or an applicable OMat alternative (Fig. 803).

S 118-176-R00
(7) Clean the repair surface.
  (a) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.
  (b) Let the surface dry.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

S 648-178-R00

CAUTION: DO NOT APPLY TOO THICK A LAYER OF DRY FILM LUBRICANT IN ONE APPLICATION. THIS WILL DECREASE THE BONDING PROPERTIES OF THE LUBRICANT.

CAUTION: DO NOT APPLY TOO THICK A LAYER OF DRY FILM LUBRICANT. THIS CAN CAUSE BLADE CHOCKING PROBLEMS.

CAUTION: DO NOT HEAT THE DRY FILM LUBRICANT TO DRY IT. THIS WILL DECREASE THE BONDING PROPERTIES OF THE LUBRICANT.

(8) Apply the dry film lubricant to the blade (Fig. 803). Use OMat 4/51 or 4/52 anti-scuffing spray.
  (a) Spray a thin smooth layer of dry film lubricant.
    1) Do the procedure again as necessary to get a constant layer thickness of 0.0008 in. to 0.0012 in. (0.02 mm to 0.03 mm).

      NOTE: It will normally require 4 layers to achieve the thickness of dry film lubricant necessary.

    2) It is recommended that you use a test piece to monitor the thickness of the applied dry film lubricant layer.
    3) Let the dry film lubricant dry in the air for a minimum of ten minutes between layers.
  (b) Let the final layer of dry film lubricant dry in the air for a minimum of two hours.

    NOTE: Shake the aerosol before you apply it to make sure the contents are fully mixed.

    NOTE: Let the dry film lubricant become touch dry between each coat.

S 958-179-R00

(9) Remove the masking tape.
  (a) Take care not to damage the dry film lubricant when you remove the tape.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

S 218-180-R00

(10) Do an inspection of the dry film lubricant (Fig. 803). Make sure that:
(a) The color of the lubricant is constant.
(b) The lubricant layer is smooth.
(c) The lubricant layer has a good bond.
(d) There are no flakes or cracks.
(e) The dimensions of the dry film lubricant are within repair limits.

S 018-181-R00

(11) Replace the chocking pads (Fig. 803).
(a) Locally remove the grease from the fan blade and chocking pad.
1) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent. Use the chocking pad that was removed or use:

ITEM	PART NO.	PART IDENT	ASSY	QTY
1	FW11180	Front Chocking Pad	A	As Necessary
1	UL21349	Front Chocking Pad	B, C	As Necessary
2	FW11185	Rear Chocking Pad	A	As Necessary
2	UL21346	Rear Chocking Pad	B, C	As Necessary
3	FW11218	Front Chocking Pad	A	As Necessary
3	UL33592	Front Chocking Pad	B	As Necessary
4	FW11188	Rear Chocking Pad	A	As Necessary
4	UL33588	Rear Chocking Pad	B	As Necessary

2) Let the chocking pad dry.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

(b) Bond the chocking pad to the fan blade (Option 1 — Silcoset compound) (Fig. 803)

NOTE: You must not bond the fan blade and the chocking pad until the preparation is complete.

NOTE: This method is an alternative to Option 2 — Double—sided adhesive tape.

1) Apply a thin coat of primer to the chocking pad and the fan blade area. Use OMat 8/221 or OMat 8/222 or OMat 8/233 primer.
2) Dry in the air for 30 minutes at room temperature.
3) Apply the Silcoset compound to the chocking pad.
   a) Use OMat 872 cold curing silcoset compound.
   b) Use a corrugated non—metallic scraper or an applicable alternative.
4) Set the chocking pad and hold in position with masking tape.
   a) Use OMat 230 Masking tape or an applicable OMat alternative.
5) Dry in the air for 48 hours at room temperature.

(c) Bond the chocking pad to the fan blade (Otion 2 — Double sided adhesive tape) (Fig. 803).

NOTE: You must not bond the fan blade and the chocking pad until the preparation is complete.

NOTE: This method is an alternative to Option 1 — Silcoset compound.

1) Apply the adhesive tape to the chocking pad.
   a) Use OMat 2/117 Double sided adhesive tape.
   b) Remove the backing tape and apply to the chocking pad.
   c) Air bubbles, creases, and wrinkles are not permitted.
   d) Cut the tape to the contour of the chocking pad.
   e) Make sure that the tape is flush or 0.039 in. (1.00 mm) larger that the edge of the chocking pad.
2) Apply the chocking pad to the fan blade.
   a) Remove the backing tape from the adhesive tape.
   b) Position the chocking pad and attach to the fan blade. Apply constant pressure.

(d) Examine the part.
1) Examine and measure the dimensions of the part.
2) Use inspection equipment.
3) Make sure the chocking pad is in the correct position.
4) Make sure the chocking pad is securely fixed to the fan blade. If not, remove and replace the chocking pad.

LP Compressor Blades - Replacement of Chocking Pads and the Dry Film Lubricant

S 938-182-R00

(12) Identify the repair.

(a) Record FRS5787/2 in the log book.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

TASK 72-31-13-968-016-R00

4. LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

A. General

(1) Use this procedure (FRS.5789) to replace the chocking pads and dry film lubricant on the LP compressor discs which have these part numbers:

RB211-535E4-37 Engines
UL21343
UL24536

RB211-535E4B-37 Engines
UL21343
UL24536

RB211-535E4C-37 Engines
UL21343

RB211-535E4B-75 Engines
UL21343
UL24536

(2) It is recommended that this repair be used with FRS5787, LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant.

(3) Two alternative methods for the replacement of the chocking pads again are provided in this repair scheme. Option 1 uses adhesive compound and Option 2 uses OMat 2/117 Double sided tape. The two methods may be used in any order on any blade.

(4) The Rapid Relube System uses a puposely-designed Rapid Relube Kit that contains cleaning and applicator tools for the relubrication of one fan blade set and fan disc. The Rapid Relube Kit is a disposable kit. This must be disposed of accordingly after the fan blade set and fan disc have been relubricated.

(5) A video has been made in support of the new Rapid Relube method. it is recommended that the video be viewed for training purposes - Trent Fan Blade removal, root repair and refit DV3194. This video is for reference only. The relubrication must be carried out in accordance to the procedure given in this document.
(6) Clean cotton or polythene gloves must be worn at all times in this repair.

B. Equipment
(1) Spatula or small trowel, or brush.
(2) Standard Equipment
(3) Non-metallic scraper
(4) Cotton or polyethene gloves
(5) Inspection Equipment
(6) Non-metallic Stiff Bristle Brush

C. Consumable Materials
(1) Scotch Brite Abrasive Pad - OMat 582
British Spec/Ref - Type S. 7448
(2) Acetone - OMat 150
(3) Isopropyl Alcohol - OMat 1/40
(4) Cleaning Solvent - OMat 1/257
(5) Adhesive, Toughened Acrylic with Initiator - OMat 8/121
British Spec/Ref - Permabond F241, No.1 initiator
(6) Cloth, Lint-free - OMat 2/101
(7) Tape, Masking, Zinc Oxide (PE.30) - OMat 230
(8) Dry Film Lubricant - OMat 4/70
(9) Rapid Relube Kit - OMat 4/72
(10) Scotchbrite, OMat 583
(11) Scotchbrite, OMat 584
(12) Paint Stripper - OMat 154
(13) Double-sided adhesive tape - OMat 2/117

D. Parts
(1) UL21344 Chocking pad, Quantity (As Necessary).
(2) UL33582 Chocking pad, Quantity (As Necessary).

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

E. Replace the Dry Film Lubricant by Rapid relube and Replace the Chocking Pads.

S 018-183-R00

(1) Remove the Loose Chocking Pad(s) (Fig. 805).

(a) Use a non-metallic scraper to remove the loose chocking pad from the fan disc.

1) Chocking pads may be used again if the chocking pad is not damaged.

(b) Use a non-metallic scraper to clean the adhesive that remains from the chocking pad.

1) Use OMat 2/101 lint free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

2) Take care not to damage the chocking pad, reject if damaged.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary container.

(c) Use a non-metallic scraper to clean the adhesive that remains from the fan disc surface.

1) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 isopropyl alcohol or OMat 1/257 cleaning solvent.

2) Take care not to damage the fan disc.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary container.

3) If the adhesive that remains is not easily removed, use OMat 154 paint stripper.

a) Apply a constant layer to the adhesive that remains, use a brush.

b) Let the paint stripper soak for 30 minutes.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

c) Remove the adhesive with a non-metallic scraper.
d) Wipe clean with a lint-free cloth.
e) Do the process again if the adhesive was not removed.

S 128-184-R00

(2) Abrade the bonding area of the chocking pad (Fig. 805).
(a) Use OMat 583 Scotchbrite or OMat 584 Scotchbrite to abrade the chocking pad bonding area (mating surface).
(b) Use a non-metallic scraper to clean the chocking pad.
1) Use 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.
2) Take care not to damage the chocking pad, reject if damaged.

NOTE: Pour the cleaning solvent into a container to prevent contamination of the primary containaer.

S 118-185-R00

(3) Clean the fan disc.
(a) Remove the grease from the fan disc.
1) Use an aqueous wash or use 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

NOTE: Only remove the loose dry lubricant.

S 118-186-R00

(4) Clean the Fan Disc dovetail slots.
(a) Use OMat 4/72 Rapid Relube Kit, fan disc cleaning rollers to remove the loose dry film lubricant from the dovetail root.
1) Regularly change the fan disc cleaning rollers.
2) Use all five of the cleaning rollers on a fan disc.

NOTE: Only remove the loose dry film lubricant.

(b) Use 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

NOTE: Only remove the loose dry film lubricant.

(c) Let the fan disc dovetail dry.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

S 648-187-R00

(5) Apply the dry film lubricant to the fan blade dovetail slot (Fig. 804).

(a) Assemble the fan disc applicator tool.

1) Use OMat 4/72 Rapid Relube Kit, fan disc applicator handle (1 each) and paint pads (5 each).

2) Assemble the fan disc applicator handle and paint pad.

NOTE: The applicator paint pad must be replaced after every 5 dovetail slot applications, as the paint pad becomes tacky and the pad deteriorates.

NOTE: Loose fibers must be removed from the paint pads as the fibers may be applied to the disc dovetail surface in the dry film lubricant. If possible, do not apply fibers to the coating.

(b) Prepare the dry film lubricant.

1) Use OMat 4/70 dry film lubricant and OMat 4/72 Rapid Relube Kit, paint tray.

2) Shake for one minute before you open the container.

3) Remove any congealed dry film lubricant from the container.

4) Pour a small amount of dry film lubricant into the paint tray, approx dia. 1.7 in. (45.0 mm).

NOTE: It is important to pour a small amount of dry film lubricant into the paint tray as the dry film lubricant dries quickly.

NOTE: Before putting more dry film lubricant into the paint tray, it is best to remove any dried lubricant from the paint tray.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

(c) Apply dry film lubricant to the applicator paint pad.
1) Make sure all the paint pad fibers are coated with dry film lubricant.
2) Remove any unwanted dry film lubricant on the edge of the paint tray.
3) The paint pad must be a flat dry grey color.

NOTE: Do not apply too much dry film lubricant to the paint pad as this will cause drips.

(d) Apply the dry film lubricant to the fan disc dovetail slot.
1) Apply the dry film lubricant to the top-dead center position of the fan disc on each dovetail slot.
2) Put the applicator tool into the dovetail slot at the top dead center position of the disc.
a) Put the paint pad to the left hand side surface of the dovetail slot, gently push left and up.
b) Apply a coat of dry film lubricant to the left hand side surface with a constant stroke along the full length of the disc and back. For example, from the front to the rear of the disc and then from the rear to the front of the disc, while on the left hand side surface.
3) Put the paint pad to the right hand side of the dovetail slot, gently push right and up.
a) Apply a coat of dry film lubricant to the right hand side surface with a constant stroke along the full length of the dovetail slot and back. For example, from the front to the rear of the disc and then the rear to the front of the disc, while on the right hand side surface.

(e) Visually inspect the dry film lubricant coating to make sure the surface is equally coated.
1) If an area of AB is not coated and the dry film lubricant is not dry, then apply the dry film lubricant to the fan disc dovetail slot.
a) Continue from "apply the dry film lubricant to the fan disc dovetail slot".
2) If an area of AB is not coated and the dry film lubricant is dry, then remove the coating.
a) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.
b) Continue from "prepare the dry film lubricant".

(f) Visually inspect the dry film lubricant coating for fibers.
1) If the coating contains more than 5 fibers per sq. cm. (0.155 sq. in.) remove the coating.
2) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

3) Continue from "prepare the dry film lubricant".

(g) Visually inspect the dovetail slot for drips.
1) Remove all drips.
2) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.
3) Continue from "prepare the dry film lubricant".

(h) Apply the dry film lubricant to the fan disc dovetail slots that remain.
1) Repeat steps "prepare the dry film lubricant" to " apply the dry film lubricant to the fan disc dovetail slots that remain".

(i) Let the dry film lubricant cure in the air for a minimum of 30 minutes before you assemble the chocking pads and the fan blades.

S 428-188-R00

(6) Replace the chocking pads (Option 1 - Adhesive compound) (Fig. 804).

NOTE: This method is an alternative to option 2 - double sided adhesive tape.

(a) Locally remove the grease from the fan disc bonding area and chocking pad.
1) Use OMat 583 or OMat 584 Scotchbrite to make the chocking pad and fan disc bonding area rough.
a) Use UL21344 chocking pad.
2) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat1/257 cleaning solvent.
3) Let the chocking pad and bonding area dry.

NOTE: You must not bond until the preparation is complete.

(b) Attach the chocking pad to the fan disc.
1) Apply a thin coat of initiator to the fan disc bonding area.
a) Use OMat 8/121 Initiator.

b) Use a small trowel, spatula, or a brush.

2) Apply a thin coat of OMat 8/121 Adhesive compound to the surface of the chocking pad as a bond.
   a) Do not spread. Enough adhesive should be applied so that the adhesive will cover all the bonding area and leave a small witness at the edges.
3) Immediately position the chocking pad and hold in position for a minimum of five minutes.
   a) Use OMat 230 masking tape or an OMat alternative.
4) Dry in the air for one hour at room temperature.

(c) Visually inspect the bonded chocking pads to make sure that there is a small witness of adhesive at the edges.

(d) Examine and measure the dimensions of the part.
1) Use inspection equipment.
2) Make sure the chocking pad is in the correct position.
3) Make sure the chocking pad is securely fixed to the fan disc. If not, remove and replace the chocking pad.

S 428-189-R00

(7) Replace the chocking pads (Option 2 - Double sided adhesive tape) (Fig. 805).

NOTE: This method is an alternative to option 1 - Adhesive compound.

(a) Locally remove the grease from the fan disc bonding area and chocking pad.
1) Use OMat 583 or OMat 584 Scotchbrite to make the chocking and fan disc bonding area rough.
   a) Use UL33582 chocking pad.
2) Use OMat 2/101 lint-free cloth and OMat 150 Acetone or OMat 1/40 Isopropyl alcohol or OMat 1/257 cleaning solvent.
3) Let the chocking pad and bonding area dry.

NOTE: You must not bond until the preparation is complete.

(b) Attach the chocking pad to the fan disc.
1) Apply the adhesive tape to the chocking pad.
   a) Use OMat 2/117 double sided adhesive tape.
   b) Remove the backing tape and apply to the chocking pad.
   c) Air bubbles, creases, and wrinkles are not permitted.
   d) Cut the tape to the contour of the chocking pad. Make sure that the tape is flush or 0.039 in (1.00 mm) larger than the edge of the chocking pad.
2) Apply the chocking pad to the fan disc.
   a) Remove the backing tape from the adhesive tape.
   b) Position the chocking pad and attach to the fan disc, apply constant pressure.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

(c) Examine and measure the dimensions of the part.
1) Use inspection equipment.
2) Make sure the chocking pad is in the correct position.
3) Make sure the chocking pad is correctly attached to the fan disc. If not, remove and replace the chocking pad.

S 938-190-R00

(8) Identify the repair.
(a) Record FRS5789 in the log book.

F. Prepare Disc and Chocking pad bonding surfaces (Assembly B only)

NOTE: LP Compressor rotor discs of Assembly A standard do not require the use of chocking pads.

S 958-093-R00

(1) Use masking tape to keep all material or cleaning fluid out of the space between the compressor disc and the back plate.

G. Prepare the disc and chocking pad bonding surfaces (Option 1)

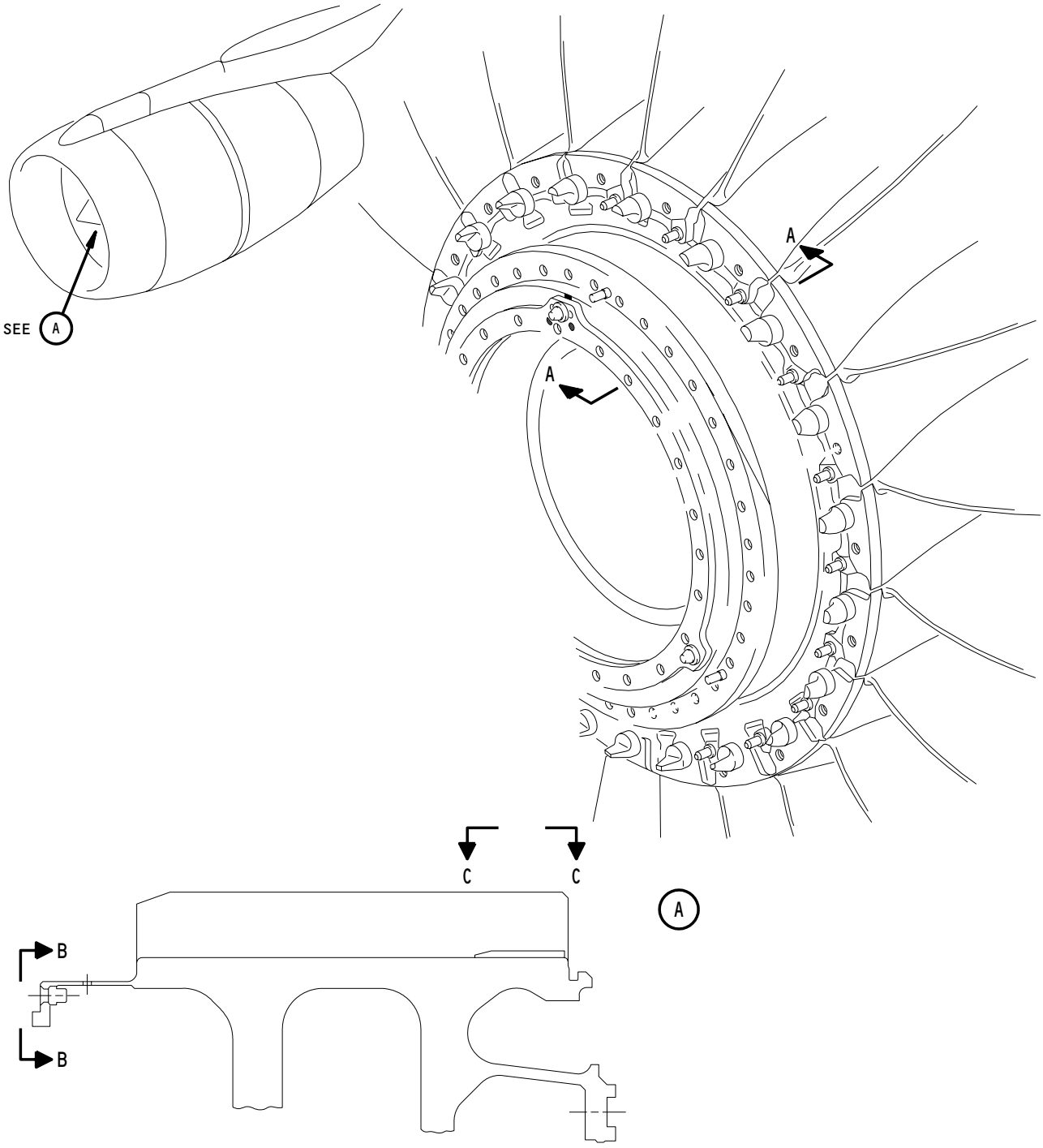
S 168-094-R00

(1) Use a non-metallic hand scraper to remove the glue from the chocking pad.

S 118-095-R00

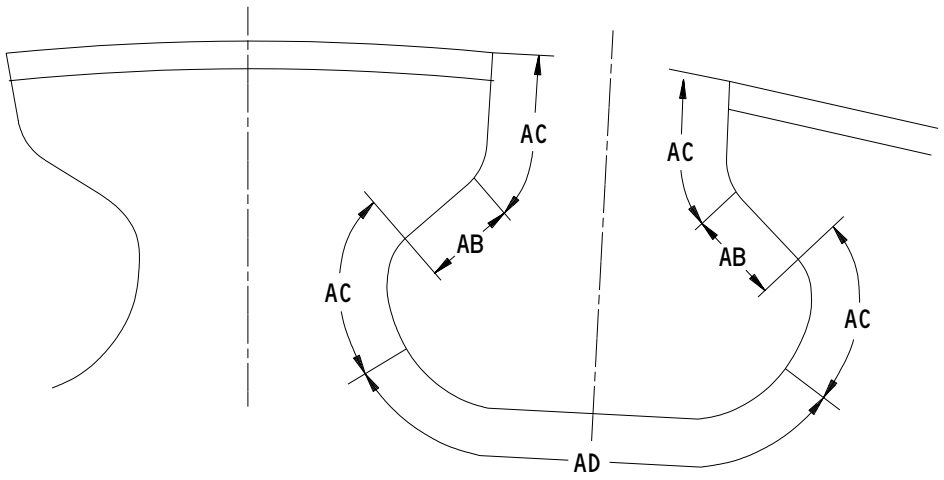
WARNING: PROTECTIVE GLOVES AND EYE PROTECTION MUST BE WORN WHEN USING PAINT STRIPPER.

(2) Remove the residual adhesive from disc using a non-metallic hand scraper. If the residual adhesive is difficult to remove, use paint stripper as follows:
(a) Apply a uniform layer of paint stripper to the residual adhesive using a brush.
(b) Let the paint stripper soak for 30 minutes.

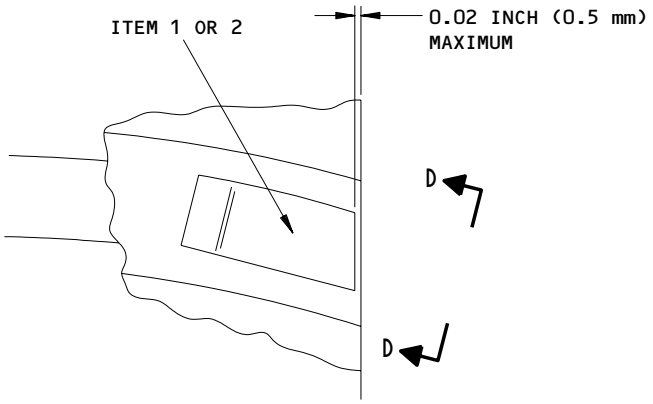


GENERAL SECTION THROUGH THE
LP COMPRESSOR DISC
A-A

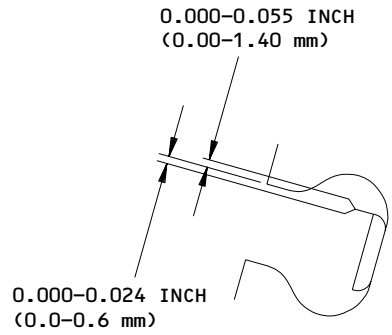
Applying Dry Film Lubricant and Removal of Loose
Chocking Pads
Figure 804 (Sheet 1)



(22 LOCATIONS)
(TYPICAL)
B-B



(22 LOCATIONS)
(TYPICAL)
C-C



(22 LOCATIONS)
(TYPICAL)
D-D

NOTE: APPLY THE DRY FILM LUBRICANT TO THE AREAS IDENTIFIED AB FOR THE FULL LENGTH OF THE SLOT TO THE INSTRUCTIONS.

DRY FILM LUBRICANT IS PERMITTED ON THE AREAS IDENTIFIED AC.

DRY FILM LUBRICANT IS NOT PERMITTED ON THE AREAS IDENTIFIED AD.

DRY FILM LUBRICANT IS NOT PERMITTED IN ANY OTHER AREAS UNLESS SPECIFIED DIFFERENTLY.

UNWANTED DRY FILM LUBRICANT MUST BE REMOVED TO THE INSTRUCTIONS.

REMOVE AND REPLACE ITEM 1 OR ITEM 2 TO THE INSTRUCTIONS.

Applying Dry Film Lubricant and Removal of Loose Chocking Pads
Figure 804 (Sheet 2)

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

(c) Remove the adhesive with a stiff bristle brush or non-metallic hand scraper.
(d) Wipe area clean with a lint-free cloth.
(e) Repeat the process if all of the adhesive was not removed.

S 118-096-R00

WARNING: YOU MUST NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE THE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA WHICH HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE LIQUID. IF YOU GET THE DEGREASING FLUID IN YOUR MOUTH, ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL HELP IMMEDIATELY IF YOU GET THE FLUID IN YOUR MOUTH OR IN YOUR EYES. KEEP THE DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS, FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE EQUIPMENT.

(3) Clean the surface which is to be painted (Fig. 802, Sheet 5). Use a clean, dry lint-free cloth soaked in Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257).

S 128-098-R00

(4) Use the Scotch Brite pad to make the chocking pad bonding area rough (Fig. 803).

S 118-099-R00

(5) Remove the grease from the disc and chocking pad areas. Use a clean, dry lint-free cloth soaked in Acetone (OMat No. 150) or Isopropyl Alchol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257). Dry the area with more clean, dry lint-free cloths.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

H. Attach the chocking pads to the disc (Option 1).

S 358-127-R00

WARNING: THERE MUST BE NO SMOKING OR EATING AT WORKPLACES WHERE THESE MATERIALS ARE USED. THEY SHOULD BE PREPARED AND USED IN WELL VENTILATED AREAS.

CAUTION: MATING SURFACES OF COMPONENTS MUST BE CLEAN. DO NOT TOUCH THE CONTACT SURFACES. IF YOU TOUCH THE SURFACES TO BE BONDED, AN INCORRECT BOND CAN OCCUR.

YOU MUST BOND THE PARTS IMMEDIATELY AFTER YOU PREPARE THE SURFACE.

(1) Apply a small amount of adhesive to the chocking pad using a small trowel or spatula. Use repair part UL21344 chocking pad.

S 358-102-R00

(2) Apply the initiator to the LP compressor disc (Fig. 803 Sheet 3) using a small trowel or spatula.

S 428-103-R00

(3) Position the chocking pad on the LP compressor disc and hold in position with a light pressure for 3 minutes.

S 428-104-R00

(4) Let the adhesive cure for 1 hour at a temperature of 70 to 73°F (21 to 25°C).

S 218-105-R00

(5) Do a visual inspection of the bonded chocking pads to make sure they are secure.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

S 228-106-R00

(6) Do a dimensional inspection of the bonded chocking pads to make sure they are correctly positioned.

S 958-107-R00

(7) Remove the masking tape.

I. Prepare the disc and chocking pad surfaces (Option 2).

S 168-108-R00

(1) If a chocking pad attached by Option 1 has been removed, remove the residual adhesive from the disc using a non-metallic hand scraper.

S 118-109-R00

(2) If the residual adhesive is not easy to remove, use the paint stripper as follows.
   (a) Apply a uniform layer of paint stripper to the residual adhesive using a brush.
   (b) Let the paint stripper soak for 30 minutes.
   (c) Loosen the adhesive with a stiff bristle brush or non-metallic scraper.
   (d) Wipe the area clean with a lint-free cloth.
   (e) Repeat the application as needed.

S 118-111-R00

WARNING: YOU MUST NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE THE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA WHICH HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE LIQUID. IF YOU GET THE DEGREASING FLUID IN YOUR MOUTH, ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL HELP IMMEDIATELY IF YOU GET THE FLUID IN YOUR MOUTH OR IN YOUR EYES. KEEP THE DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS, FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE EQUIPMENT.

(3) Use a clean, dry lint-free cloth soaked in Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257). Dry the area with more clean, dry lint-free cloths.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

S 128-112-R00

(4) Use the scotch brite pad to make the area rough where the chocking pad will be bonded.

S 118-113-R00

(5) Use a clean, dry lint-free cloth soaked in Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257) on the disc and chocking pad. Dry the area with more clean, dry lint-free cloths.

J. Attach the chocking pads to the LP compressor disc (Option 2).

S 358-114-R00

CAUTION: THE MATING SURFACES OF THE COMPONENTS MUST BE CLEAN. DO NOT TOUCH THE CONTACT SURFACES. IF YOU TOUCH THE SURFACES TO BE BONDED, AN INCORRECT BOND CAN OCCUR.

YOU MUST BOND THE PARTS IMMEDIATELY AFTER YOU PREPARE THE SURFACE.

(1) Apply the double-sided adhesive tape to the chocking pad (Fig. 803). Air bubbles, creases or wrinkles are not permitted.

S 358-115-R00

(2) Trim the tape to the profile of the chocking pad so that the tape is flush or 0.039 inch (1 mm) larger than the edge of the pad.

S 428-116-R00

(3) Remove the backing strip from the adhesive tape. Position the pad and attach the blade by applying even pressure to the pad.

S 218-117-R00

(4) Do a visual inspection of the bonded chocking pads to make sure they are secure.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

S 228-118-R00

(5) Do a dimensional inspection of the bonded chocking pads to make sure they are correctly positioned. .

K. Prepare the surfaces to be painted with dry film lubricant.

S 128-119-R00

(1) Use the scotch brite pad the make the area rough where the lubricant will be applied.

NOTE: It is not necessary to remove all of the initial lubricant from dovetail surfaces which do not touch other surfaces.

S 958-120-R00

(2) Apply the masking tape to the surfaces which will not be painted with dry film lubricant.

S 118-121-R00

WARNING: YOU MUST NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE THE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA WHICH HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE LIQUID. IF YOU GET THE DEGREASING FLUID IN YOUR MOUTH, ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL HELP IMMEDIATELY IF YOU GET THE FLUID IN YOUR MOUTH OR IN YOUR EYES. KEEP THE DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS, FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE EQUIPMENT.

(3) Use a clean, dry lint-free cloth soaked in Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257) to clean the surfaces to be painted (Fig. 803)

NOTE: It is important to use a clean, dry, lint-free cloth at each step to remove the grease. Pour the Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257) into a different container before you soak the cloth in it. This is to prevent contamination of the primary container.

LP Compressor Disc - Replacement of the Chocking Pads and Dry Film Lubricant

S 118-129-R00

CAUTION: THE PROCEDURE TO APPLY THE DRY FILM LUBRICANT TO THE SURFACES IS TO BE DONE IMMEDIATELY AFTER THEY ARE CLEANED.

(4) Dry the surface with a clean, dry, lint-free cloth.

L. Apply the dry film lubricant to the LP compressor rotor disc.

S 648-123-R00

WARNING: DO NOT USE THE LUBRICANT NEAR SOURCES OF IGNITION. THE LUBRICANT CONTAINS FLAMMIBLE SOLVENTS. YOU MUST VENTILATE THE POSITION WHERE THE LUBRICANT WILL BE USED.

CAUTION: THE PROCEDURE TO APPLY THE DRY FILM LUBRICANT TO THE SURFACES IS TO BE DONE IMMEDIATELY AFTER THEY ARE CLEANED.

(1) Apply the dry film lubricant by spray (Fig. 803, Sheets 1 and 2). Use OMat No. 4/51 or 4/52 lubricants.
   (a) Use a spray to apply sufficient layers of lubricant to get a layer thickness of 0.0018 to 0.003 inch (0.045 to 0.075 mm).
   (b) Let the lubricant air dry for 10 minutes between layers.
   (c) Let the last dry film lubricant layer air dry for more than 2 hours.

S 958-125-R00

(2) Remove the masking tape.

S 228-126-R00

(3) Do an inspection of the dry film lubricant to make sure that:
   (a) The color of the lubricant is consistent.
   (b) The lubricant layer is smooth.

(c) The lubricant layer has a good bond.
(d) There are no flakes or cracks.
(e) The dimensions of the dry film lubricant surfaces are in limits.

M. Identify the repair.

S 938-022-R00

(1) Vibro-engrave the repair number (FRS.5789) adjacent to the part number or, if this is not possible, to do these steps:
(a) Write the repair number (FRS.5789) in the engine log book.
(b) Make sure you vibro-engrave the repair number (FRS.5789) adjacent to the part number at the next 01 module overhaul.

LP Compressor Wide Chord Fan Blades - Leading Edge Cropping - Fly Back Limits Only

TASK 72-31-13-358-031-R00

5. LP Compressor Wide Chord Fan Blades - Leading Edge Cropping - Fly Back limits Only

A. General

(1) The tip cropping in this procedure, FRS.5186 is permitted only as a fly back repair.

(a) The cropped blades must not be operated more than 125 hours or 25 flights.

(b) The blades must be replaced when it gets to the first of the two conditions.

(2) This repair must be done with the blades installed.

(3) The repair can be done with one of the two procedures that follow:

(a) The repair permits up to three fan blades in a fan set to be repaired by cropping back to the maximum permitted limits.

NOTE: It is then necessary to use the correct trim balance weight to keep the out of balance of the engine to a minimum.

(b) Alternatively, up to three fan blades in a fan set can be repaired by cropping back to remove the damaged part of the blade tip.

(c) It is then necessary to remove an equivalent quantity of material from a blade or number of blades opposite the cropped blades.

NOTE: This makes sure the engine out of balance is kept to a minimum.

(4) Dressing and scalloping as specified in FRS.5025, can also be used with this repair.

(5) After cropping of the rotor blades, Test No. 6 (AMM 71-00-00/501) must be done to make sure that the vibration valve is in the limit specified.

(6) It is recommended to use the trim balance weight procedure.

(7) The fan blade material is Titanium alloy (RR Symbol TBQ).

(8) Do an inspection of the blades before and after cropping.

(a) Use binoculars (x10 magnification) or do a penetrant crack detection test.

LP Compressor Wide Chord Fan Blades - Leading Edge Cropping - Fly Back Limits Only

(9) This procedure can be used on RB211-535E4 rotor blades which have the part numbers that follow:

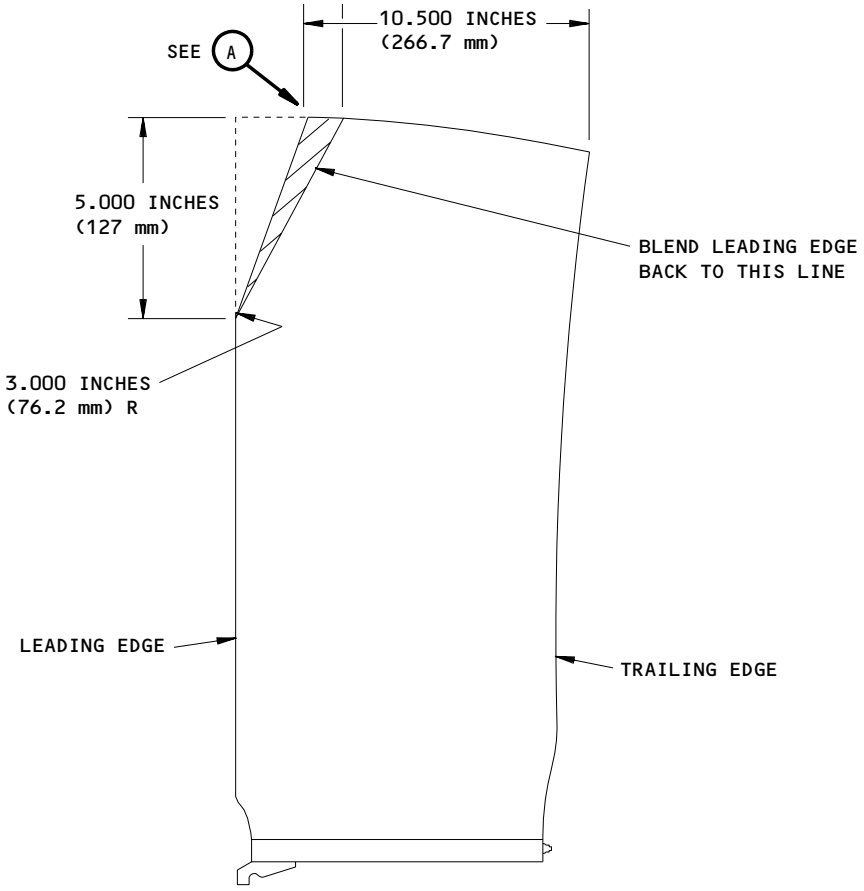
RB211-535E4 and E4-B Engines

UL16171	UL19643 SB72-7917
UL24532 SB72-8354	
UL20044 SB72-7993	UL20132 SB72-7993
UL20616 SB72-8377	UL21345 SB72-8354
UL24528 SB72-8354	UL24530 SB72-8354
UL24534 SB72-8354	UL24525 SB72-8354
UL22286 SB72-8342	UL23122 SB72-8742
UL27992 SB72-9132	UL29556 SB72-9485
UL29511 SB72-9513	UL37090 SB72-9751
UL36992 SB72-9751	UL38029 SB72-C138
UL38032 SB72-C138	FW12308 SB72-C946
FW12529 SB72-C946	FW12377 SB72-C946
FW12376 SB72-C946	FW12309 SB 72-C946
FW12379 SB 72-C946	FW12375 SB 72-C946
FW12374 SB 72-C946	FW12373 SB 72-C946
FW12372 SB 72-C946	FW12367 SB 72-C946
FW12366 SB 72-C946	FW12368 SB 72-C946
FW12371 SB 72-C946	FW12396 SB 72-C946
FW12378 SB 72-C946	UL28601 SB 72-9295
UL30817 SB 72-9295	UL30933 SB 72-9295
UL33707 SB 72-9295	UL37272 SB 72-9295
UL37276 SB 72-9295	UL38373 SB 72-9295
UL38377 SB 72-9295	UL28602 SB 72-9295
UL30819 SB 72-9295	UL30935 SB 72-9295
UL33709 SB 72-9295	UL37274 SB 72-9295
UL37278 SB 72-9295	UL38375 SB 72-9295
UL38379 SB 72-9295	

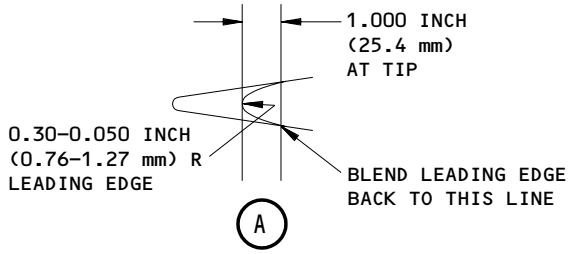
B. Equipment
   (1) Penetrant crack test equipment
   (2) Portable grinding equipment
   (3) Binocular inspection equipment (x10 magnification)
C. Consumable Materials
   (1) Abrasive paper (Silicone Carbide)
       OMat No. 5/28 to 5/42
D. Cut away the damaged material from the LP Compressor rotor blades (Fig. 805).

S 238-032-R00

(1) Find the full length of the damaged area.
   (a) Use binoculars (x10 magnification) or do a penetrant crack detection test.



LEADING EDGE TIP CROPPING FLY BACK LIMITS ONLY



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Repair Details and Dimensions for Leading Edge Tip Cropping
Figure 805

LP Compressor Wide Chord Fan Blades - Leading Edge Cropping - Fly Back Limits Only

S 428-033-R00

(2) Put the blade which is to be cropped on the engine vertical center line at the bottom.

S 328-059-R00

CAUTION: ALL WHEELS, STONES AND ABRASIVE PAPERS USED TO REMOVE DAMAGED MATERIAL OR MAKE SMOOTH AND POLISH THE DAMAGED AREA OF THE LP COMPRESSOR ROTOR BLADE(S) MUST BE THE SILICON CARBIDE TYPE.

CAUTION: IF MECHANICAL CUTTERS ARE USED, ONLY LIGHT CUTS CAN BE USED TO REMOVE MATERIAL. THIS WILL NOT LET THE MATERIAL BECOME TOO HOT. DURING THE PROCEDURE TO GET THE SMOOTHEST AND MOST POLISHED SURFACE, IT IS POSSIBLE THERE WILL BE A DIFFERENCE IN THE SURFACE COLOR. IT IS POSSIBLE THE SURFACE COLOR WILL CHANGE TO A LIGHT STRAW COLOR. THIS IS PERMITTED, BUT IF THE SURFACE COLOR CONTINUES TO CHANGE THE COMPONENT HAS BECOME TOO HOT. THE COMPONENT MUST BE REJECTED.

(3) Use hand grinding equipment to remove the damaged part of the blade tip.
   (a) Remove material from the same part of a blade which is opposite the damaged blade.
   (b) Alternatively cut back the blade tip to the full limit.

S 438-035-R00

(4) Use the table below to find the correct trim balance weight.

NOTE: The trim balance weight must be installed directly below the cropped blades.

TABLE A

Number of blades cropped	Corrective weight
1	5.9 ounces
2	11.8 ounces
3	17.3 ounces

S 358-036-R00

(5) When the cutaway procedure is complete, smooth and polish the cut away area to remove all the remaining marks.
   (a) Use abrasive paper (Item 1) to remove all the marks.

LP Compressor Wide Chord Fan Blades - Leading Edge Cropping - Fly Back Limits Only

(b) The polish marks that remain after the polish procedure is complete must go in a radial direction from blade root to blade tip.
(c) Surface finish must compare to the initial surface of the rotor blade (Fig. 805).

S 358-037-R00
(6) Use abrasive paper to remove the leading edge of the rotor blade material until the radius is put back.

S 358-038-R00
(7) Use abrasive paper (Item 1) to lightly polish the leading edge of the blade.
(a) Make sure there is a smooth change from the radius surface to the airfoil surface.
(b) The polish marks that remain after the polish procedure is complete must go in a radial direction.
(c) The surface finish must compare to the initial surface finish of the rotor blade (Fig. 805).

E. Inspect and complete the rotor blade repair (Fig. 805)

S 228-039-R00
(1) Do a dimension check of the rotor blade repair.

S 218-041-R00
(2) Do a visual inspection of the rotor blade repair.

S 238-040-R00
(3) Do a penetrant crack test, or a binocular inspection (x10 magnification), on the cut away area.

F. Do a vibration inspection

S 758-042-R00
(1) Use Test No. 6 (AMM 71-00-00/501) to do an engine vibration test.
(a) If the vibration value shown is out of the limit given, use Table A to get the correct value.

G. Record the repair

S 978-043-R00
(1) Make a record of FRS.5186 in the engine log book.

LP Compressor Fan Blade - Annular Filler Assembly -
Replace Air Sealing Strips and Buffer Pad

TASK 72-31-13-358-047-R00

6. LP Compressor Fan Blade - Annular Filler Assembly -
Replace Air Sealing Strips and Buffer Pad

A. General

(1) The repair in this procedure is FRS.5135.

(2) This procedure can be used to replace air sealing strips and buffer pads.

(3) This repair procedure can be used to repair annular filler assemblies with the part numbers that follow:

RB211-535E4

UL 16145
UL 16408 (RR SB72-7693)
UL 16160 (RR SB72-8717)

B. Equipment

(1) Comb, HU30353
(2) Pad position gauge, HU30352

C. Consumable Materials

(1) Silcoset Primer OP1
OMat No. 876A
(2) Cold curing silicone compound (Silcoset 152)
OMat No. 872
(3) Colloidal molybdenum disulphide in Toluene
OMat No. 444
(4) Two pack epoxy, finish white and catalyst
OMat No. 795
(5) Red oxide, touch up primer (Synthetic oil resistant)
OMat No. 708
(6) Waterproof silicon carbide (Grit 240)
OMat No. 5/35
(7) Waterproof silicon carbide (Grit 320)
OMat No. 5/33
(8) Lint free cloth - Local Resources
(9) Wetting agent
OMat No. 2/7
(10) Phosphoric acid, H3P04
OMat No. 117
(11) Chromate conversion coating for aluminum (Brushing type)
OMat No. 175D
(12) Chromate conversion coating for aluminum (Brushing type)
OMat No. 175E
(13) Acetone - OMat No. 150

LP Compressor Fan Blade - Annular Filler Assembly - Replace Air Sealing Strips and Buffer Pad

(14) Iso Propyl Alcohol - OMat No. 1/40
(15) Cleaning Solvent - OMat No. 1/257

D. Parts
(1) Pressure Surface Air Seal, (Item 1) - ARM892 (RR1010638)
(2) Pressure Surface Air Seal, (Item 2) - ARM891 (RR1010637)
(3) Buffer Pad (Item 3), ARM 822 or
Buffer Pad (Item 3), WRS 1342 or
Buffer Pad (Item 3), BA5063

E. Replace the air sealing strips and the buffer pads (Fig. 806)

S 048-046-R00

(1) Remove the sealing strips and the buffer pads that show weak bonds.
(a) Remove the sealing strips and the buffer pads.

CAUTION: MAKE SURE YOU DO NOT SCRATCH THE METAL SURFACE WHEN YOU SCRAPE OFF THE ADHESIVE THAT IS STILL THERE. DAMAGE TO THE SURFACE CAN OCCUR IF YOU SCRATCH THE SURFACE.

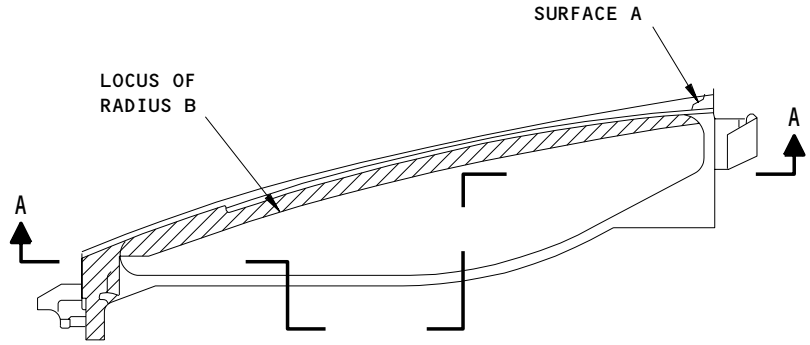
(b) Carefully scrape the surface from which the sealing strips and buffer pads have been removed.

S 168-048-R00

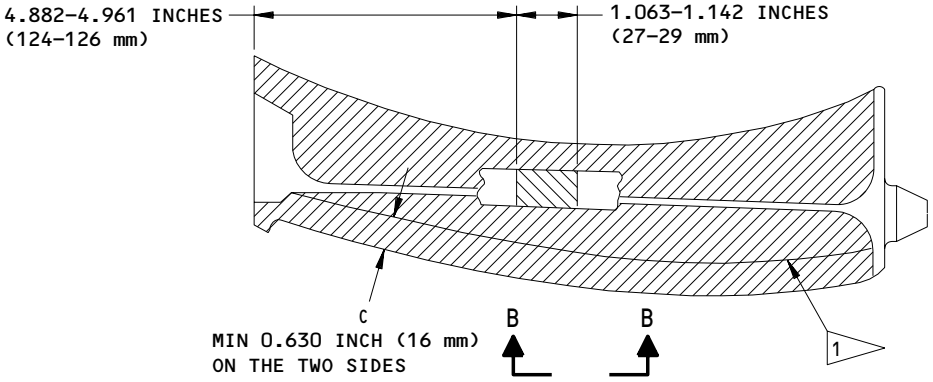
(2) Clean the repair area.

WARNING: YOU MUST NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA WHICH HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IMMEDIATELY IF YOU GET FLUID IN YOUR MOUTH OR IN YOUR EYES. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

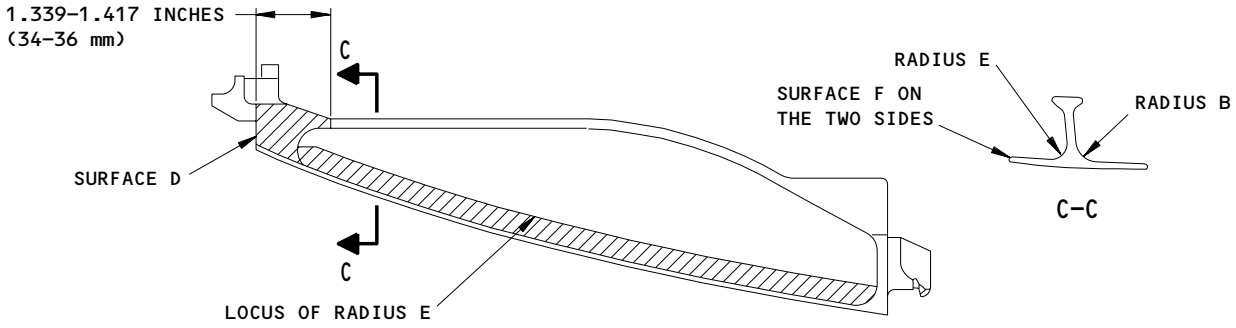
(a) Make a clean, dry lint-free cloth moist with Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257).
1) Use this cloth to clean the area that you repair.
2) Dry the repair area before the liquid becomes a gas.
3) You must discard the dirty cloth after you use it.



VIEW OF ANNULUS FILLER WITH AIR
SEALING STRIPS AND BUFFER PAD REMOVED



A–A



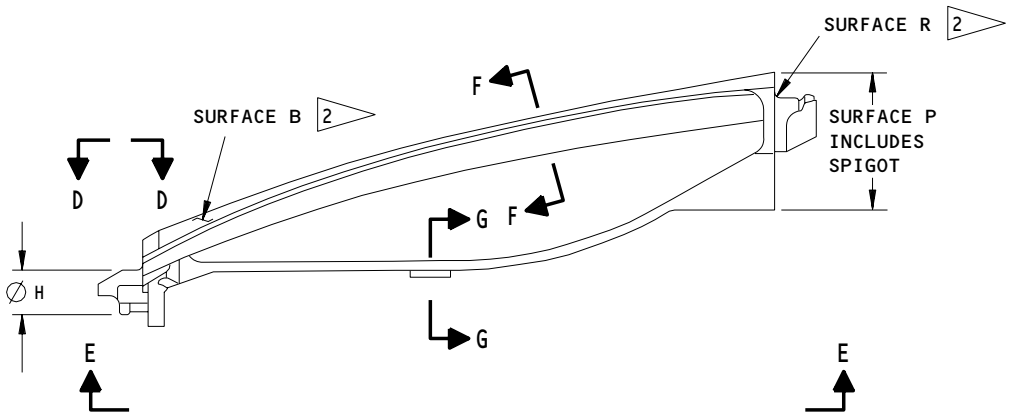
C–C

B–B

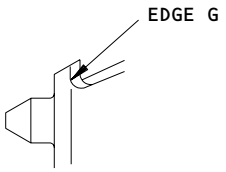
1 PUT A LAYER OF ADHESIVE PRIMER ON THE SHADED AREAS. OVERSPRAY IS OK, BUT NOT ON SURFACES A, D, F, P AND ϕH.

66154

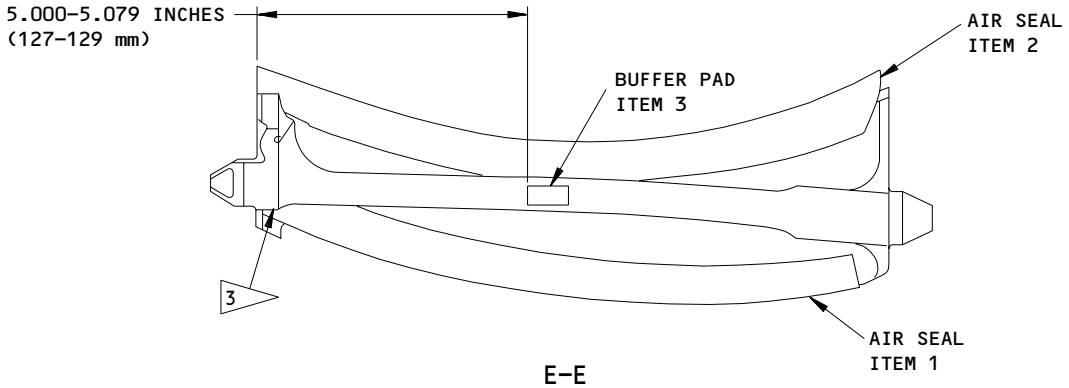
Repair Details and Dimensions to the Air Sealing Strips
and Buffer Pads for the Annular Filler Assembly
Figure 806 (Sheet 1)



VIEW OF ANNULUS FILLER SEALING STRIPS
AND BUFFER PAD INSTALLED



D–D



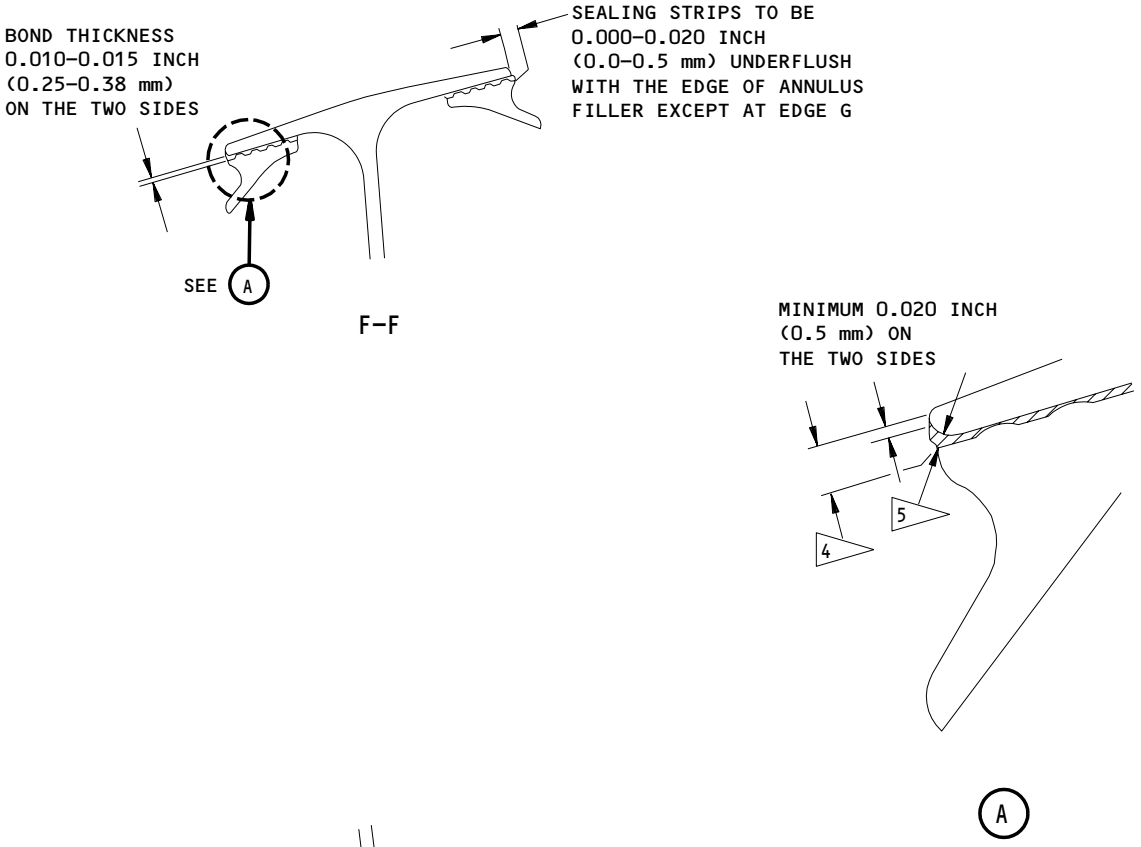
E–E

2 OVERSPRAY OF DRY FILM LUBRICANT AND PAINT ON SURFACE A IS NOT PERMITTED OVER AREAS DESIGNATED C, SURFACES F AND SURFACE D. IF IT IS NECESSARY, DRY FILM LUBRICANT CAN BE PUT ON SURFACES P AND R. TOUCH UP THE PAINT ON SURFACE B WHERE IT IS NECESSARY.

3 PUSH THE SEALING STRIP HOME FULLY IN THE FORWARD POCKET OF THE ANNULUS FILLER

66155

Repair Details and Dimensions to the Air Sealing Strips
and Buffer Pads for the Annular Filler Assembly
Figure 806 (Sheet 2)



4 APPLY DRY FILM LUBRICANT ALONG THIS SURFACE ON THE TWO SIDES. OVERSPRAY IS NOT PERMITTED ON SURFACES A AND D.

5 MAKE SURE A BEAD OF BOND IS ALONG THIS AREA ON THE TWO SIDES.

66156A

Repair Details and Dimensions to the Air Sealing Strips and Buffer Pads for the Annular Filler Assembly
Figure 806 (Sheet 3)

LP Compressor Fan Blade - Annular Filler Assembly - Replace Air Sealing Strips and Buffer Pad

S 348-049-R00

WARNING: THE PRIMER IS FLAMMABLE. KEEP IT AWAY FROM SPARKS, FLAME AND HEAT.

WARNING: YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK WHEN YOU USE THE PRIMER BECAUSE IT IS POISONOUS. USE THE PRIMER IN AN AREA THAT HAS A GOOD FLOW OF AIR. IF YOU GET PRIMER ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES, FLUSH WITH WATER THEN GET MEDICAL AIR. DO NOT BREATHE THE FUMES FROM THE PRIMER. INJURY TO PERSONS CAN OCCUR IF YOU BREATHE THE FUMES.

(3) Apply the primer to the areas of the metal that are to be bonded.
   (a) Prepare the primer, OMat 876A.

      NOTE: Refer to the manufacturer's instructions.

   (b) Use a clean paint brush to apply primer to the areas of the metal that are to be bonded.
   (c) Let the primer cure at room temperature for 30 minutes.

S 348-050-R00

WARNING: DO NOT GET ADHESIVE ON YOUR SKIN. USE THE CORRECT HAND PROTECTION AND BARRIER CREAM. AT THE END OF WORK OR IF CONTAMINATION OCCURS WASH YOUR HANDS WITH A CREAM THAT REMOVES RESIN.

WARNING: DO NOT SMOKE OR EAT WHEN THE ADHESIVE IS USED. USE THE ADHESIVE IN AN AREA THAT HAS A GOOD FLOW OF AIR. IF YOU BREATHE THE GAS FROM THE ADHESIVE, INJURY TO YOUR LUNGS CAN OCCUR.

(4) Apply the adhesive to the surfaces of the seals and pads that are to be bonded.
   (a) Apply the adhesive, OMat 872, to all the surfaces to be bonded.

      NOTE: Use the comb, HU30353.

LP Compressor Fan Blade - Annular Filler Assembly - Replace Air Sealing Strips and Buffer Pad

S 448-051-R00

(5) Install the seals and the pads to the annular filler assembly.
  (a) Put the seals and the pads into the correct position on the annular filler assembly.

    NOTE: Use the pad position gauge HU30352.

  (b) Remove all excess adhesive.
  (c) Let the adhesive cure at room temperature for 48 hours.

    NOTE: You can remove the pad position gauge after 2 hours.

  (d) Do a check to make sure the weight of the annular filler is correct.

    NOTE: The weight of the annular filler should be 687g ±10g. If the weight of the annular filler is less than 677g you must increase the weight of the assembly. Add fillets of the adhesive to the joints between the sealing strips and the annular ifller assembly (on the two sides). The weight identified on the component must be the actual weight minus 5g.

S 218-052-R00

(6) Inspect the seals and the pads.
  (a) Do a visual and dimensional inspection of the pads and the seals.

S 348-053-R00

WARNING: USE THE COLLOIDAL MOLYBDENUM DISULPHIDE IN TOLUENE IN AREAS WHICH HAVE GOOD AIR MOVEMENT. INJURY TO PERSONS CAN OCCUR IF YOU BREATHE THE FUMES.

(7) Apply colloidal molybdenum disulphide in toluene.
  (a) Apply one layer of colloidal molybdenum disulphide in toluene, OMat 444, where necessary, to the annular filler assembly.
  (b) Let the colloidal molybdenum disulphide in toluene to dry at room temperature for 8 hours.

S 348-054-R00

(8) Apply the surface protection to the annular filler assembly.
  (a) Remove the damaged area of paint with waterproof silicon carbide, OMat 5/33 or OMat 5/35.

LP Compressor Fan Blade - Annular Filler Assembly - Replace Air Sealing Strips and Buffer Pad

WARNING: YOU MUST NOT GET THE DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR IN YOUR EYES. YOU MUST USE APPLICABLE GLOVES, EYE PROTECTION AND A FACE MASK. USE THE FLUID IN AN AREA WHICH HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. IF YOU GET DEGREASING FLUID ON YOUR SKIN, IN YOUR MOUTH OR YOUR EYES, FLUSH IT AWAY WITH WATER. GET MEDICAL AID IMMEDIATELY IF YOU GET FLUID IN YOUR MOUTH OR IN YOUR EYES. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAME AND HEAT. DEGREASING FLUID IS A POISONOUS FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.

(b) Make a clean, dry lint-free cloth moist with Acetone (OMat No. 150) or Isopropyl Alcohol (OMat No. 1/40) or Cleaning Solvent (OMat No. 1/257).
(c) Clean the repair area.
(d) Dry the repair area before the liquid becomes a gas.
(e) Discard the dirty cloth after you use it.

WARNING: YOU MUST NOT GET THE SOLUTION ON YOUR SKIN OR IN YOUR EYES. WEAR APPLICABLE GLOVES, AN APRON AND GOGGLES. USE THE SOLUTION IN AN AREA THAT HAS A GOOD FLOW OF AIR. IF YOU GET THE SOLUTION ON YOUR SKIN OR IN YOUR EYES FLUSH IT AWAY WITH WATER. GET MEDICAL AID IMMEDIATELY IF YOU GET THE SOLUTION IN YOUR EYES.

WARNING: YOU MUST NOT LET THE MATERIALS THAT YOU APPLIED OR REMOVED THE CHROMATE SOLUTION WITH TO BECOME DRY. IF THEY BECOME DRY THEY CAN BE A FIRE HAZARD. THE MATERIALS MUST BE WASHED CAREFULLY THAT YOU DISCARD.

(f) Use a clean brush to apply wetting agent, OMat 2/7, to the repair area.
(g) Flush the repair area with clean water.
(h) Prepare a phosphoric acid etch solution, OMat 117.
(i) Mix 330 ml of phosphoric acid with 670 ml of water.
(j) Use a clean brush to apply the phosphoric acid etch solution to the repair area.
(k) Flush the repair area with clean water.
(l) Use a clean brush to apply the chromate conversion coating, OMat 175D or Omat 175E.

NOTE: You must continue to apply the chromate conversion coating until the surface of the metal shows an iridescent gold to a light golden-brown color.

(m) Flush the repair area with clean water.

LP Compressor Fan Blade - Annular Filler Assembly - Replace Air Sealing Strips and Buffer Pad

(n) Dry the repair area.

NOTE: Use warm air or carefully wipe with clean lintfree cloths.

WARNING: YOU MUST USE THE PAINTS IN AN AREA WHICH HAS A GOOD FLOW OF AIR. DO NOT BREATHE THE FUMES FROM THE FLUID. INJURY TO PERSONS CAN OCCUR IF YOU BREATHE THE FUMES.

(o) Apply one layer of red oxide touch up primer, OMat 708, to the repair area.
(p) Let the red oxide primer dry for 4 to 16 hours at a minimum temperature of 16 deg. C (61 deg. F).
(q) Alternatively, you can dry the red-oxide touch up primer for 30 minutes at 120 deg. C to 130 deg. C (248 deg. F to 266 deg. F).
(r) Apply one layer of the two pack expoxy, OMat 795 to the repair.
(s) Let the epoxy finish dry for a minimum of 1 hour at a temperature of more than 16 deg. C (61 deg. F).

NOTE: A second layer can be applied if it is necessary. If a second layer is applied you must let it dry for a minimum of 4 hours at a temperature above 16 deg. C (61 deg. F).

S 978-055-R00

(9) Record the repair.
(a) Vibro-engrave the repair number (FRS.5135) adjacent to the part number.

ANNULUS FILLERS - REMOVAL/INSTALLATION

1. General
   A. Use this procedure when you replace all of the annulus fillers.
      (1) This procedure contains these tasks:
         (a) The removal of the annulus fillers.
         (b) The installation of the annulus fillers.
      (2) There are three different aerodynamic standards of rotor blade.
      (3) Aerodynamic identification of the rotor blades is as follows:
         (a) The initial aerodynamic standard of rotor blades post RR SB72-8354 and RR SB 72-9132 can be identified by a white paint mark on the blade root.
         (b) The changed aerodynamic standard of rotor blades post RR SB 72-8342 can be identified by a gold paint mark on the blade root.
         (c) The changed aerodynamic standard of rotor blades post RR SB 72-9513 can be identified by a sea green paint mark on the blade root.
      (4) These Vendor Service Bulletins are referred to in this procedure:

SB 72-9513:	LP Compressor wide chord fan blade with recambered aerofoil.
SB 72-9177:	Introduction of extended nose cone and re- profiled annulus fillers.
SB 72-7735:	Rotor disc front balance weight carrier jacking feature access hole blanked or deleted.
SB 72-8342:	To include an LP Compressor rotor with a different aerodynamic standard and a changed cavity etch.
SB 72-8354:	To add chocking pads to the LP Compressor rotor blades and disc dovetails.
SB 72-9532:	To include an LP Compressor rotor blade with the initial aerodynamic standard and a changed cavity etch.

   TASK 72-31-14-024-019-R00

2. Removal of the Annulus Fillers
   A. General
      (1) To remove the annulus fillers do the following steps:
         (a) Remove the inlet fairing.
         (b) Remove the support ring.
         (c) Remove the weight carrier.
   B. References
      (1) AMM 72-35-01/401, LP Compressor Inlet Rotating Fairing - Removal/Installation.
   C. Equipment
      (1) Protective work mat - 289200, Rolls-Royce
      (2) Extractor bolt no. 10 UNF x 1.250 - Commercially available

D. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
411 No. 2 Power Plant (Right)

E. Prepare to Remove the Annulus Fillers

S 864-002-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19 ENGINE START CONT LEFT

S 864-020-R00
(2) For the right engine, open the circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

F. Removal of the Annulus Fillers

S 024-021-R00
(1) Remove the support ring on the nose cone (Fig. 401).
(a) Put the work mat in the air intake.
(b) Remove the LP Compressor inlet rotating fairing (AMM 72-35-01/401).

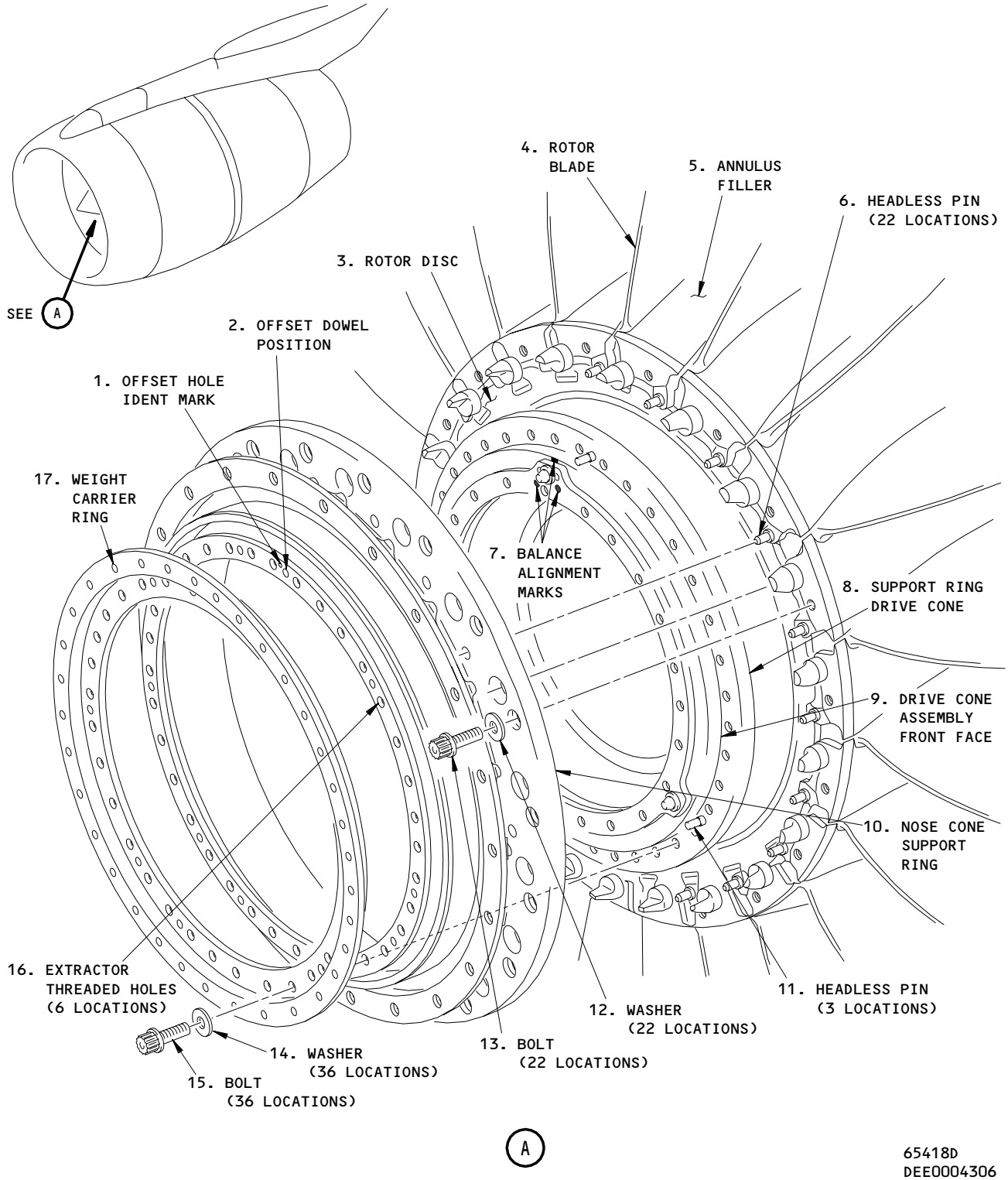
S 024-048-R00

WARNING: THE SUPPORT RING ON THE NOSECONE WEIGHS 13.2 POUNDS (6.0 KILOGRAMS). HOLD THE SUPPORT RING ON THE NOSE CONE TIGHTLY WHEN IT IS REMOVED FROM THE COMPRESSOR ASSEMBLY. INJURY TO PERSONS CAN OCCUR.

(2) Remove items (12) to (15) that attach the support ring on the nose cone and the ring on the weight carrier.

NOTE: You must remove the two inner and outer rings of bolts.

S 024-023-R00
(3) Remove the ring on the weight carrier (17).



Support Ring – Removal/Installation
Figure 401

S 024-049-R00
(4) Remove the support ring in the nose cone (10).

NOTE: If it is not easy to remove the support ring on the nose cone, put the six extractor bolts in the threaded extraction holes (16). The threaded extraction holes (16) are in the inner flange to the support ring on the nose cone.

S 024-025-R00
(5) Tighten the extractor bolts diagonally in increments until you release the support ring on the nose cone.

S 024-026-R00
(6) Remove the support ring (10).

S 024-027-R00
(7) Remove the extractor bolts from the extractor holes (16) on the support ring.

S 824-028-R00
(8) Position the annulus filler for removal at Bottom Dead Center (B.D.C.).
(a) Pull the annulus filler (5) forward to remove from the rear support panel.
(b) Turn the fillers counterclockwise.

S 824-029-R00
(9) Do the previous step for the remainder of the annulus fillers.

TASK 72-31-14-424-030-R00

3. Installation of the Annulus Fillers

A. General
(1) This procedure contains the installation of the annulus fillers.
(2) Do the steps that follow:
(a) Install the inlet rotating fairing.
(b) Install the support ring.
(c) Install the weight carrier.

B. References
(1) AMM 70-51-00/201, Torque Tightening Technique

C. Equipment
(1) Protective work mat - 289200, Rolls-Royce
(2) Strip of stiff plastic with the dimensions that follow:
(a) Length: 3.150 to 4.724 inches (80.00 to 120.00 mm).

(b) Width: 1.575 to 2.362 inches (40.00 to 60.00 mm).
(c) Thickness: approximately 0.039 inch (1.00 mm).

D. Consumable Materials
(1) OMat 418 - Silicone Grease
(2) OMat 1011 - Engine Oil

E. Access
(1) Location Zones
410 No. 1 Power Plant (Left)
411 No. 2 Power Plant (Right)

F. Prepare to Install the Annulus Fillers

S 864-031-R00
(1) For the left engine, open the following circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT RIGHT

G. Install the Annulus Fillers.

NOTE: Where possible, replace rejected annulus fillers with a filler of the same weight to keep the previous light/heavy balance configuration. Where this is not possible, keep the difference in weight between the original and replacement parts to not more than 4g (0.14oz). The weight of the annulus filler is identified on the underside, towards the rear. If it is not possible to install a part that is within 4g of the rejected filler, do the heavy/light distribution again.

NOTE: If only one annulus filler is replaced (and no other LP compressor assembly parts are replaced or moved), and the replacement part is within 4g (0.14oz) of the original part, it is not neessary to do a vibration survey or trim balance (AMM 71-00-00/501).

NOTE: If you replace one SB72-9700 annulus filler with a post SB72-C901 annulus filler and you cannot get within the 4g difference in weight, you can install two SB72-C901 annulus fillers, 180 degrees apart. These two annulus fillers must have the same difference in weight between each other as the two replacement parts, or be within 4g of that difference. The heavier new part should go in the same position as the heavier replaced part.

S 944-032-R00
(1) Put the annulus fillers on a suitable work surface in the sequence of heaviest first and lightest last.

S 424-052-R00

WARNING: IF MORE THAN SIX LP COMPRESSOR ROTOR BLADES OF SB72-9513 STANDARD ARE INSTALLED, SB72-9177 MUST BE INCORPORATED.

(2) Install annulus fillers between blades in a heavy - light - heavy sequence, making sure the annulus fillers are correctly installed in the rear support panel and the seals are not bent back or trapped (Fig. 402). Do not install Pre Mod SB72-9177 annulus fillers on engines Post Mod SB72-9177 because this could affect engine operation.

NOTE: To help in the installation of the annulus fillers, you can apply OMat 418 silicone grease or OMat1011 engine oil to the seal strips.

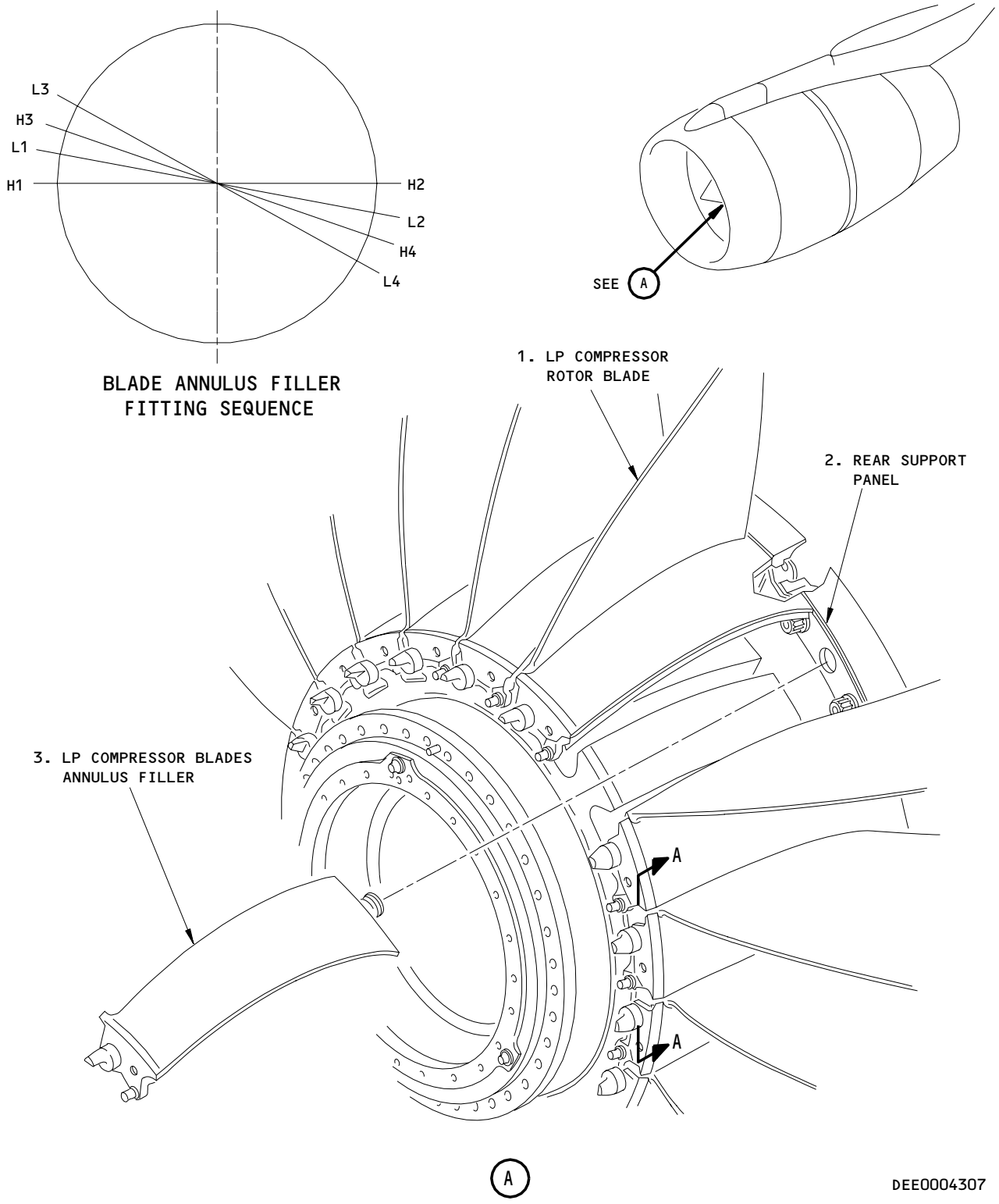
S 424-010-R00
(3) Make a selection of the heaviest annulus filler and install at position H1.

S 424-034-R00
(4) Make a selection of the second heaviest filler and install at position H2.

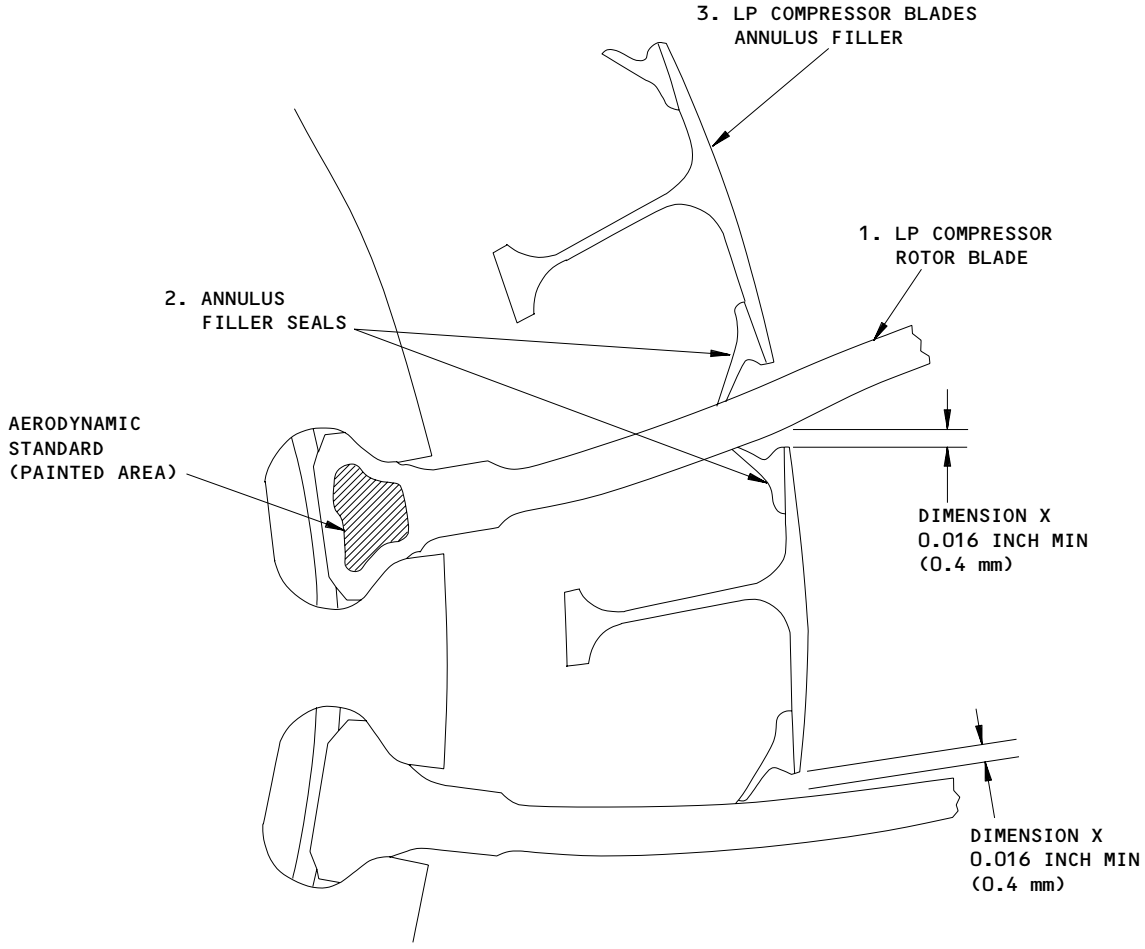
S 424-035-R00
(5) Make a selection of the lightest annulus filler and install at position L1.

S 424-036-R00
(6) Make a selection of the second lightest annulus filler and install at position L2.

S 424-037-R00
(7) Continue with the installation process with the same sequence heavy - light - heavy.



Annulus Fillers – Removal/Installation
Figure 402 (Sheet 1)



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Annulus Fillers - Removal/Installation
Figure 402 (Sheet 2)

S 424-038-R00

(8) Install the support ring on the nose cone (Fig. 401).
  (a) Identify the identification mark (1) on the offset dowel hole to the support ring (10) on the nose cone and the drive cone (8).
  (b) Make sure the support ring (10) on the nose cone is correctly aligned with the ident marks.
  (c) Put the ring (10) on the three headless pins (16) attached to the support ring on the drive cone.
  (d) Put the ring on the headless pins (6) on the blade annulus fillers (5).

NOTE: If it is not easy to install the support ring on the nose cone, heat the ring in an oven to 302 degrees F (150 deg. C) before you install the ring.

S 424-047-R00

WARNING: FOR ENGINES WHICH ARE PRE RR SB72-7735, YOU CAN INSTALL THE HEADLESS PINS IN THE CLEARANCE HOLES OF THE EXTRACTOR IN PLACE OF THE OFFSET DOWEL HOLES. IF YOU INSTALL THE PINS INCORRECTLY, ENGINE DAMAGE CAN OCCUR.

(9) Install the weight carrier ring.
  (a) Identify the position of the offset dowel hole identification mark on the weight carrier ring (15) and the nose cone support ring (10).
  (b) Make sure you correctly align the weight carrier ring (17) and nose cone support ring (10) identification marks with the balance alignment mark (7) on the support ring of the drive cone assembly.
  (c) Put the ring (17) on the three headless pins (11) attached to the support ring on the drive cone (8).
  (d) Install and secure the bolts and washers (14) and (15) through the balance weight carrier ring (17) and the nose cone support ring (10) into the rotor disc (3).

S 424-040-R00

(10) Install and secure the bolts and washers (12) and (13) through the nose cone support ring (10) into the blade annulus fillers.

S 424-041-R00

(11) Tighten the bolts (13) and (15) on opposite sides in increments (AMM 70-51-00/201).

S 424-042-R00

(12) Put the annulus fillers sealing strips in the correct position (Fig. 402), do this procedure along the full chordal length at each side of each fan blade.

CAUTION: MAKE SURE THAT THE PLASTIC STRIP HAS A SMOOTH SURFACE AND EDGES. IF YOU USE A ROUGH SURFACE OR EDGE, DAMAGE TO THE RUBBER SEAL CAN OCCUR.

MAKE SURE THAT YOU DO NOT BREAK THE PLASTIC STRIP AND LEAVE PIECES OF IT IN THE FAN, PIECES OF PLASTIC CAN CAUSE DAMAGE TO THE RUBBER.

(a) Push the plastic strip between the fan blade and the annulus filler toward the rear of the fan.

NOTE: If this is not easy to do, it can be an indication that the seal is caught.

(b) Use the plastic strip to move the seal into the correct position.

NOTE: When the seal is in the correct position you can easily move the plastic strip (from the front to the rear of the fan blade).

S 224-043-R00

(13) Examine the annulus filler clearance (Fig. 402).
(a) Put the No. 1 blade at the bottom dead center (B.D.C.).
(b) Pull the No. 1 blade to its most forward position.
(c) Examine the clearance dimension "x" between blade no. 1 and the annulus fillers.
(d) The minimum clearance is 0.016 in. (0.40 mm) along the length of each blade flank.
(e) Do the steps above again for each blade that you replace.

S 424-044-R00

(14) Install the LPC rotating fairing (AMM 72-35-01/401).

S 024-050-R00

(15) Remove the work mat from the air intake.

H. Put the Engine to Its Usual Condition

S 844-045-R00

(1) For the left engine, remove the DO-NOT-CLOSE tag and close the following circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINE START CONT LEFT

S 844-046-R00

(2) For the right engine, remove the DO-NOT-CLOSE tag and close the following circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINE START CONT RIGHT

S 704-051-R00

(3) Do Test 6-Vibration Survey and, if necessary, Test 7-Fan Trim Balance (AMM 71-00-00/501).

NOTE: If only one annulus filler is replaced (and no other LP compressor assembly parts are replaced or moved), and the replacement part is within 4g (0.14oz) of the original part, it is not necessary to do a vibration survey or trim balance (AMM 71-00-00/501).

ANNULUS FILLERS - INSPECTION/CHECK

1. General
   A. Use this procedure when you remove the annulus fillers.

TASK 72-31-14-216-033-R00

2. Inspect/Check the Annulus Fillers
   A. References
      (1) AMM 70-42-13/201, Screw Threads
      (2) AMM 72-31-13/801, LP Compressor Rotor Blades
      (3) AMM 72-31-14/401, Annulus Filler
   B. Access
      (1) Location Zones
          410 No. 1 Power Plant (Left)
          411 No. 2 Power Plant (Right)

   C. Prepare to do the inspection of the annulus fillers

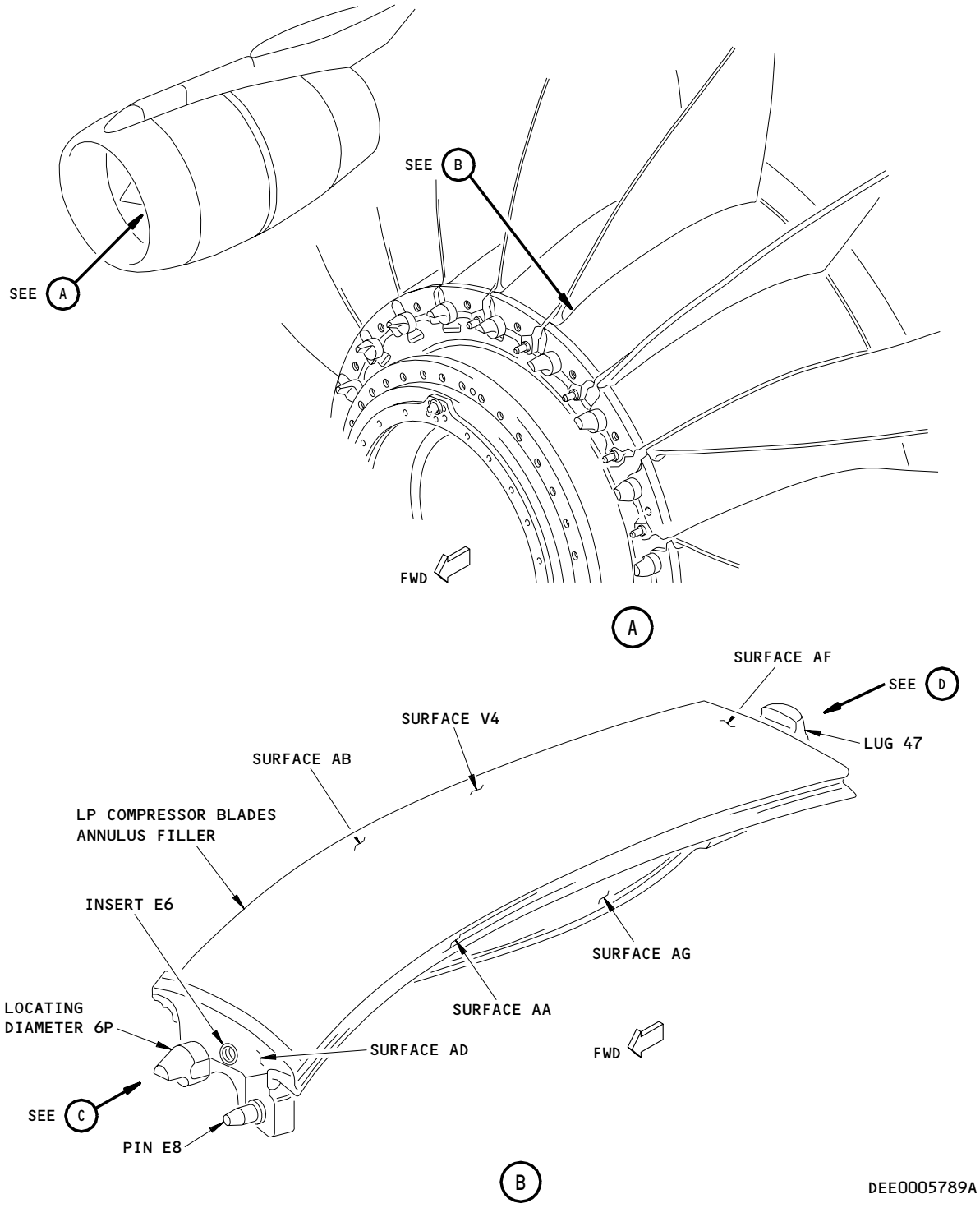
      S 026-034-R00
      (1) Remove the annulus fillers from the L.P. Compressor (AMM 72-31-14/401).
   D. Do the inspection of the annulus fillers (Fig. 601).

      S 216-035-R00
      (1) Do a visual inspection of the L.P. Compressor blade annulus fillers.
          (a) If you find corrosion - Reject.
          (b) If you find damage - Reject.

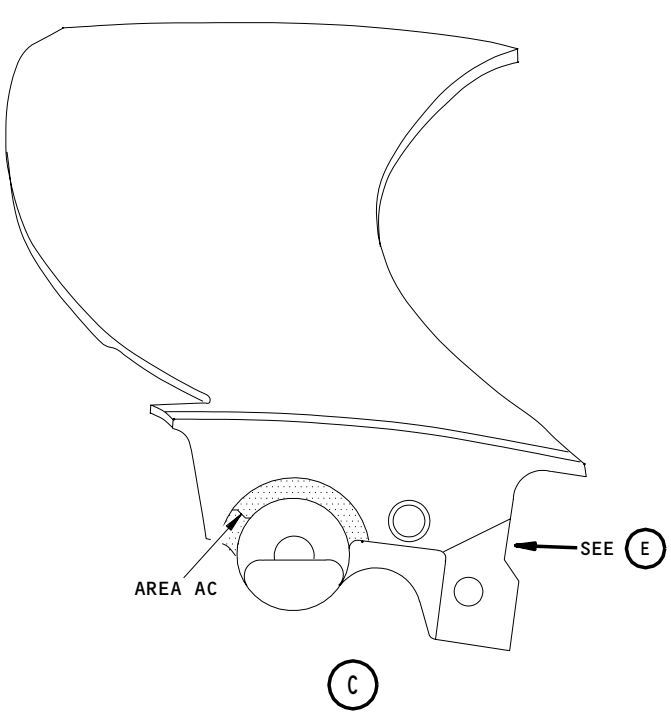
      S 216-036-R00
      (2) Do an inspection of the rear location lug (Location 47).
          (a) If you find scores:
              1) To a maximum depth of 0.003 inches (0.08 mm) - Accept.
              2) More than 0.003 inches (0.08 mm) in depth - Reject.

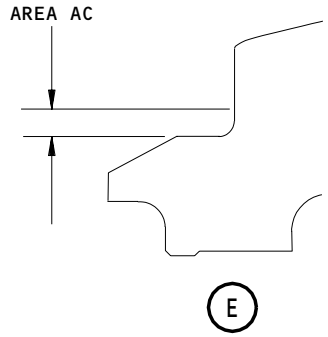
      S 216-037-R00
      (3) Do an inspection of the Locating diameter (Location 6P).
          (a) If you find scores:
              1) To a maximum depth of 0.003 inches (0.08 mm) - Accept.
              2) More than 0.003 inches (0.08 mm) in depth - Reject.

      S 216-038-R00
      (4) Do an inspection of the pin (Location E8).
          (a) If you find scores:
              1) To a maximum depth of 0.003 inches (0.08 mm) - Accept.
              2) More than 0.003 inches (0.08 mm) in depth - Reject.

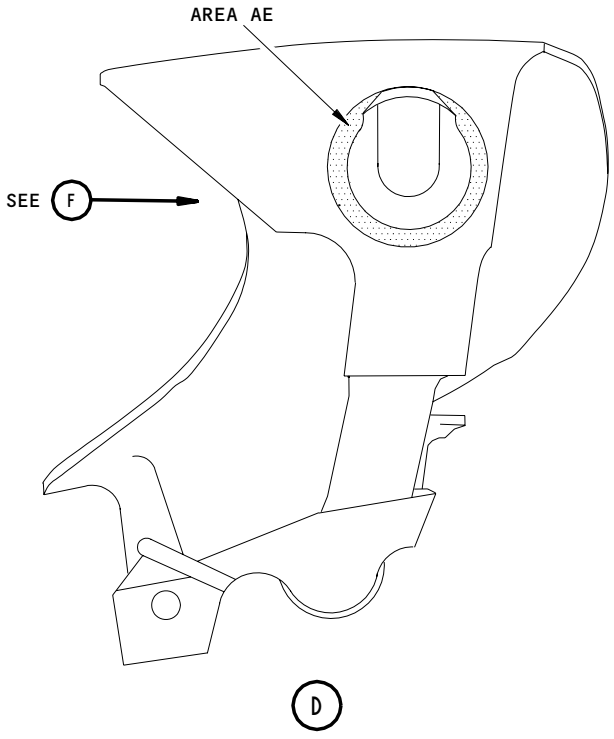


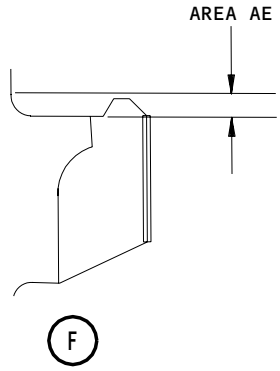
LP Compressor Annulus Fillers
Figure 601 (Sheet 1)





PART NO	AREA AC
UL16208 UL16160 UL38852	4,0 mm
UL38855 UL35848 UL39738	5,5 mm





PART NO	AREA AE
UL16208 UL16160 UL38852 UL38855 UL35848 UL39738	4,0 mm

DEE0005798

LP Compressor Annulus Fillers
Figure 601 (Sheet 2)

S 216-039-R00
(5) Do an inspection of the wire thread insert (Location E6).
  (a) If you find the wire thread insert damaged, then repair to FRS 3002 (AMM 70-42-13/201).

S 216-040-R00
(6) Do an inspection of the sealing strips and the buffer pads.
  (a) If you find loose, missing or damaged strips/pads, then repair to FRS 5135 (AMM 72-31-13/801).

S 216-041-R00
(7) Do an inspection of the surface of the annulus filler (Location V4).
  (a) If you find surface damaged or deteriorated - Accept.

S 216-042-R00
(8) Do an inspection of the surface of the annulus filler (Location AA).
  (a) If you find the surface protection is damaged or deteriorated - Accept.
  (b) Do an inspection for damage marks.
    1) If you find damage less than 0.010 inches (0.25 mm) in depth - Accept.
    2) If you find damage more than 0.010 inches (0.25 mm) in depth - Reject.

S 216-043-R00
(9) Do an inspection of the surface of the annulus filler (Location AB).
  (a) If you find the surface protection is damaged or deteriorated - Accept.
  (b) If you find damage to a maximum of 0.010 inches (0.25 mm) in depth and the damage is more than 2.00 inches (50 mm) from surface AD - Accept.
  (c) If you find damage more than 0.010 inches (0.25 mm) in depth - Reject.
  (d) If the damage is less than 2.00 inches (50 mm) from surface AD - Reject.

S 216-044-R00
(10) Do an inspection of the surface of the annulus filler (Location AG).
  (a) Do an inspection for damage marks.
    1) If you find damage less than 0.010 inches (0.25 mm) in depth - Accept.
    2) If you find damage more than 0.010 inches (0.25 mm) in depth - Reject.

S 216-045-R00

(11) Do an inspection of the front face of the annulus filler (Location AD).

(a) Do an inspection for galling.

1) Galling less than 80 percent of the area of location AD, a maximum of 0.010 inches (0.25 mm) in depth and galling does not go into area AC - Accept.
2) Galling more than 80 percent of the area of location AD - Reject.
3) Galling in area AC - Reject.
4) Galling of more than 0.010 inches (0.25 mm) in depth - Reject.

(b) Do an inspection for pitting.

1) Pitting less than 80 percent of the area of location AD, a maximum of 0.010 inches (0.25 mm) in depth and galling does not go into area AC - Accept.
2) Pitting more than 80 percent of the area of location AD - Reject.
3) Pitting in area AC - Reject.
4) Pitting of more than 0.010 inches (0.25 mm) in depth - Reject.

(c) Do an inspection for nicks (Top face / Location V4 side).

1) Nicks 0.010 inches (0.25 mm) or less in depth and does not go into arae AC - Accept.
2) Nicks more than 0.010 inches (0.25 mm) in depth - Reject.
3) Nicks in area AC - Reject.

S 216-046-R00

(12) Do an inspection of the rear face of the annulus filler (Location AF).

(a) Do an inspection for galling.

1) Galling less than 80 percent of the area of location AD, 0.010 inches (0.25 mm) or less in depth and galling does not go into area AE - Accept.
2) Galling more than 80 percent of the area of location AD - Reject.
3) Galling in area AE - Reject.
4) Galling of more than 0.010 inches (0.25 mm) in depth - Reject.

(b) Do an inspection for pitting.

1) Pitting less than 80 percent of the area of location AD, 0.010 inches (0.25 mm) or less in depth and galling does not go into area AE - Accept.
2) Pitting more than 80 percent of the area of location AD - Reject.

3) Pitting in area AE - Reject.
4) Pitting of more than 0.010 inches (0.25 mm) in depth - Reject.

E. Put the aircraft back to its usual condition.

S 426-047-R00

(1) Install the annulus fillers to the LP Compressor (AMM 72-31-14/401).

LP COMPRESSOR CASE - INSPECTION/CHECK

1. General
   A. This procedure contains these two tasks:
      (1) Inspection of the LP Compressor Case
      (2) Examine the Kevlar Wrapping on the LP Compressor Case.
   B. The Inspection of the LP Compressor Case gives you the steps and the recommended acceptance standards which are necessary when you do the inspection.

TASK 72-34-10-216-001-R00

2. Inspection of the LP Compressor Case
   A. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
      (2) AMM 72-34-10/801, LP Compressor Case
      (3) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

      (2) Access Panels

415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

   C. Prepare for the Inspection of the LPC Case

      S 846-002-R00
      (1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D19, ENGINES START CONT LEFT

      S 846-003-R00
      (2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D20, ENGINES START CONT RIGHT

S 046-004-R00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 016-005-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Open the thrust reversers (AMM 78-31-00/201).

S 016-006-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(5) Open the fan cowl panels (AMM 71-11-04/201).

D. Procedure (Fig. 601 and 602)

S 216-007-R00

(1) Do this task: Examine the Kevlar Wrapping on the LPC Case (which can be found at the end of this task).

S 216-009-R00

(2) Examine the outer side of the LP compressor case-rear for cracks and dents.

S 216-010-R00

(3) Do an inspection of the location areas for the thrust reverser on the engine firewall.
   (a) Examine the location areas for the conditions that follow:
      1) Surface damage
      2) Cracks

S 216-053-R00
(4) Do an inspection of the location areas for the fan cowl doors on the engine firewall stiffeners.
  (a) Examine the location areas for the conditions that follow:
    1) Surface damage
    2) Cracks

S 216-011-R00
(5) Examine the firewall spacer blocks for damage and to make sure they are securely attached.

S 216-012-R00
(6) Examine the inner side of the LP compressor case-rear for cracks and dents.

S 216-013-R00
(7) Examine the Outlet Guide Vanes (OGV) for the LP compressor.

  (a) Do an inspection of the OGV for cracks and birdstrike damage.
  (b) Examine the OGV annulus former panels for cracks, erosion and correct attachment.

    NOTE: If OGV annulus former panels are damage or not there the debris can collect in the air inlet duct for Integrated Drive Generator (IDG) and cause blockage to the airflow.

S 216-014-R00
(8) Examine the integrated drive generator for blockage.

S 216-015-R00
(9) Examine the A-Frame Glass Reinforced Plastic (GRP) Fairings.
  (a) Examine the A-frame fairings for deterioration of the anti-erosion coating.
  (b) Examine the A-frame fairings for delamination.

S 216-016-R00
(10) Examine the inner side of the LP Compressor Case-Front.
  (a) Examine the attrition lining for erosion, impact damage and circumferential scoring (blade tip rub).
  (b) Go into the air intake and examine the front acoustic panels for dents, cracks, bulges and areas that are unbonded.
  (c) Enter the air intake and inspect the ice impact panel for damage, missing or buging glass reinforced composite (GRC) skin.

    NOTE: Bulging may indicate the presence of corrosion on the casing under the panel.

  (d) Inspect the OGV annulus former strip for missing material.

E. Acceptance Standards

S 866-018-R00

(1) LP Compressor Rear Case - Externally
  (a) Cracks - Reject.
  (b) Dents
    1) Dents that are smaller than 2.0 square-inches (1290.3 sq. mm) and that have smooth bottoms are permitted, unless you find these conditions:
      a) The dent has a depth that is more than 0.03 inch (0.76 mm).
      b) There are more than two dents in an area of 144 square-inches (929 sq. cm).
      c) There are more than twenty dents on one case.
    2) Damage in excess of these limits - Reject.
    3) Battering - Reject.
    4) Galled:
      a) Up to 0.030 inch (0.75 mm) in depth with a maximum area of 1 sq inch (625 sq mm).
        1. Dress to depth with FRS3253 (AMM 70-42-11/201).
        2. Use a Fluorescent Penetration Inspection Crack Test as defined by AMM 70-20-04/201, with high sensitivity Penetrant OMat 651, after doing the repair FRS3253.
      b) Damage in excess of these limits - Reject.

S 216-019-R00

(2) Thrust reverser location areas on the engine firewall stiffeners.
  (a) Surface damage
    1) If the wear is less than 0.010 inch (0.25 mm), accept it.
    2) If the wear is more than 0.010 inch (0.25 mm) but less than 0.025 inch (0.63 mm), accept it for these conditions:
      a) The worn areas do not cover more than 20 percent of the total location area on the right side of the engine.
      b) The worn areas do not cover more than 20 percent of the total location area on the left side of the engine.
    3) Damage that is more than the limits given, replace the affected stiffeners to FRS4938 in less than 100 flight hours.
  (b) Cracks
    1) Cracks in the location area, reject it.

S 216-054-R00

(3) Location areas for the fan cowl doors on the engine firewall stiffeners:
  (a) Surface damage
    1) If the wear is less than 0.025 inch (0.63 mm), accept.

2) If the wear is 0.025 inch (0.63 mm) or more - Replace the stiffener to FRS4938 in less than 100 flight hours.

(b) Cracks

1) Cracks in the location area, reject it.

S 216-020-R00

(4) Inspect the firewall spacer blocks.

(a) If they are damaged or missing - accept

S 866-021-R00

(5) LP Compressor Rear Case - Internally

(a) Cracks between the perforations

1) One crack that goes between four holes is OK unless you find these conditions:

a) There are more than two cracks on one case.

b) The cracks are within 1.5 inches (38.1 mm) of a Delron insert.

2) If the damage is more than these limits - Reject.

(b) Cracks that do not stop at the perforations.

1) Cracks are OK unless you find these conditions:

2) The crack length that are not more than 1.0 inch (25.4 mm) are OK unless you find these conditions:

a) There are more than 2 cracks on each case.

b) The cracks are within 1.5 inches (38.1 mm) of a Delron insert.

3) If the damage is more than the limits permitted - Reject.

(c) Dents

1) Dents that are smaller than 2.0 square-inches (1290.3 sq. mm) and that have smooth bottoms are OK unless you find these conditions:

a) The dent has a depth that is more than 0.03 inch (0.76 mm).

b) There are more than two dents in an area of 144 square-inches (929 sq. cm).

c) There are more than twenty dents on one case.

2) Dents that are smaller than 0.7 square-inches (452.0 sq. mm) and that have smooth bottoms are OK unless you find these conditions:

a) The dent has a depth that is more than 0.020 inch (0.76 mm).

b) There are more than six dents in an area of 144 square-inches (929 sq. cm).

c) There are more than twenty dents on one case.

3) If the damage is more than the limits permitted - Reject.

4) Battering - Reject.

(d) A-Frame glass reinforced plastic (GRP) fairings.

1) If all or some of the anti-erosion layer is missing, Accept.

2) If all of the fairing is missing - Accept. A permanent repair is to be carried out at the next engine shop visit.

3) If some of the Glass Reinforced Plastic (GRP) fairing is missing, do one of the steps that follow:
   a) Use FRS.5947 to repair the fairing temporarily in less than 100 flight hours (AMM 72-34-10/801). Replace the fairing at the subsequent scheduled engine overhaul.
   b) Remove all the remaining GRP fairing from the A frame and replace the fairing at the subsequent scheduled engine overhaul.

S 866-022-R00

(6) LP Compressor Outlet Guide Vanes (OGV)

(a) Cracks

NOTE: If you see bird material on the OGV, it is possible a birdstrike has occurred. If you see this condition, do a fluorescent penetrant inspection that can be cleaned with water. You must examine each blade that has bird material and the two blades adjacent to the hit area. If the inspection procedure cannot be done immediately, a fly-on condition is permitted. The inspection procedure must be done the first time it is possible to do it.

1) If cracks that more than 1.0 inch (25.4 mm) in length - Reject.
2) You can permit two cracks on each vane if they do not connect together to form a continuation crack.
3) If cracks are shown on adjacent vanes in any sector - Reject.
4) The total crack length and maximum number of cracked vanes in each sector must not be more than the values shown (below):

Position	Maximum Number of Cracked Vanes	Total Length of Cracks
Upper Sector	2	2.0 inches (50.8 mm)
Lower Sector	2	2.0 inches (50.8 mm)
Left and Right Sectors	6	6.0 inches (152.4 mm)
Maximum Total	8	8.0 inches (203.2 mm)

5) Cracks that more than the above limits - Reject.
6) Cracks of OGV root weld - Reject.

(b) OGV annulus former panel
1) Cracks and erosion - Accept.
2) ENGINES PRE-RR-SB 72-9188 AND PRE-RR-SB 72-7847; Correct attachment.
a) Up to 6 panels missing - Accept.
b) More than 6 panels missing, repair to FRS 5156 (AMM 72-34-10/801).
c) Erosion of filler/coating or filler/coating is gone - Accept.
3) ENGINES PRE-RR-SB 72-9188 AND POST-RR-SB 72-7847; Correct attachment.
a) For panels that are missing, repair to FRS 5156 (AMM 72-34-10/801).
b) Erosion of filler/coating or filler/coating is gone - Accept.
4) ENGINES POST-RR-SB 72-9188 AND POST-RR-SB 72-7847; Correct attachment.
a) For panels that are missing, repair to FRS 5156 (AMM 72-34-10/801).
b) Erosion of filler/coating or filler/coating is gone - Accept.
(c) OGV Infill Panels
1) PRE SB72-7847; Correct attachment
a) Up to 6 Panels missing - Accept.
b) Between 7 to 10 panels missing - Repair to FRS5156 before 50 flight hours.
c) Filler coating damaged or missing - Accept.
2) POST SB72-7847; Correct attachment
a) Panels missing - Repair to FRS5156.
b) Filler coating damaged or missing - Accept.

S 866-023-R00
(7) Integrated Drive Generator (IDG) air inlet duct - blockage.
(a) Remove all unwanted material from the duct.

S 866-024-R00
(8) LP Compressor Internal Front Case - Attrition Lining
(a) Erosion Damage or Blade Tip Rub
1) Erosion damage or tip rub (on the tip path) less than 0.100 in. (2.54 mm) in depth is permitted.

NOTE: Make sure the full depth of the erosion damage or tip rub is measured.

2) If the erosion damage or tip rub (on the tip path) is more than 0.100 in. (2.54 mm) but less than 0.150 in. (3.81 mm) in depth, proceed as follows:
a) Step at leading (forward) edge of the erosion damage or tip rub - accept.

CAUTION: DO NOT REMOVE THE LEADING (FORWARD) EDGE STEP.

b) Step at the trailing (rear) edge of the erosion damage or tip rub - dress the rear edge of the erosion damage axially to give a convex radius that blends into the annulus.

NOTE: Make sure you do not dress the ice impact panel.

c) Do the repair FRS.5201 if the erosion damage or tip rub is more than the limits above or more than the depth of the installed honeycomb (AMM 72-34-10/801).

NOTE: This repair improves the flow through the LP compressor, which improves engine performance.

(b) Impact Damage to Filled Honeycomb and/or Missing Filler of the Attrition Lining

1) Not more than five damage areas to the honeycomb, which can extend to the full depth of the attrition lining to the containment are permitted, with these conditions:
   a) The maximum dimension of each area is not more than 9.0 square inches (5806 sq mm).
   b) The distance between the damaged area is more than 4.0 inches (101.6 mm) of lining that is not damaged.
2) Unlimited number of damage areas to the honeycomb, which extend to the full depth of the attrition lining to the containment case, with these conditions:
   a) The maximum dimension of each area is not more than 4.0 square inches (2580 sq mm).
   b) The distance between the damaged area is more than 4.0 inches (101.6 mm) of lining that is not damaged.

CAUTION: A REDUCTION IN THE DECLARED CYCLIC LIFE WILL BECOME EFFECTIVE WITH THESE CONDITIONS:

THE FAN BLADES AND DISCS ARE EXPOSED TO A CUMULATIVE TOTAL OF 100 OR MORE FLIGHT CYCLES WITH ATTRITION LINING DAMAGE MORE THAN THE ABOVE LIMITS.

THE DAMAGED SECTIOR IS DESCRIBED BY THE TOP 20 OGVs. ROLLS-ROYCE SHOULD BE INFORMED TO ENABLE THE REDUCTIONS TO BE ASSESSED.

c) Damage more than the above limits are permitted with these conditions:

NOTE: It is in the operator's interest to repair damage at the earliest opportunity to reduce fan blade and disc exposure and conserve the 100 flight cycles cumulative total.

1. It is permitted to fly-on for a minimum number of flights and repair to FRS.5201 at the next opportunity (AMM 72-34-10/801).
2. Make a record of the fan disc and blade exposure.
3. If the damage is in the sector of the top 20 OGVs, include details of the cyclic lives, against the serial number of the fan disc and each blade installed in the engine at that time.

(c) Circumferential Scoring of the Attrition Lining

1) Scores of all lengths are acceptable if the adjacent lining is not damaged.

S 866-025-R00

(9) Damage to Ice Impact Panel

(a) Any number of marks or dent are OK if there are no holes in the GRC panel - Accept.

(b) Debond of the ice impact area is permitted if it is less than the limits that follow:

1) A maximum of 10% debond of a panel is permitted.

2) If the debond is more than 10% then use FRS.5202 to replace the panel (AMM 72-34-10/801). The replacement must be completed in less than 500 hours or at the subsequent Aircraft Maintenance Inspection, whichever occurs first.

(c) Damage which goes into the GRP skin.

1) If the total area is not more than 10% of the circumferential area, and a maximum of 30% of one panel with a small decrease of filler, then use FRS.5203 to repair it (AMM 72-34-10/801). The repairs must be completed in less than 500 hours or at the subsequent Aircraft Maintenance Inspection, whichever occurs first.

2) If the total is not more than 30% of the circumferential area and a maximum of 30% of one panel with a small decrease of filler, then use FRS.5203 to repair it (AMM 72-34-10/801). The repairs must be completed in less than 250 hours or at the subsequent Aircraft Maintenance Inspection, whichever occurs first.
3) If the damage is more than the above limits, then use FRS.5202 to replace the panel (AMM 72-34-10/801). The replacement must be completed in less than 50 hours or at the subsequent Aircraft Maintenance Inspection, whichever occurs first.

(d) Bulging
1) Up to 0.040 in. (1.00 mm) - accept.
2) In excess of the above limits - repair to FRS.5202 within 5000 hours or at the next shop visit, whichever is the soonest.

S 866-026-R00

(10) Examine the front acoustic panels for damage:
(a) Dents but no cracks - Accept.
(b) Bulges in the annulus surface - Accept unless there is one of these conditions:
1) There are no more than three bulges in each panel.
2) Each bulge is less than of 4.0 square-inches (2580.6 sq. mm).
3) On each panel, there must be a minimum of 2.0 inches (50.8 mm) between the bulges.
a) Each bulge must be a minimum of 2.0 inches (50.8 mm) from the circumferential edge.
4) There are no bulges that have cracks on them.
(c) Bulges on the vertical face of the front of the panel are OK if it is less than this:
1) The bulge is not more than 0.020 inch (0.508 mm) forward of the front face of the front flange on the fan casing - Accept.
2) Bulges that are more than the limits permitted - Reject.

(d) Holes up to 5.00 sq in.(3225 sq mm) separated by at least 6.00 in. (152.4 mm) undamaged length with a total area affected of not more than 10.08 sq in. (6500 sq mm) - accept within fly on limits given below.
1) Fly on limit - It is permitted to fly on with loss of front acoustic panel as given above for up to 250 hours or next opportunity to repair, whichever occurs first.
2) Repair to FRS.5965 Procedure B (AMM 72-34-10-801) or by replacement of the panel as follows:
a) ENGINES PRE RR SB-72-9562 OR PRE RR SB-72-B003; Replace the panel (FRS.5198).
b) ENGINES POST SB-72-9562 OR POST RR SB-72-B003; Replace the panel (FRS.6588

(e) Holing more than given limits - repair to FRS5962 Procedure B (AMM 72-34-10/801) or replace the panel as follows within 50 flight hours:
1) ENGINES PRE RR SB-72-9562 OR PRE RR SB-72-B003; Replace the panel (FRS.5198).
2) ENGINES POST RR SB-72-9562 OR POST RR SB-72-B003; Replace the panel (FRS.6588).

(f) If there are cracks that are no more than 2.0 inches (50.8 mm) in length - Accept.

S 216-027-R00

(11) Cracks in the front acoustic panels.
(a) If there are cracks that are not more than 2.0 inch (50.8 mm) and there is no related panel debond - Accept.
(b) If there are cracks that are more than 2.0 inch (50.8 mm) in length or there is related panel debond:
1) Repair to FRS.5965 Procedure B (AMM 72-34-10/801) or replace the panel as follows:

NOTE: The maximum area of acoustic lining that can be repaired (filled) is given in the Structural Repair Manual (SRM 54-00-01). If the damage is more than this, replace the panel to FRS5198 or FRS6588 in less than 90 days.

a) ENGINES PRE-RR-SB 72-9562 OR PRE-RR-SB 72-B003; Replace the panel (FRS6588).
b) ENGINES POST-RR-SB 72-9562 OR POST-RR-SB 72-B003; Replace the panel (FRS6588).
2) If it is not possible to immediately repair or replace the panel, do these steps:
a) Remove all the loose pieces of the damaged panel.
b) Repair or replace the panel in less then two cycles.
c) If you remove all of the panel, refer to the inspection step "Missing acoustic panel".

S 216-028-R00

(12) Acoustic panel debond

(a) Do this test to find where the acoustic panel is debonded:

1) Use a coin to lightly hit the damaged area.
2) A debonded area will usually make a hollow sound.
3) Make a decision as to how much of the panel has become debonded.

(b) ENGINES PRE RR SB 72-9562 OR PRE RR SB 72-B003;
If you identify debond, replace the panel to FRS.5198 (AMM 72-34-10/801) or repair to FRS.5965 (AMM 72-34-10/801).

NOTE: The maximum area of acoustic lining that can be repaired (filled) is given in the Structural Repair Manual (SRM 54-00-01). If the damage is more than this, replace the panel to FRS.5198 in less than 90 days.

1) If you repair the panel to FRS.5965 (AMM 72-34-10/801) and the debond is less than 20% of the panel area use Procedure A.
2) If you repair the panel to FRS.5965 (AMM 72-34-10/801) and the debond is more than 20% of the panel area use Procedure B.
3) After a repair to FRS.5965, do an inspection of the acoustic panels at intervals of no more than 400 hours (this inspection is to identify if more panel debond has occurred).
4) If you cannot replace or repair the panel, refer to the inspection step "Missing acoustic panel".

(c) ENGINES POST RR SB 72-9562 OR POST RR SB 72-B003;
If you identify debond:

NOTE: The maximum area of acoustic lining that can be repaired (filled) is given in the Structural Repair Manual (SRM 54-00-01). If the damage is more than this, replace the panel to FRS6588 in less than 90 days.

1) Accept debond that is not more than 40% of the panel area.
   a) Do an inspection of the acoustic panels at intervals of no more than 4,500 hours (this inspection is to identify if more panel debond has occurred).
2) If the debond is more than 40% of the panel area, as soon as possible:
3) Repair the panel to FRS.5965, Procedure A (AMM 72-34-10/801) or replace the panel (FRS6588).

S 216-029-R00

(13) Missing acoustic panel (not there or removed)

(a) If you cannot replace the panel to FRS5198 or FRS6588 immediately, you can "fly-on" for two cycles with the conditions that follow:

1) Make sure that air cannot circulate below the adjacent panels.

2) Use OMat 874 blue filler to prevent air circulation (AMM 71-11-01/801).

a) Make sure you clean the area before you use blue filler, then mix the filler, apply it and blend.

b) You must remove the blue filler before you do FRS.5198.

(b) A maximum of one panel can be missing.

(c) ENGINES PRE RR SB 72-9562 OR PRE RR SB 72-B003; Adjacent panels are not permitted to have debond.

S 216-030-R00

(14) AIRPLANES POST RR SB 72-9562; Flaking/missing adhesive around acoustic panel retention bolt assemblies.

NOTE: RR SB 72-9562 introduces a new front acoustic panel configuration immediately forward of the fan blade rub track. This new panel is made of eight circumferential panel segments held in place by 24 equally spaced, round bonded bolt assemblies. In the center of each assembly is a retention bolt covered by a dark filler material providing aerodynamic smoothness. When the metal inserts are bonded into the panels, excess adhesive is squeezed out and this has been smoothed out and flared with an even taper into a circular washer shape. With time in service this adhesive layer will crack and break off.

(a) If there are cracks in the adhesive, or the adhesive is missing from above or around the panel fasteners - Accept.

1) Adhesive missing from under the panel fasteners - Inspect the panel for debond (MPD R72-34-10-216-028-R00).

NOTE: Missing adhesive under the lip of the fastener would indicate possible acoustic panel looseness.

S 216-032-R00

(15) OGV Annulus Former Strip

(a) It is permitted to fly on with missing sections of the OGV annulus former strip for up to 500 hours. After 500 hours, replace the annulus former strip to FRS.5189.

F. Put the Airplane Back to its Usual Condition

S 416-033-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the thrust reversers (AMM 78-31-00/201).

S 416-034-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(2) Close the fan cowl panels (AMM 71-11-04/201).

S 866-035-R00

(3) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 866-036-R00

(4) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 446-037-R00

(5) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 72-34-10-216-038-R00

3. Examine the Kevlar Wrapping on the LP Compressor Case

A. References
(1) AMM 71-11-04/201, Fan Cowl Panels
(2) AMM 72-34-10/801, LP Compressor Case
(3) AMM 78-31-00/201, Thrust Reverser System

B. Access
(1) Location Zones

410	No. 1 Power Plant (Left)
420	No. 2 Power Plant (Right)

(2) Access Panels

415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

C. Procedure

S 016-039-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(1) Open the fan cowl panels (AMM 71-11-04/201).

S 216-040-R00

(2) Examine the protective plastic cover for the Kevlar (Fig. 601 and 602).
  (a) Examine the protective cover surface for holes, indentations or cuts.
  (b) Examine the cover edges for separation from the compressor casing.

    NOTE: Condensation under the protective plastic cover can occur, this is permitted.

S 216-041-R00

(3) Examine the outer layer of the Kevlar Wrapping.

  NOTE: You can only examine the Kevlar wrap outer layer if the damage to the teflon sleeve goes through to the Kevlar wrap outer layer.

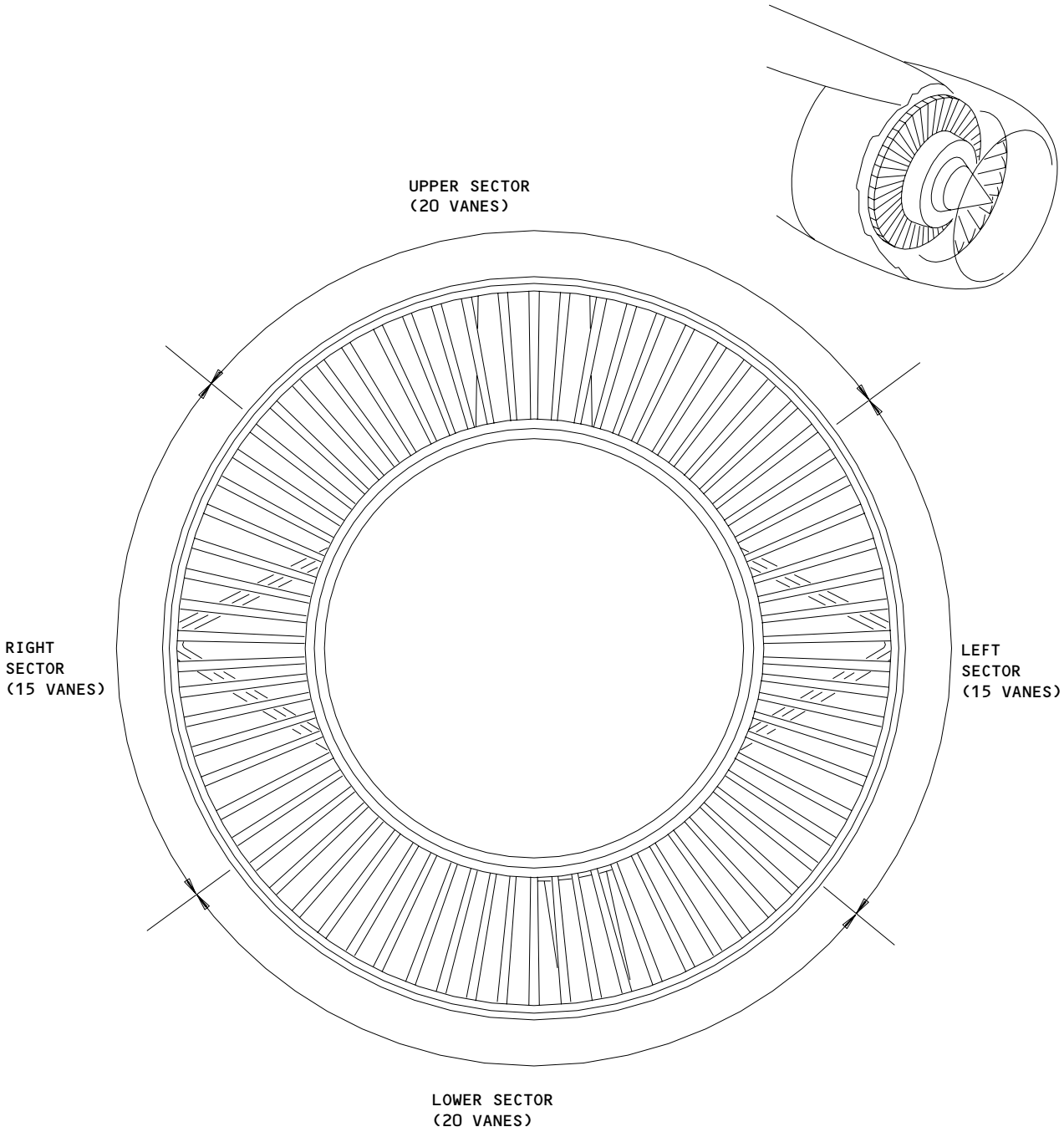
  (a) Examine the outer layer surface for witness marking.
  (b) Examine the outer layer from the adjacent inner layer for separation.
  (c) Examine for cuts or fraying.
  (d) Examine the Kevlar for the hydraulic fluid contamination.

S 216-042-R00

(4) Examine the Sub-layers of the Kevlar Wrapping.

  NOTE: You can only examine the Kevlar wrap sub-layer if the damage to the outer layer goes through to the sub-layer.

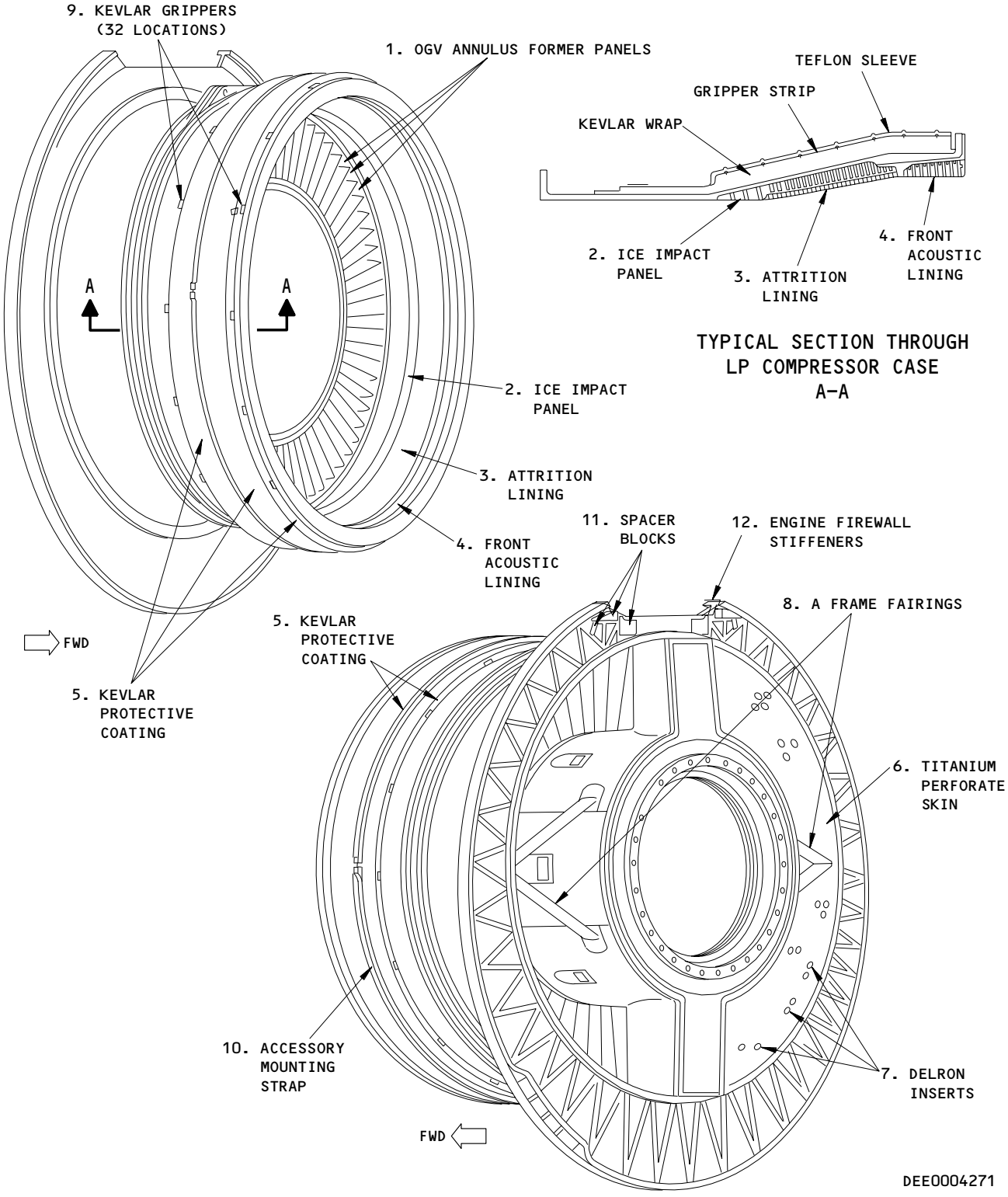
  (a) Examine the sub-layer for damage.



VIEW OF LP COMPRESSOR OUTLET GUIDE VANES LOOKING AFT

59549

LP Compressor Outlet Guide Vanes
Figure 601



LP Compressor Case
Figure 602

(b) Examine the sub-layer for cracks, cuts and holes.
(c) Examine the adjacent layers for separation.

S 216-043-R00
(5) Examine the Kevlar Wrapping Attachments.
(a) Examine the accessory end fitting of the mounting strap for cracks.

S 216-044-R00
(6) Examine the Kevlar Wrapping Gripper
(a) Make sure the front and rear attachment points are correctly attached.
(b) Examine the gripper for cracks.

S 416-045-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANEL. IF YOU DO NOT OBEY THE PRECAUTIONS, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(7) Close the fan cowl panels (AMM 71-11-04/201).

D. Acceptance Standards

S 866-046-R00
(1) Teflon sleeve (Kevlar protective coating)
(a) Dents are permitted.
(b) Holes or cuts.

CAUTION: YOU MUST REPAIR THE TEFLON SLEEVE AT THE FIRST AVAILABLE TIME. IF YOU DO NOT REPAIR THE SLEEVE, THE DAMAGE TO THE SLEEVE WILL CONTINUE. IF THERE IS TOO MUCH DAMAGE, YOU MUST REPLACE THE SLEEVE.

1) Accept the damage if you obey the conditions that follow:

a) A fly-on condition is permitted for a maximum time of 1000 engine hours.
b) A repair to the teflon sleeve must be done before 1000 hours of engine operation is complete.
c) Do the repair at the first available time.
d) Repair the damage to the teflon sleeve to FRS.5193, FRS.5194 or FRS.5972 (AMM 72-34-10/801).

NOTE: Use the repair procedure that is applicable to the type of repair that is necessary.

(c) Large areas of missing material that you cannot repair.
1) A fly on condition is permitted if you do an inspection at a maximum of every 1000 engine hours to make sure that there is no damage or contamination to the kevlar wrapping.

(d) Separation.
1) Separation of the edges on the covering to the compressor casing - Accept the damage if you obey the conditions that follow:

a) A fly-on condition is permitted for a maximum time of 1000 engine hours.
b) A repair to the teflon sleeve must be done before 1000 hours of engine operation is complete.
c) Do the repair at the first available time.
d) Repair the damage to the teflon sleeve to FRS.5193, FRS.5194 or FRS.5972 (AMM 72-34-10/801).

NOTE: Use the repair procedure that is applicable to the type of repair that is necessary.

(e) Heat damage to the Teflon Sleeve.
1) Damage up to 11.8 X 23.6 in. (300 X 600 mm) - Repair to FRS7230.
2) Damage more than 11.8 X 23.6 in. (300 X 600 mm) - Repair to FRS5972.

(f) Corrosion on the LP Compressor Case outer surfaces behind, aft and forward edges of the Kevlar wrapping.
1) Corrosion is permitted on the outer surface behind, aft and forward edges of the Kevlar wrapping. Remove all obvious moisture. You must do a visual check of the case for corrosion at the next shop visit.

S 866-047-R00

(2) Kevlar Wrapping - Outer Layer
(a) You can permit witness marking that includes a scratch of the outer layer surface but not holes or cuts.
(b) Outer layer cut or frayed less than 2.0 inches (50,8 mm) in length - Repair FRS.5196 (AMM 72-34-10/801).
(c) Cut or frayed more than 2.0 inches (50.8 mm) in length - Reject.
(d) Accept damage to the outer layer that up to 9.0 inches (228,6 mm) long and 1.0 inch (25,4 mm) wide if:
1) The maximum axial length of the damage (from front to rear of the fancase) at any angular position is less than 1.0 inch (25,4 mm).
2) The second layer of Kevlar is not affected.
3) The area is less than 3.150 inch (80,0 mm) from the rear edge of the Kevlar.
4) Damage more than the limits above - Reject
(e) Damage from hydraulic fluid contamination.
1) Use a dry, clean, lintfree cloth to clean the surfaces which have unwanted hydraulic fluid on them - Accept.

S 866-048-R00

(3) Kevlar Wrapping - Sub Layers
  (a) Damage of any kind - Reject.
  (b) You can permit the separation of adjacent layers and gap that is shown between the edges of adjacent layers as long as the Kevlar wrapping grippers are not broken or loose.

S 866-049-R00

(4) Kevlar Wrapping Attachments
  (a) If you find any crack on the accessory mounting strap for end fitting - Reject.

S 866-050-R00

(5) Kevlar Wrapping Gripper
  (a) Loose or disengage - Reject.
  (b) Cracks - Reject.

LOW PRESSURE (LP) COMPRESSOR CASE - APPROVED REPAIRS

1. General
   A. List of Repair Schemes (FRS)

PARAGRAPH NUMBER	REPAIR NUMBER	TITLE
2.	FRS.5156	Replace OGV Annulus Former Panel
3.	FRS.5189	LPC Case, Front - Replace Annulus Former Strip
4.	FRS.5193	Repair Teflon Sleeve with a Patch
5.	FRS.5194	Local Repair of Teflon Sleeve with Tape
6.	FRS.5195	Repair Unbonded Front and Rear Edges of Teflon Sleeve
7.	FRS.5196	Repair Outer Layer of Kevlar Wrapping
8.	FRS.5198	LPC Case, Front - Replacement of Front Acoustic Panels
9.	FRS.5201	Repair Attrition Lining with Blue Filler
10.	FRS.5202	Repair Ice Impact Panel with Cold Cure Adhesive
11.	FRS.5203	Repair Ice Impact Panel Dents with Blue Filler
12.	FRS.5258	Repair Attrition Lining Below GRP Layer with Blue Filler
13.	FRS.5947	LPC Case Support Structure ('A' Frame) - Repair

PARAGRAPH NUMBER	REPAIR NUMBER	TITLE
14.	FRS.5965	LPC Case, Front - Temporary Repair of Disconnected Front Acoustic Panel Perforate Skin
15.	FRS.5972	LPC Case, Front - Repair the Teflon Sleeve with a Teflon Insert
16.	FRS.6588	LPC Case, Front - Replacement of Mechanically Fastened Acoustic Panels
17.	FRS.5614	LPC Case, Rear - Repair of Damage to the Outer Skin
18.	FRS.4938	Replacement of the Rear Diaphragm Stiffeners
19.	FRS.7101	Rebond the Pitot Tubes
20.	FRS.7230	LP Compressor Case — Repair to Teflon Sleeve with a Heat Resistant Patch.
21.	FRS.5230	LPC - Replace the rotor path lining with the use of the cold cure adhesive and hand dressing.

Replace The Outlet Guide Vanes To The Annulus Former Panels

TASK 72-34-10-308-001-R00

2. Replace the Outlet Guide Vanes to the Annulus Former Panels

A. General

(1) This procedure, FRS.5156, refers to the replacement of the annulus former panels and the restoration of smooth aerodynamic surfaces with the sealant.

(2) Bolted and non-bolted annulus former panels can be mixed on LP compressor cases with the part numbers that follow:

UL17489	UL17548	UL17540	UL19031
UL17495	UL17549	UL16454	UL16470
UL17496	UL17550	UL17494	UL17546
UL17497	UL17551	UL17471	UL16450
UL17567	UL16465	UL17552	

(3) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on surfaces that bond will result in poor adhesion and unsatisfactory bonding.

(4) Clean cotton or polythene gloves must be worn by all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(5) In this procedure the Outlet Guide Vanes (OGV) is referred to as the OGV.

B. Equipment

(1) Vacuum cleaner
(2) Protective clothing (face mask and polythene gloves)
(3) New clean soft hair brush
(4) Scales, 500 gm capacity, accurate to 1 gm
(5) Spatula or palette knife
(6) Supports or wedges (locally manufactured)
(7) Heater lamps

Replace The Outlet Guide Vanes To The Annulus Former Panels

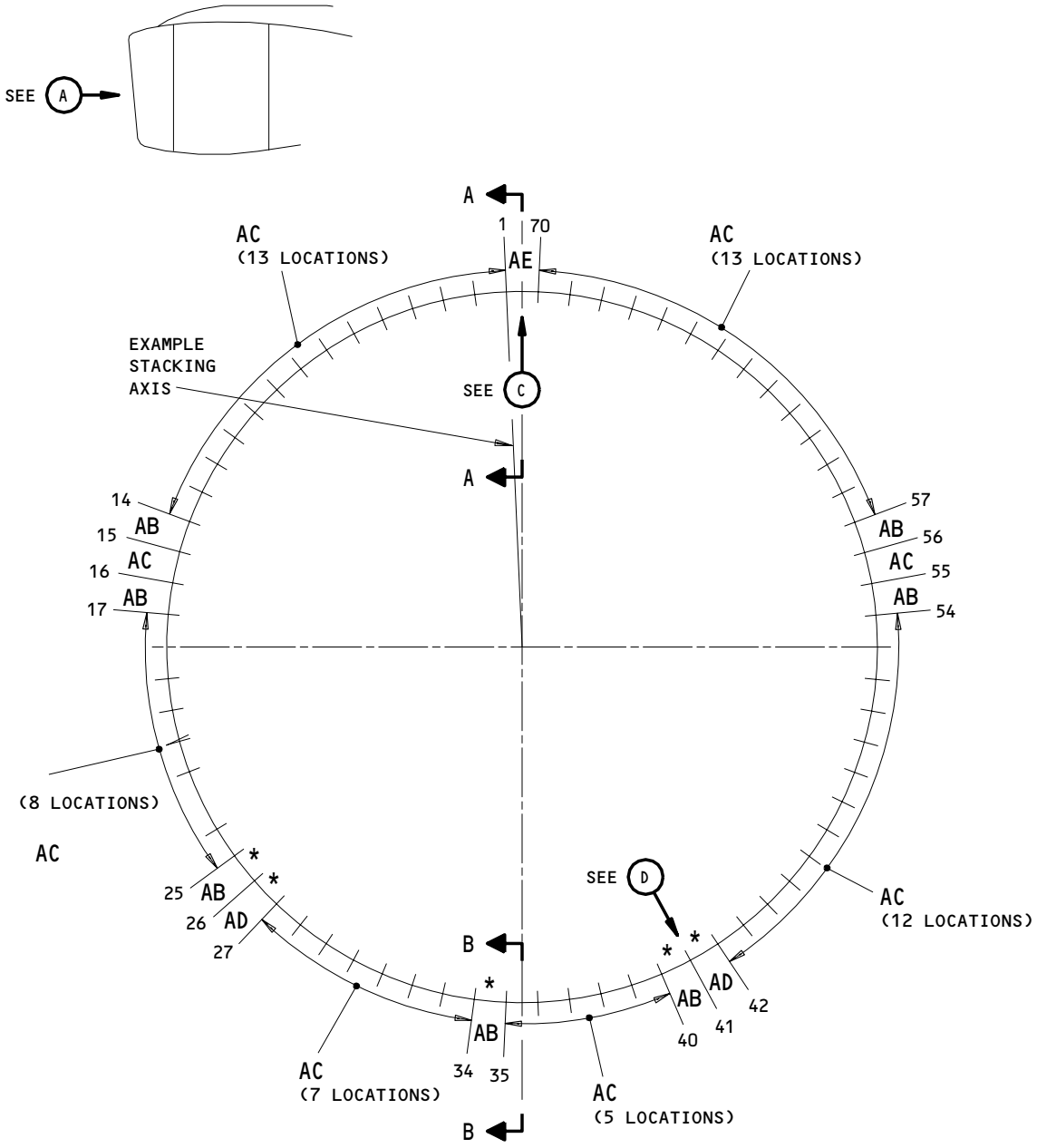
C. Consumable Materials
(1) Hysel Adhesive EA934 NA (Optional to Araldite)
OMat No. 8/52
(2) Epoxy Resin, Araldite SV409
OMat No. 805
(3) Polymide Hardener
OMat No. 806
(4) Sealant PB1422B
British Spec/Ref – DTD900/4709
OMat No. 8/136
(5) Blue Filler EC3524 B/A (Optional to Sealant PR1422B)
OMat No. 874
(6) Masking Tape
OMat No. 237
(7) Abrasive Paper, grade 60
OMat No. 5/98
(8) B50009 – Acetone, OMat No. 150
(9) B50018 – Isopropyl Alcohol, OMat No. 1/40
(10) B00713 – Degreaser, OMat No. 1/257
(11) Distilled water - local resources
(12) Lint free cloth - Local Resources

D. Parts
(1) OGV annulus former panel (1, Fig. 802) UL16461
(Rolls Royce)
(2) OGV annulus former panel (2) UL16462
(Rolls Royce)
(3) OGV annulus former panel (3) UL17544
(Rolls Royce)
(4) OGV annulus former panel (4) UL17545
(Rolls Royce)
(5) Panel, O.G.V infill - UL 27490 - (SB72-9188).
(6) Panel, O.G.V infill - UL 27491 - (SB72-9188).
(7) Panel, O.G.V infill - UL 27492 - (SB72-9188).
(8) Screw, Pan head U755304 (Rolls Royce)
(9) Screw, CSK U756262 (Rolls Royce)
(10) Plain washer B470829 (Rolls Royce)
(11) Bi-hex head nut

E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. Replace the OGV to the Annulus Former Panels

S 028-002-R00
(1) Remove the Damaged or Loose Annulus Panels (Fig. 801)

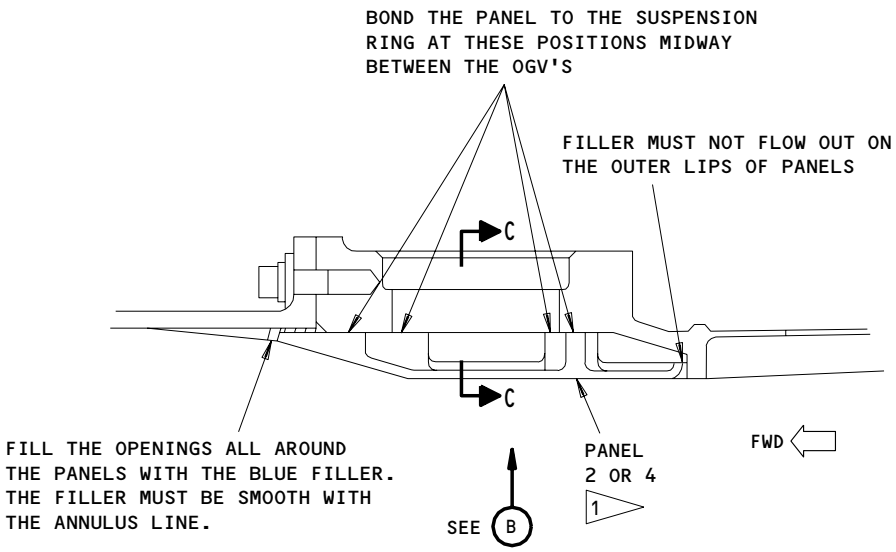


AFT VIEW OF THE FAN CASE THAT SHOWS
THE POSITIONS OF THE OGV INFILL PANELS

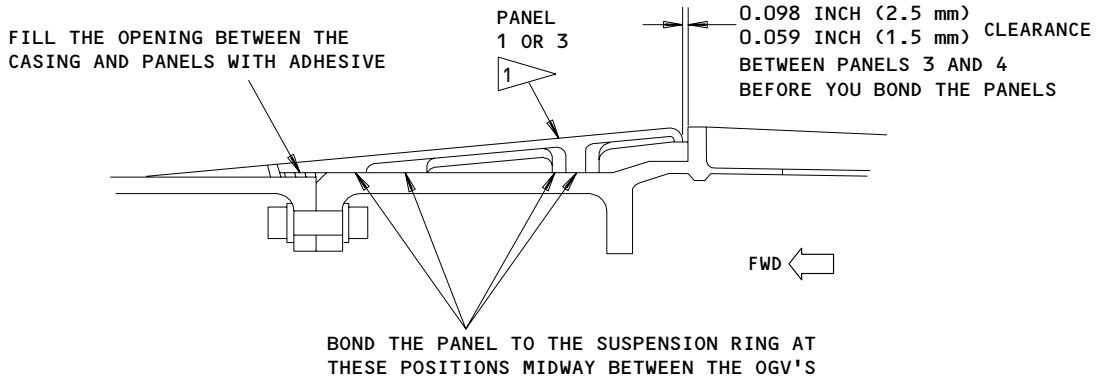
A

83312

Damaged or Loose Annulus Panel Repair
Figure 801 (Sheet 1)



VIEW THROUGH FRONT SUSPENSION RING ON VERTICAL ℄
A–A



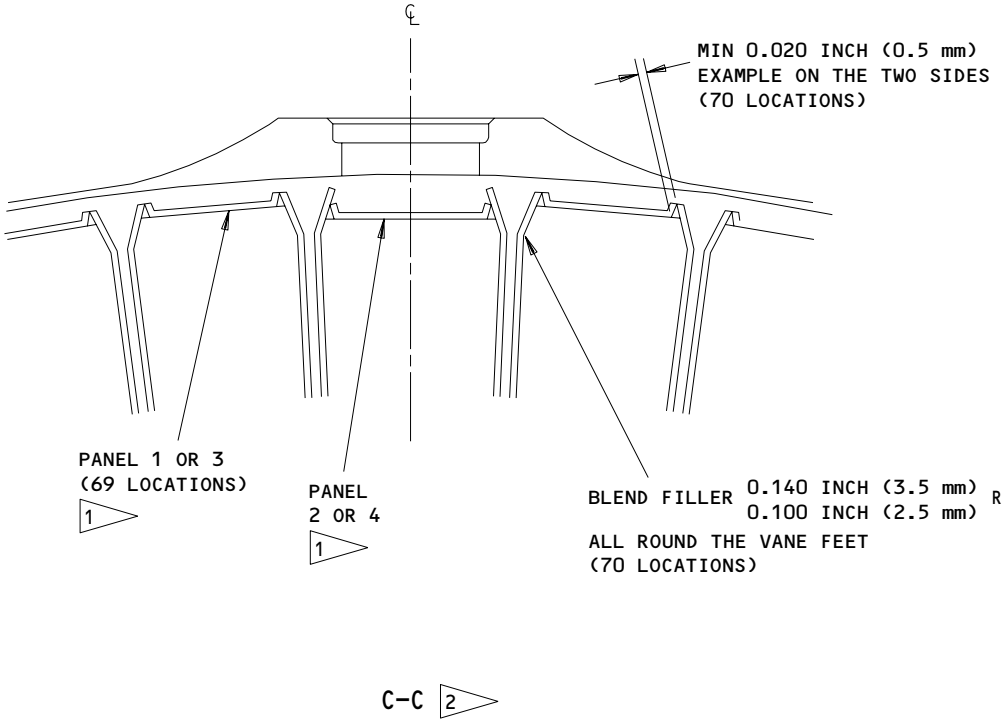
VIEW THROUGH FRONT SUSPENSION RING ON VERTICAL ℄
B–B

NOTE: BONDED JOINTS ARE GROUP 2.

1 OGV ANNULUS FORMER PANELS
PANEL 1 (UL 16461)
PANEL 2 (UL 16462)
PANEL 3 (UL 17544)
PANEL 4 (UL 17545)

66003A

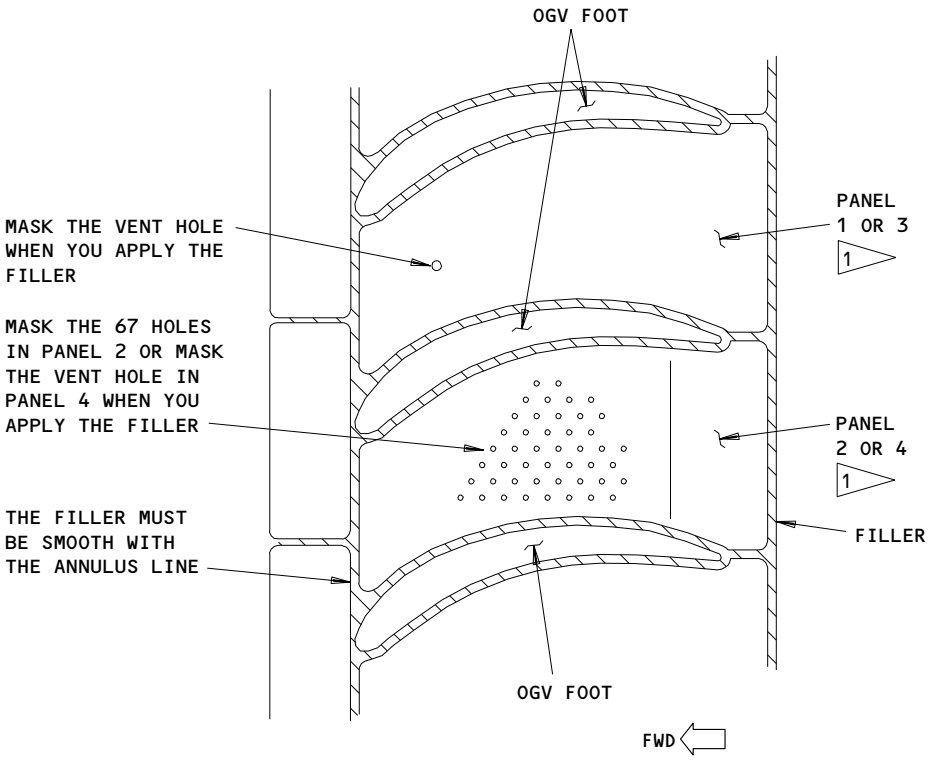
Damaged or Loose Annulus Panel Repair
Figure 801 (Sheet 2)



2 YOU MAY INSTALL PANELS 3 AND 4 AS ALTERNATIVES TO PANELS 1 AND 2.
WHEN YOU INSTALL PANELS 3 AND 4, FILL THE FASTENER HOLES WITH BLUE FILLER.
THE FILLER MUST BE SMOOTH WITH THE ANNULUS LINE.
MAKE SURE THE VENT HOLE IN THE PANELS 1, 3, AND 4 ARE CLEAR
AFTER YOU APPLY THE FILLER.

66004A

Damaged or Loose Annulus Panel Repair
Figure 801 (Sheet 3)

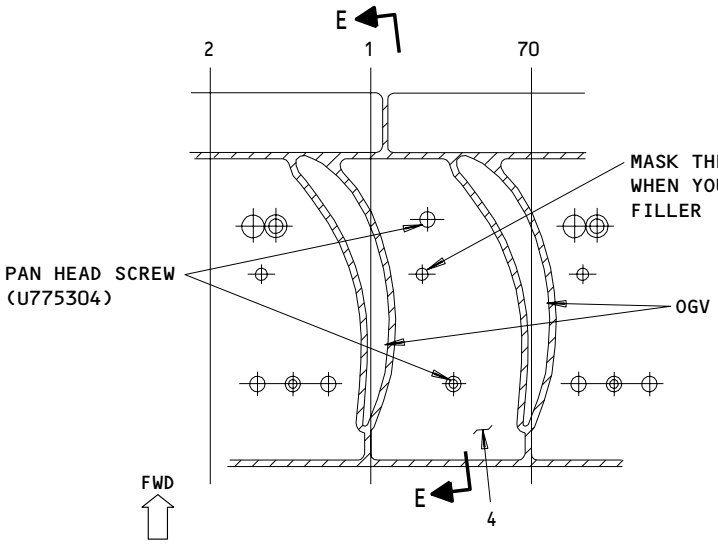


VIEW OF THE FILLER ROUND THE PANELS AND THE OGV FEET

(B)

66005A

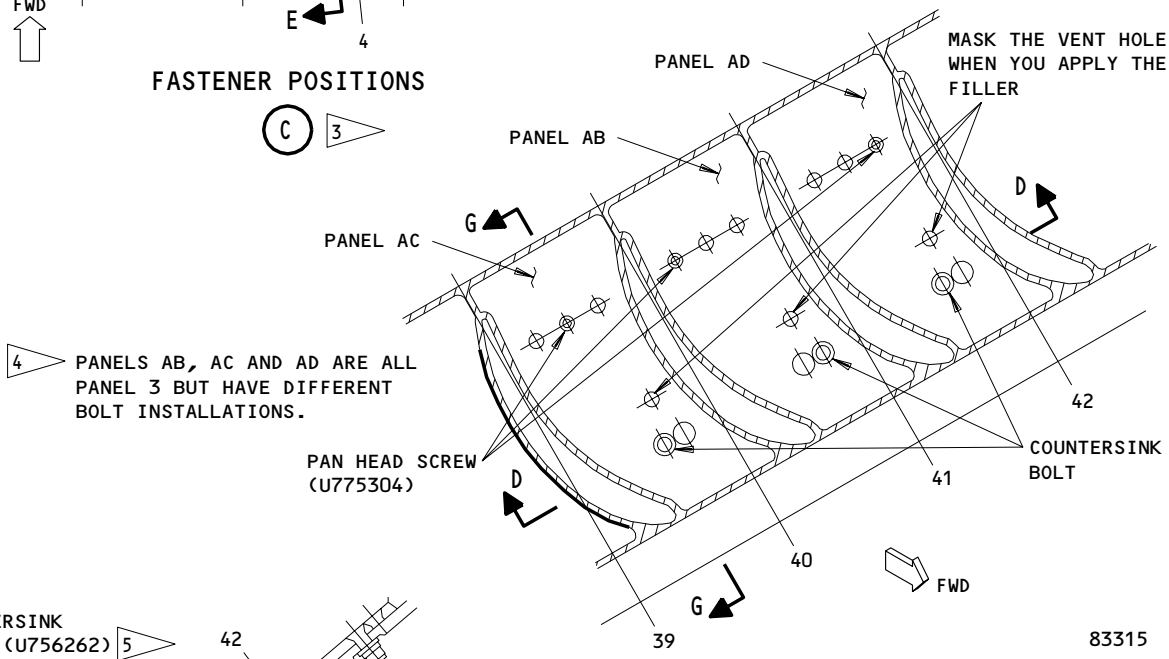
Damaged of Loose Annulus Panel Repair
Figure 801 (sheet 4)



3 FILL THE OPENINGS WITH THE BLUE FILLER. THE FILLER MUST BE SMOOTH WITH THE ANNULUS LINE.

FASTENER POSITIONS

C 3

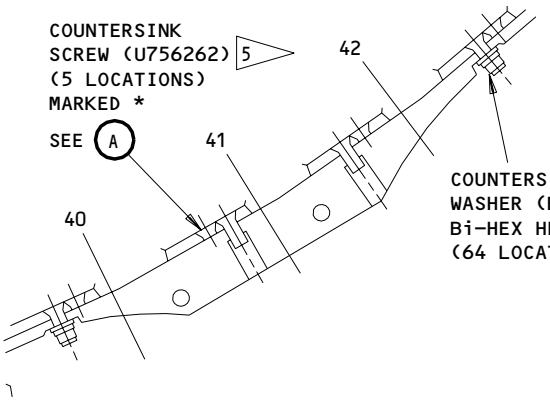


4 PANELS AB, AC AND AD ARE ALL PANEL 3 BUT HAVE DIFFERENT BOLT INSTALLATIONS.

83315

FASTENER POSITIONS

D 4

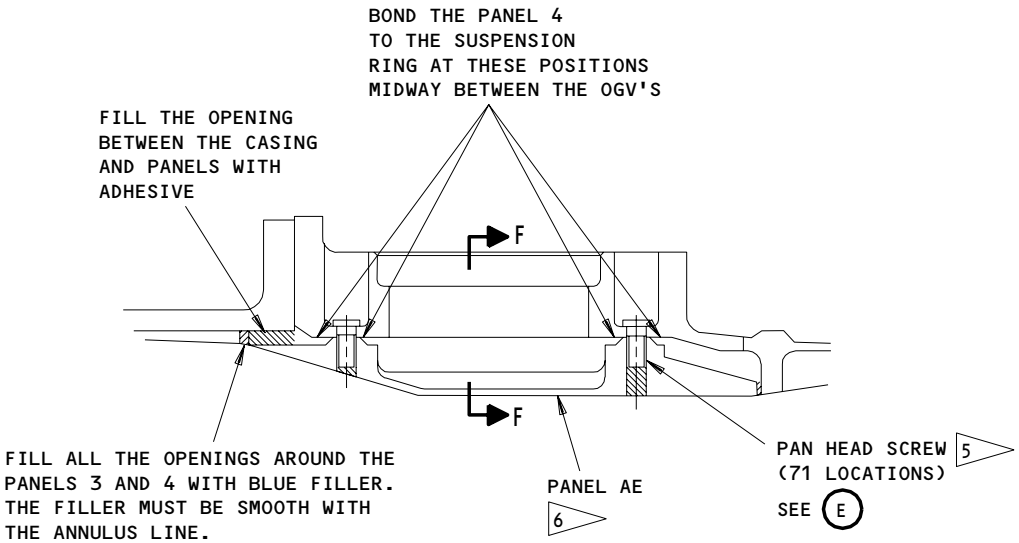


5 INSTALL WITH WET ADHESIVE

FRONT ROW OF SCREWS
D-D

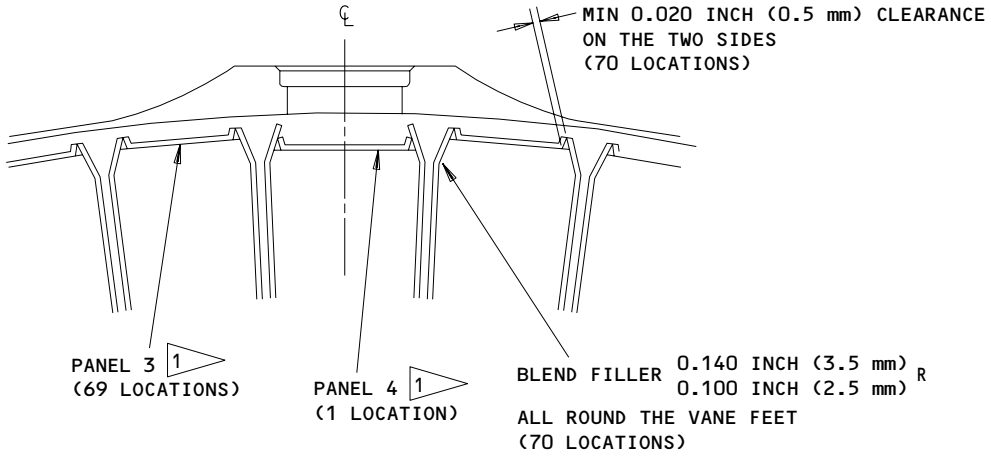
83316

Damaged or Loose Annulus Panel Repair
Figure 801 (Sheet 5)



E-E

83313

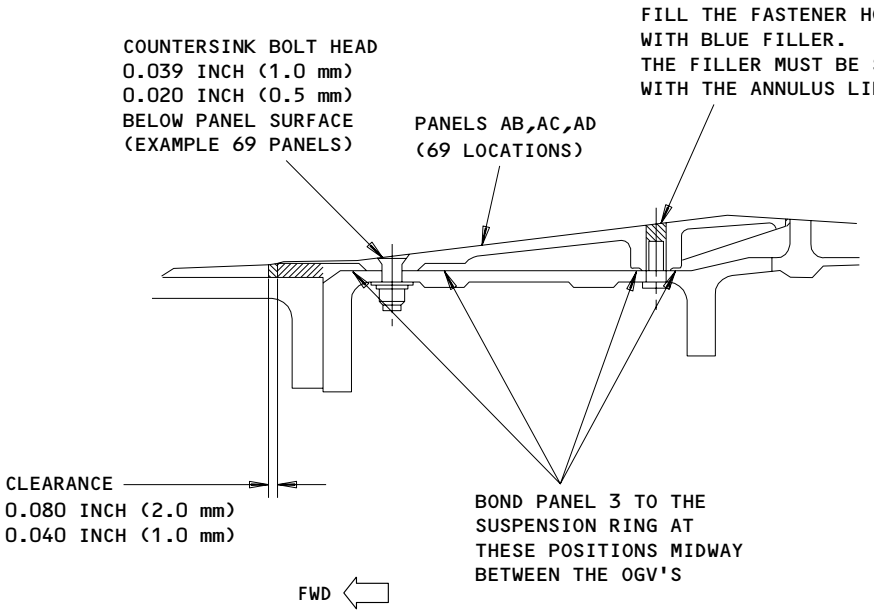


F-F

6 ALL OF THE REAR ROW, PLUS 1 ADDN. ROW AT PANEL AE

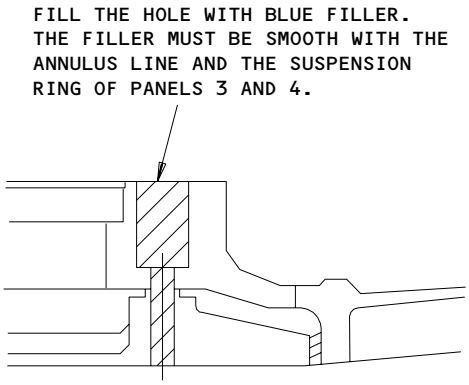
66004A

Damaged or Loose Annulus Panel Repair
Figure 801 (Sheet 6)



83313

G-G



E 7

7 THIS REPAIR CONDITION IS NECESSARY WHEN YOU DO NOT USE THE HOLES OR YOU CANNOT GET ACCESS TO THE HOLES TO INSTALL THE SCREWS BECAUSE OF THE PROXIMITY OF THE EXTERNAL ENGINE COMPONENTS

83316

Damaged or Loose Annulus Panel Repair
Figure 801 (Sheet 7)

Replace The Outlet Guide Vanes To The Annulus Former Panels

(a) Lightly hit each annulus panel to make sure it is bonded correctly.
    1) If a hollow sound occurs, you did not bond the panel correctly.
    2) Remove all panels not bonded correctly.
(b) Use approved hand tools and abrasive paper to remove the adhesive or sealant that stays on the casing.
(c) Use a vacuum cleaner to remove the dust and unwanted material.

S 358-003-R00

CAUTION: DO NOT TOUCH THE PARTS ON PREPARED BONDING SURFACES. WEAR CLEAN POLYTHENE GLOVES AT ALL TIMES TO PREVENT CONTAMINATION OF PARTS.

(2) Prepare the Bonding Surfaces of the Casing and Annulus Panels
(a) Use panels UL16461, UL16462, UL17544 or UL17545, when it is necessary.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Make a clean, dry, lintfree cloth moist with degreasing fluid.
    1) Use this cloth to clean the area to be repaired.
    2) Let the surface dry fully.
(c) Use abrasive paper to make the bonding surfaces rough.
(d) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
    1) Use this cloth to clean the area to be repaired.
    2) Let the surface dry fully.
(e) Apply a thin layer of distilled water over the area to be bonded with a hair brush that is soft and clean.
(f) Look at the layer of distilled water, immediately.

NOTE: Look for breaks in the continuity of the layer.

(g) If breaks occur in less than 30 seconds, you must clean the surfaces again until you see a continuous layer.
(h) Use a clean, lintfree cloth soaked in clean acetone to remove the distilled water.
    1) Let the surfaces dry.

Replace The Outlet Guide Vanes To The Annulus Former Panels

S 358-004-R00

(3) Do these steps to prepare and apply the adhesive:

NOTE: It is permitted to use alternative polysulphide compounds OMat No. 8/107 or OMat No. 8/136 to the specified adhesives. Mix polysulphide compounds OMat No. 8/107 and OMat No. 8/136 to manufacturers instructions.

WARNING: DO NOT USE ADHESIVES UNLESS PREPARED IN AREAS WHICH HAVE GOOD VENTILATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. THIS FILLER CAN CAUSE SKIN IRRITATION.

(a) Prepare the Araldite adhesive.
  1) Mix, by weight, 70 parts of resin and 30 parts of the hardener.
  2) Mix the adhesive until it is homogeneous and has a cream color.

(b) Prepare the Hysol adhesive.

NOTE: Hysol adhesive (optional), EA934 NA, is a two part epoxy resin:

- Part A - A grey paste which must be stirred in its container before it is weighed out.
- Part B - An amber liquid is used as supplied.

1) Mix, by weight, 100 parts of grey paste and 33 parts of amber liquid until it becomes a homogenous paste.

NOTE: The adhesive has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(c) You must use a clean spatula or palette knife to apply the adhesive to the two surfaces to be bonded.
  1) Apply the adhesive 0.024 inch (0.610 mm) thick.

(d) You will bond the panels at the middle position between the vanes, with spacing ribs, that touch the rear fan case.
  1) Make sure you bond the leading edge of the annulus panel and it is smooth with the surface of the adjacent case.

(e) Install the screws with the wet adhesive.
  1) Tighten the countersunk screws, washers and nuts to 40 pound-inches (4.52 Newton meters).
  2) Tighten the panhead screws to 3.0 pound-inches (0.34 Newton meters).

(f) Panels not mechanically attached to the case must be held in its position with locally available wedges and supports.

Replace The Outlet Guide Vanes To The Annulus Former Panels

(g) You must use a clean spatula or palette knife to remove the unwanted adhesive from panels and casing.
(h) Let the Araldite adhesive cure.

NOTE: The cure time for Araldite adhesive is as follows:
1 hour at 212°F (100°C)
3 hours at 158°F (70°C)
4 hours at 72°F (22°C)

(i) Let the Hysol adhesive cure.

NOTE: Cure time for Hysol adhesive is dependent on the temperature at the bond line. The minimum cure time is 1 hour. The adhesive will not cure below 54°F (12°C). The temperature at the bond line must be monitored by thermocouples or other procedure when the cure time is faster with heat. Ref Table 1 for cure time/temperature relationship.

Table 1

Time - Hours	168	96	40	24	16	8	4	2	1
Temp Deg. F.	54	59	68	72	77	86	96	113	140
Temp Deg. C.	12	15	20	22	25	30	35	45	60

(j) Remove the wedges and supports.
(k) Lightly hit each panel to make sure that it is bonded correctly.
1) If a hollow sound occurs, the panel is not bonded correctly.
2) Remove and rebond all panels not bonded correctly.

S 358-005-R00

(4) Repair the Surfaces to a Smooth Aerodynamic Shape
(a) Use masking tape to seal the acoustic holes in the annulus panels.
1) Make sure the sealant does not go near the holes.
(b) Mix the sealant or Blue filler to the manufacturers instructions.
(c) Apply the sealant smoothly to get aerodynamic surfaces.
1) Make sure you fill all bolt holes fully.

Replace The Outlet Guide Vanes To The Annulus Former Panels

(d) Remove the masking tape from the acoustic holes on the annulus panels.
(e) Examine the annulus panels and sealant for a satisfactory aerodynamic finish.
(f) Use a vibro-engraver to write the repair application number, FRS.5156, adjacent to the part number on the LPC case.

Replace The Annulus Former Strip

TASK 72-34-10-308-006-R00

3. Replace the Annulus Former Strip

A. General

(1) This procedure, FRS.5189, refers to the replacement of the annulus former strip and the restoration of smooth aerodynamic surfaces with the sealant.

(2) This repair can be used on LPC cases with the part numbers that follow:

UL16446

UL50007 post RR SB 72-7832	UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003	UL37316 post RR SB 72-B185
UL38887 post RR SB 72-B961	UL50007 post RR SB 72-7832
UL37823 post RR SB 72-B961	UL31314 post SB RR 72-B002
UL37317 post RR SB 72-B185	UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942	FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942	FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942	FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942	FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942	FW11652 post RR SB 72-C942
UL19041 post RR SB 72-8170	UL21903 post RR SB 72-C942
UL21904 post RR SB 72-8170	UL21905 post RR SB 72-C946
UL21906 post RR SB 72-8170	UL21907 post RR SB 72-8170
UL21908 post RR SB 72-8170	UL19047 post RR SB 72-8170
UL19040 post RR SB 72-8170	UL19039 post RR SB 72-8170
UL19038 post RR SB 7208170	UL19307 post RR SB 72-8170
UL21909 post RR SB 72-8170	UL21910 post RR SB 72-8170
UL27456 post RR SB 72-9290	UL28520 post RR SB 72-9290
UL29612 post RR SB 72-9290	UL29613 post RR SB 72-9290
UL29614 post RR SB 72-9290	UL29615 post RR SB 72-9290
UL29616 post RR SB 72-9290	UL29617 post RR SB 72-9290
UL29618 post RR SB 72-9290	UL29619 post RR SB 72-9290
UL29620 post RR SB 72-9290	

Replace The Annulus Former Strip

(3) This repair can be used for the LP Compressor, Outlet Guide Vanes (OGV), and the Rear Assembly with the part numbers that follow:

RB211-535E4 and E4-B Engines

UL16433	UL16454 post RR SB 72-7602
UL16450 post RR SB 72-7602	UL16470 post RR SB 72-7767
UL16465 post RR SB 72-7767	UL17494 post RR SB 72-7559
UL17567 post RR SB 72-7818	UL31047 post RR SB 72-9516
UL17489 post RR SB 72-7652	UL17496 post RR SB 72-7336
UL17495 post RR SB 72-7335	UL17540 post RR SB 72-7847
UL17497 post RR SB 72-7341	UL17548 post RR SB 72-7765
UL17546 post RR SB 72-7847	UL17550 post RR SB 72-7765
UL17549 post RR SB 72-7765	UL17552 post RR SB 72-7765
UL17551 post RR SB 72-7765	UL17571 post RR SB 72-7818
UL19031 post RR SB 72-7765	UL19040 post RR SB 72-8170
UL19042 post RR SB 72-8170	UL19043 post RR SB 72-8170
UL19044 post RR SB 72-8170	UL19045 post RR SB 72-8170
UL19046 post RR SB 72-8170	UL19048 post RR SB 72-8170
UL21908 post RR SB 72-8170	UL27445 post RR SB 72-7765
UL29621 post RR SB 72-9290	UL29622 post RR SB 72-9290
UL29623 post RR SB 72-9290	UL29624 post RR SB 72-9290
UL34089 post RR SB 72-9675	UL37775 post RR SB 72-9188
UL37776 post RR SB 72-9188	UL39115 post RR SB 72-C355

(4) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on surfaces that bond will result in poor adhesion and unsatisfactory bonding.

(5) Clean cotton or polythene gloves must be worn by all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

Replace The Annulus Former Strip

(6) In this procedure the Outlet Guide Vanes (OGV) are referred to as the OGV.

B. Equipment
(1) Vacuum cleaner
(2) Vibro-engraving Equipment
(3) Hand Tools
(4) Compressed Air (Oil and Moisture Free)
(5) Clamp Assembly, MH16330
(6) Protective clothing (face mask and polythene gloves)
(7) New clean soft hair brush
(8) Scales, 500 gm capacity, accurate to 1 gm
(9) Spatula or palette knife
(10) Heater lamps

C. Consumable Materials
(1) Polythene Sheet
OMat No. 1249
(2) Hysol adhesive EA934 NA
OMat No. 8/52
(3) Sealant PR1422B
British Spec/Ref - DTD900/4709
OMat No. 8/136
(4) Blue filler EC3524 B/A (optional to Sealant PR1422B)
OMat No. 874
(5) Masking tape
OMat No. 230
(6) Garnet Paper
OMat No. 5/93 to 5/97
(7) B50009 - Acetone, OMat 150
(8) B50018 - Isopropyl alcohol, OMat 1/40
(9) B00713 - Degreaser, OMat No.1/257
(10) Distilled water - local resources
(11) Lint free cloth - Local Resources

Replace The Annulus Former Strip

D. Parts
(1) Annulus Former Strip, UL10583
(Rolls Royce)
(2) ENGINES POST RR SB 72-9689;
Annulus Former Strip, UL36013
(Rolls Royce)

E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. Replace the Annulus Former Strip

S 028-007-R00

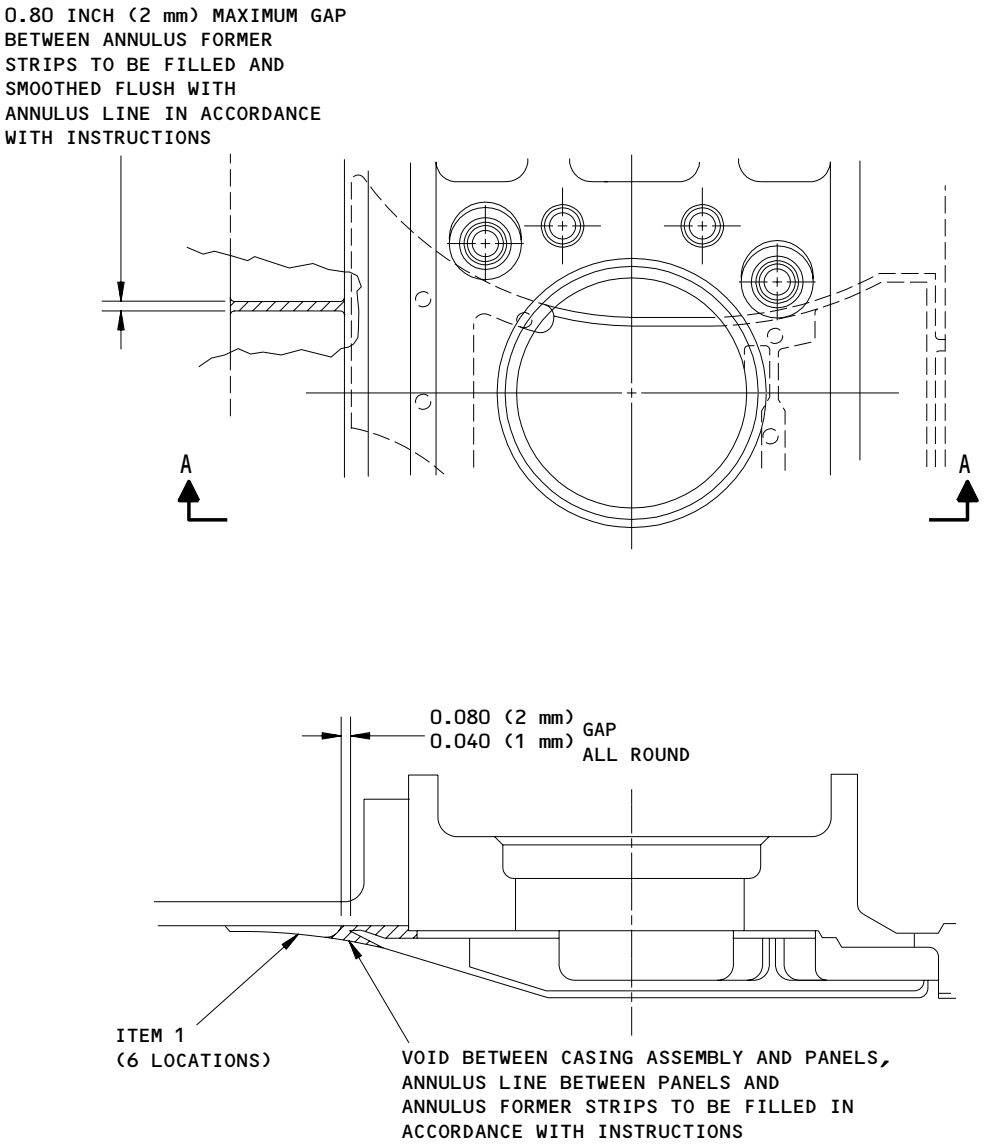
(1) Remove the Damaged or Loose Material (Fig. 802)
(a) Remove enough of the LP fan blades to get access to the damaged Annulus Former Strips (AMM 72-31-13/401).

NOTE: The initial positions of the blades must be recorded to make sure they are re-installed in their correct positions.

(b) Seal off the IPC intake with the polythene sheet and masking tape.
(c) Cover the remaining LP fan blades and surrounding area with a polythene sheet to prevent debris collection.
(d) Remove the damaged or loose former strips from the repair area using the hand tools.
(e) Use a vacuum cleaner to remove the dust and unwanted material.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(f) Brush the repair area vigorously with a new clean paint brush soaked in degreasing agent (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257) to degrease the area.
(g) Dry the repair area immediately with the oil and moisture free air.



PART SECTION SHOWING SEALING, FRONT TO REAR
LP COMPRESSOR CASINGS
A-A

NOTES: ANGULAR POSITION OF ANNULUS FORMER STRIPS MAY VARY FREELY

DIMENSIONS IN INCHES (MILLIMETTERS)

DE00066206

Replace the Annulus Former Strip
Figure 802

K13256

Replace The Annulus Former Strip

S 128-008-R00

(2) Prepare the repair area

(a) Use the garnet paper to make the repair area bonding surfaces rough.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Brush the repair area vigorously with a new clean paint brush soaked in degreasing agent (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257) to degrease the area.

(c) Let the surface dry fully.

(d) Apply a thin layer of distilled water over the area to be bonded with a hair brush that is soft and clean.

(e) Look at the layer of distilled water, immediately.

NOTE: Look for breaks in the continuity of the layer.

(f) If breaks occur in less than 30 seconds, you must clean the surfaces again until you see a continuous layer.

(g) Use a clean, lintfree cloth soaked in clean acetone to remove the distilled water.

(h) Let the surfaces dry.

S 358-009-R00

(3) Prepare the adhesive

Replace The Annulus Former Strip

WARNING: DO NOT USE ADHESIVES UNLESS PREPARED IN AREAS WHICH HAVE GOOD VENTILATION. DO NOT LET THIS ADHESIVE TOUCH YOUR SKIN. PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. THIS ADHESIVE CAN CAUSE SKIN IRRITATION.

(a) Prepare the Hysol adhesive using the 500g weigh scale as follows:

NOTE: Hysol adhesive (optional), EA934 NA, is a two part epoxy resin:

Part A - A grey paste which must be stirred in its container before it is weighed out.
Part B - An amber liquid is used as supplied.

1) Mix, by weight, 100 parts of grey paste and 33 parts of amber liquid until it becomes a homogenous paste.

NOTE: The adhesive has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(b) You must use a clean spatula or palette knife to apply the adhesive to the two surfaces to be bonded.
1) Apply the adhesive 0.024 inch (0.610 mm) thick.

NOTE: You must place a thermocouple in the bond line if a local heat source is to be used to cure the adhesive.

(c) Install the annulus former strips and apply hand pressure to the bond.
(d) Make sure that the gaps around the strip are correct (Fig. 802).
(e) Masking tape may be used to temporarily hold the upper panels on the fan case.
(f) Secure the strips with clamp MH16330 and allow to cure as follows:

Replace The Annulus Former Strip

(g) Let the Hysol adhesive cure.

NOTE: Cure time for Hysol adhesive is dependent on the temperature at the bond line. The minimum cure time is 1 hour. The adhesive will not cure below 54°F (12°C). The temperature at the bond line must be monitored by thermocouples or other procedure when the cure time is made faster with heat. See the table below for the cure time/temperature relationship.

Table 1

Time - Hours	168	96	40	24	16	8	4	2	1
Temp Deg. F.	54	59	68	72	77	86	96	113	140
Temp Deg. C.	12	15	20	22	25	30	35	45	60

(h) Remove the clamps and cut off the thermocouple (if used) level with the panel surface.

S 358-010-R00

(4) Prepare the filler

WARNING: DO NOT USE FILLERS UNLESS PREPARED IN AREAS WHICH HAVE GOOD VENTILATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. THIS FILLER CAN CAUSE SKIN IRRITATION.

(a) Prepare the Polysulphide compound OMat No. 8/136 to the manufacturers instructions.

(b) Prepare the Blue filler (OMat No. 874) using the 500g weigh scale as follows:

1) Mix, by weight, 100 parts of blue paste and 94 parts of white paste until no streaks can be seen and the mixture is a consistent color.

NOTE: The filler has a working life of approximately one hour at a room temperature of 72°F (22°C).

Replace The Annulus Former Strip

S 358-011-R00

(5) Apply the filler (Fig. 802)

(a) Apply the sealant smoothly to the gaps around the strip to get aerodynamic surfaces.

1) Before the filler is fully cured remove any extra or unwanted filler. Use a pallet knife or small trowel to make sure the filler is blended with the adjacent surfaces.

(b) Cure the OMat No. 8/136 Polysulphide compound for 24 hours at room temperature.

(c) The cure times for the OMat No. 874 Blue Filler are shown below:

Time - Hours	24	16	8	4	2	1
Temp Deg. F.	72	77	86	95	113	140
Temp Deg. C.	22	25	30	35	45	60

S 358-012-R00

(6) Inspect the repair area

(a) Blend the OMat No. 8/136 to the manufacturers instructions.

(b) Use the OMat No. 5/97 garnet paper to blend the OMat No. 874 blue filler with the adjacent surfaces.

(c) Lightly tap the new strip with a coin to test the bond. Reject the bond if a distinct hollow sound is heard.

(d) Use a vibro-engraver to write the repair application number, FRS.5189, adjacent to the part number on the LPC case.

S 728-013-R00

(7) Re-Install the LP Fan Blades

(a) Re-install the LP fan blades to their initial positions (AMM 72-31-13/401). The blade positions were recorded when the blades were removed.

Repair The Teflon Sleeve With A Patch

TASK 72-34-10-308-014-R00

4. Repair the Teflon Sleeve with a Patch

A. General

(1) This procedure, FRS.5193, refers to the repair of the teflon sleeve by application of a self adhesive teflon patch and PTFE Tape. .

(2) Apply a self adhesive teflon patch and PTFE tape on the LP compressor cases with the part number that follows:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) Wooden roller
(2) Face mask and plastic gloves

C. Consumable Materials

(1) B50009 - Acetone, OMat No. 150

Repair The Teflon Sleeve With A Patch

(2) B50018 - Isopropyl alcohol, OMat No. 1/40
(3) B00713 - Degreaser, OMat No. 1/257
(4) Self adhesive PTFE tape
OMat No. 8/128
(5) Self adhesive, PTFE glass cloth
(6) Polyurethane Tape
OMat No. 2/149
(7) Aluminum Foil Tape
OMat No. 298A
(8) F.E.P. Tape
OMat No. 2/148
(9) Lint free cloth - local resources

D. Access
(1) Location Zones
410 Power Plant
420 Power Plant

E. Repair the Teflon Sleeve with a Patch

S 358-015-R00
(1) Repair the Damaged Area (Fig. 803)
(a) Remove all loose or damaged material.

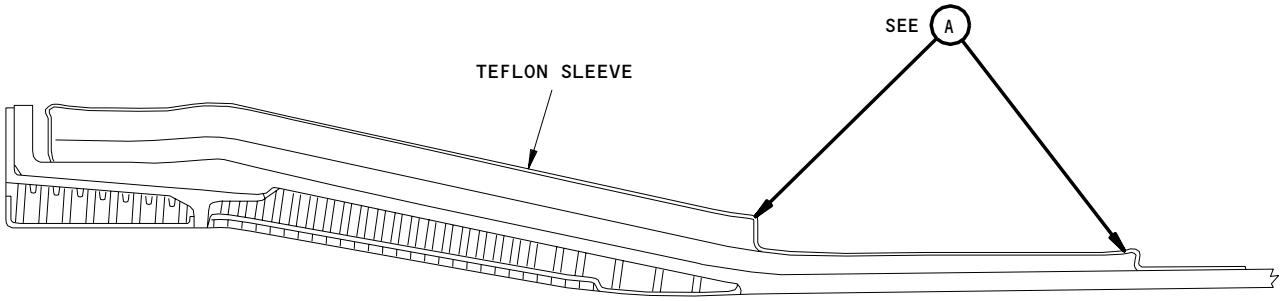
NOTE: Use caution to prevent damage to the Kevlar wrapping.

1) Cut the edges of the sleeve to a smooth, flat finish.
2) If you are using OMat No. 2/148, F.E.P. Tape do not cut out the split section. Use your hands to bring the edges of the repair together as closely as possible.

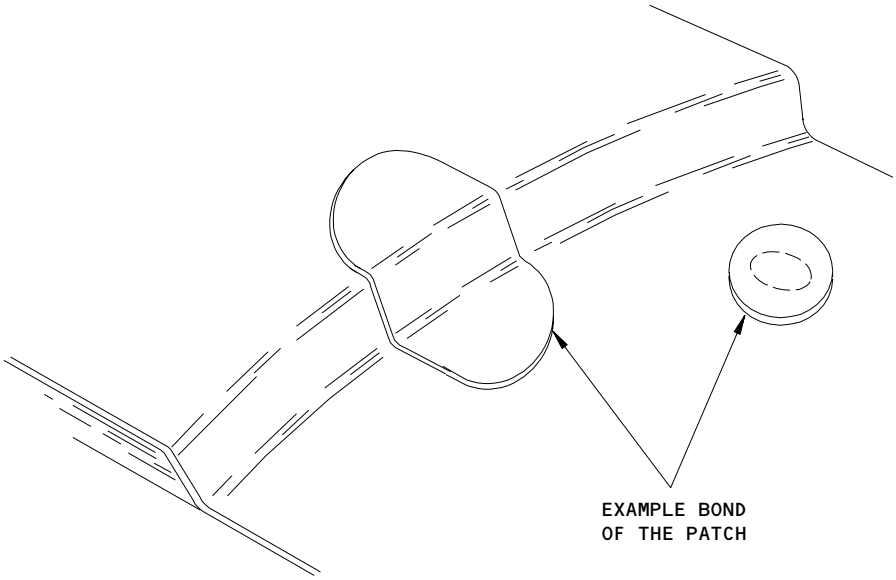
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT LET THE DEGREASING FLUID TOUCH THE KEVLAR. THE KEVLAR WILL ABSORB THE FLUID.

(b) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area to be repaired.



VIEW THROUGH THE LP COMPRESSOR FRONT CASE



EXAMPLE VIEW

A

66222A

Repair the Teflon Sleeve with a Patch
Figure 803

Repair The Teflon Sleeve With A Patch

2) Let the surface dry fully.

(c) Cut the PTFE glass cloth to the correct dimension.
1) Always use circular patches where possible for the repair. For large patches or awkward positions, the corners can be cut with a large radius. The diameter of the corner fillet should be half the length of the largest edge.
2) Make an overlap to the repair area with the glass cloth by 1.0 inch (25.4 mm) minimum.

(d) If the damage area is large, cut the repair material in small strips to prevent the mis-shaping of the patch when you apply it.
1) Make an overlap of the strips by 1.0 inch (25.4 mm) minimum.

(e) Bond the glass cloth to the repair area.
1) Make an overlap to the edges of the strips when you bond them.
2) Remove all air bubbles and creases by hand or with a wooden roller.
3) Apply pressure to the center of the patch and push out to the edges.

(f) Make an overlap to the edges with the PTFE tape.

(g) Seal the edges with the PTFE tape.
1) Remove all air bubbles and creases by hand or with a wooden roller.

(h) When using OMat No. 2/149 Polyurethane tape, apply a wetting solution to the tape adhesive made up of 1 part Isopropyl Alcohol with 3 parts water by volume.
1) Allow the repair to cure for 24 hours.

(i) When using OMat No. 2/148 F.E.P. Tape, apply the tape directly over the damaged sleeve material.

(j) Examine the repair area to make sure you removed all the air bubbles and creases.
1) Make sure there is a fluid barrier.

(k) Use a vibro-engraver to write the repair identification number, FRS.5193, adjacent to the part number on the LPC case.

NOTE: Alternatively, FRS.5193 can be marked on the LPC case with a suitable permanent ink.

Local Repair Of The Teflon Sleeve With Tape

TASK 72-34-10-308-016-R00

5. Local Repair of the Teflon Sleeve with Tape

A. General

(1) This procedure, FRS.5194, refers to the repair of the teflon sleeve.

(2) Apply the PTFE tape on the LPC cases with the part number that follows:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) Wooden roller

(2) Face mask and plastic gloves

C. Consumable Materials

(1) B50009 - Acetone, OMat No. 150

Local Repair Of The Teflon Sleeve With Tape

(2) B50018 - Isopropyl alcohol, OMat No. 1/40
(3) B00713 - Degreaser, OMat No. 1/257
(4) Self adhesive, PTFE tape
OMat No. 8/128
(5) Lint free cloth - local resources

D. Access
(1) Location Zones
410 Power Plant
420 Power Plant

E. Local Repair of the Teflon Sleeve with Tape

S 358-017-R00
(1) Repair the Damaged Area (Fig. 803A)
(a) Remove the loose or damaged material.

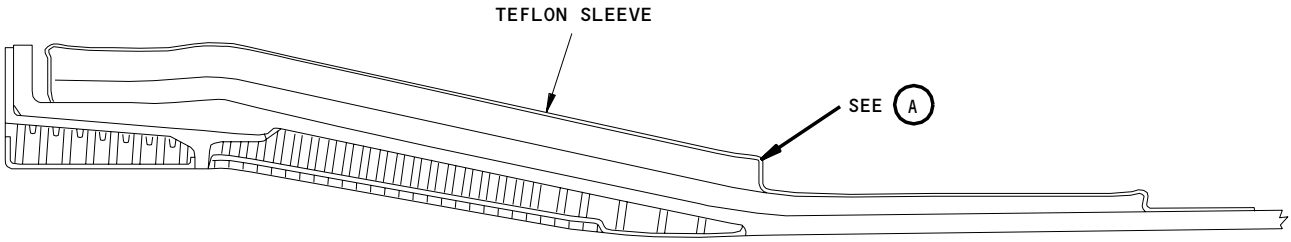
NOTE: Use caution to prevent damage to the Kevlar wrapping.

1) Cut the edges of the sleave to a smooth, flat finish.

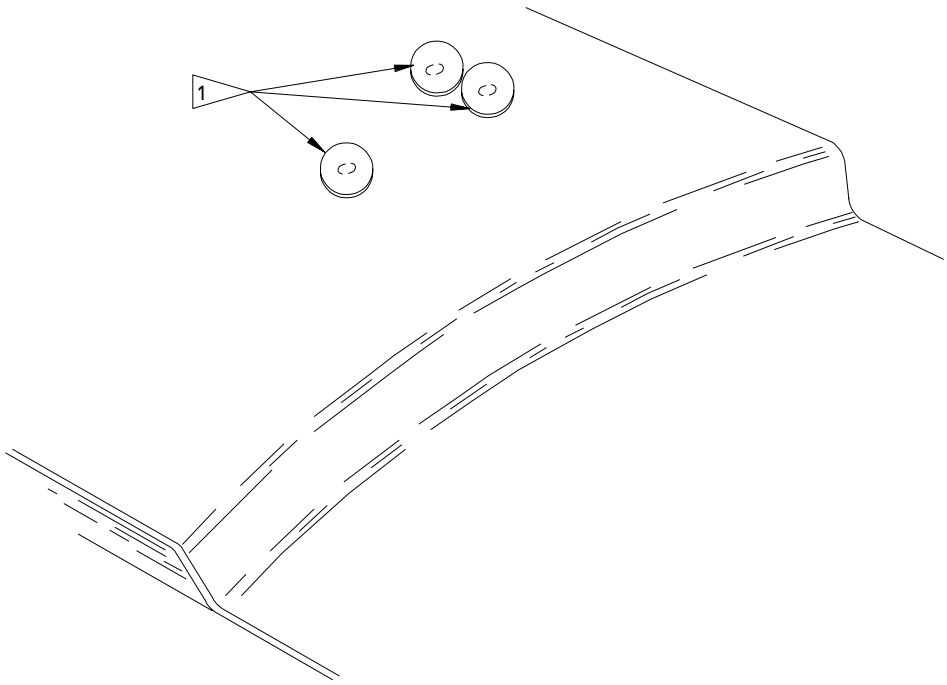
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT LET THE DEGREASING FLUID TOUCH THE KEVLAR. THE KEVLAR WILL ABSORB THE FLUID.

(b) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area to be repaired.



EXAMPLE VIEW THROUGH THE LP COMPRESSOR FRONT CASE



EXAMPLE VIEW
A

1 REPAIR THESE PUNCTURES WITH TAPE.

66223A

Repair the Teflon Sleeve with Tape
Figure 803A

Local Repair Of The Teflon Sleeve With Tape

2) Let the surface dry fully.

(c) Cut the tape to the correct dimension.
1) Always use circular patches where possible for the repair. For large patches or awkward positions, the corners can be cut with a large radius. The diameter of the corner fillet should be half the length of the largest edge.
2) Temporarily attach the tape to the surface you will repair.
3) Make an overlap of the tape to the repair area by 1.0 inch (25.4 mm) minimum.

(d) Bond the tape to the repair surface.
1) Remove all air bubbles or creases by hand or with a wooden roller.
2) Apply pressure in the center of the patch and push out to the edges.

(e) Examine the repair area to make sure you removed all the air bubbles and creases.
1) Make sure there is a fluid barrier.

(f) Use a vibro-engraver to write the repair identification number, FRS.5194, adjacent to the part number on the LPC case.

NOTE: Alternatively, FRS.5194 can be marked on the LPC case with a suitable permanent ink.

Repair The Unbonded Front And Rear Edges Of The Teflon Sleeve

TASK 72-34-10-308-018-R00

6. Repair the Unbonded Front and Rear Edges of the Teflon Sleeve

A. General

(1) This procedure, FRS.5195, refers to the repair of the teflon sleeve.

(2) The sleeve on the front and rear edges of the LP compressor cases with the part number that follows:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) New 0.5 inch (12.5 mm) paint brush (2 locations)
(2) Face mask and plastic gloves
(3) Air supply (oil and moisture free)
(4) Scales, 500 gm capacity, accurate to 1 gm

C. Consumable Materials

(1) Polyurethane adhesive resin (Adiprene LW520)
Omat No. 8/50
(2) Polyurethane adhesive hardener (HY932) or (XU HY205)
OMat No. 8/51
(3) Intumescent paint (Flamarest 1600B)
OMat No. 7/28A

Repair The Unbonded Front And Rear Edges Of The Teflon Sleeve

(4) B50009 - Acetone, OMat No. 150
(5) B50018 - Isopropyl alcohol, OMat No. 1/40
(6) B00713 - Degreaser, OMat No. 1/257
(7) White Spirit,
OMat No. 102
(8) Chromate Conversion (brushing type),
OMat No. 175E
(9) Epoxy Resin and Catalyst (two pack),
OMat No. 766
(10) Epoxy Finish Yellow and Catalyst (two pack),
OMat No. 799A
(11) Lint free cloth - local resources

D. Access
(1) Location Zones
410 Power Plant
420 Power Plant

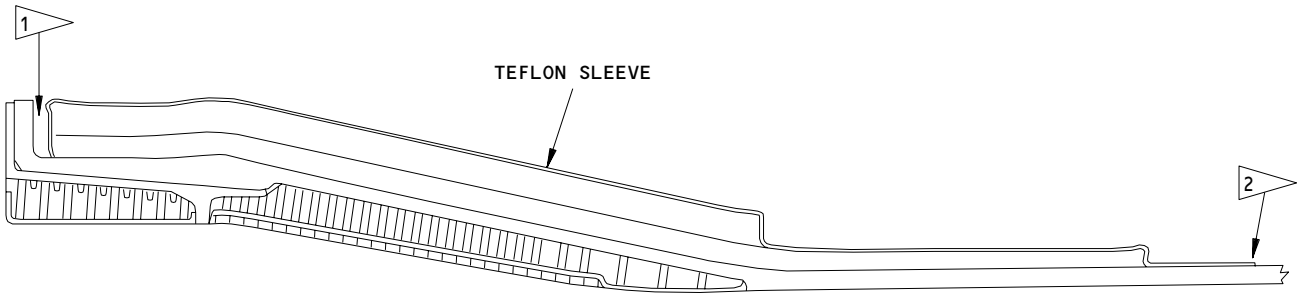
E. Repair the Unbonded Front and Rear Edges of the Teflon Sleeve

S 358-019-R00
(1) Repair the Damaged Area (Fig. 803B)
(a) Remove the used adhesive and intumescent paint.
(b) Use an air jet to remove all the loose particles from the LPC case.

NOTE: The air jet must not contain oil or water.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area to be repaired.



EXAMPLE VIEW THROUGH THE LP COMPRESSOR FRONT CASE

1 BOND THE FRONT EDGE OF THE TEFLON SLEEVE.

2 BOND THE REAR EDGE OF THE TEFLON SLEEVE.

Repair Unbonded Front and Rear Edges of Teflon Sleeve
Figure 803B

Repair The Unbonded Front And Rear Edges Of The Teflon Sleeve

2) Let the surface dry fully.

(d) Protect the Parent Metal

1) Visually inspect the repair area for signs of corrosion. If you find corrosion, refer to Rolls-Royce for advice.

2) Re-protect areas of bare metal with Chromate Conversion (OMat 175E).

a) Mix in accordance with the manufacturers instructions.

b) Use a ready mixed solution as an alternative.

(e) Apply epoxy primer to the Chromate Conversion (OMat 766).

1) Mix equal volumes of the base and accelerator or catalyst. Add thinner up to 10 percent of volume.

2) Wait 30 minutes before the mixture is applied.

3) Discard any mixture not used within 8 hours.

(f) Apply epoxy yellow finish to the epoxy primer (OMat 799A).

1) Mix equal volumes of the base component and the catalyst component.

2) Add spraying or brushing thinner as required.

3) Wait 30 minutes before the mixture is applied.

4) Discard any mixture not used within 8 hours.

(g) Visually inspect to ensure all exposed surfaces are treated.

(h) Mix, by weight, 100 parts of resin to 13.5 parts of the hardener.

1) Mix the resin and hardener at a room temperature of 72°F (22°C).

2) Use a clean, new container to prevent contamination.

(i) If the resin is cloudy due to crystallization, the resin must become warm to a temperature between 122 to 212°F (50 to 100°C).

NOTE: Until the resin is clear.

1) Decrease the room temperature to 72°F (22°C), before you mix the resin with the hardener.

Repair The Unbonded Front And Rear Edges Of The Teflon Sleeve

(j) Apply the adhesive to the repair with a paint brush.
(k) Cure the adhesive at 68°F (20°C) for a minimum of 8 hours or 140°F (60°C) for 1 hour.
1) For a hot cure, it will be necessary to use heat lamps.
2) The bonded surfaces must touch, with sufficient pressure to the repair area, until the cure is completed.

S 378-020-R00

(2) Apply Intumescent Paint to the Repair on the Front Outer Face of the Teflon Sleeve Only.
(a) Apply the paint with a paint brush.
1) You must apply two layers.
2) You will apply these immediately one after the other.
(b) Prevent high temperatures and humidity when you apply the paint.
1) Do not apply the paint to the case of the front flange.

NOTE: Cure the paint at 72°F (22°C) for 24 hours or 95 to 113°F (35 to 45°C) for 6 hours. You can decrease the cure time when you increase the temperature with heat lamps. Make sure the surface temperature of the intumescent paint is not more than 113°F (45°C).

(c) You must be careful with the holes, gripper rod ends and the root radius of the Kevlar wrapping, when you seal around the case.
1) Apply the filler to the openings around the replacement panels with a spatula or palette knife.
2) Fill the three bolt holes in the replacement panels. Panel part no. UL3115 or UL37156.
a) Completely fill the holes. Make the filler surface smooth or below the panel surface.
(d) Examine the repair to make sure that the teflon sleeve bonded satisfactorily.
(e) Examine the repair to make sure you attach the intumescent paint to the repair area.
(f) Use a vibro-engraver to write the repair identification number, FRS.5195, adjacent to the part number on the LPC case.

NOTE: Alternatively, FRS.5195 can be marked on the LPC case with a suitable permanent ink.

Repair The Outer Layer Of The Kevlar Wrapping

TASK 72-34-10-308-021-R00

7. Repair the Outer Layer of the Kevlar Wrapping

A. General

(1) This procedure, FRS.5196, refers to the repair of the Kevlar wrapping.

(2) This repair can be used on the Kevlar wrapping with polyurethane filler on the LP compressor cases with the following part numbers:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832 Item A
UL32667 post RR SB 72-9562 Part 1
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) You must do this repair, also (FRS.5193 - Repair of the Teflon Sleeve).

(4) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) New 0.50 inch (12.50 mm) paint brush
(2) Face mask and plastic gloves
(3) Scales, 500 gm capacity, accurate to 1 gm

C. Consumable Materials

(1) B50009 - Acetone, OMat No. 150

Repair The Outer Layer Of The Kevlar Wrapping

(2) B50018 - Isopropyl alcohol, OMat No. 1/40
(3) B00713 - Degreaser, OMat No. 1/257
(4) Polyurethane adhesive resin (Adiprene LW520)
OMat No. 8/50
(5) Polyurethane adhesive hardener (HY932) or (XU HY205)
OMat No. 8/51
(6) Acetone OMat No. 150 or
Isopropyl alcohol OMat No. 1/40 or
Cleaning solvent Desoclean OMat No. 1/257
(7) Lint free cloth - Local resources

D. Access
(1) Location Zones
410 Power Plant
420 Power Plant

E. Repair the Outer Layer of the Kevlar Wrapping

S 358-022-R00
(1) Repair the Damaged Area (Fig. 803C)

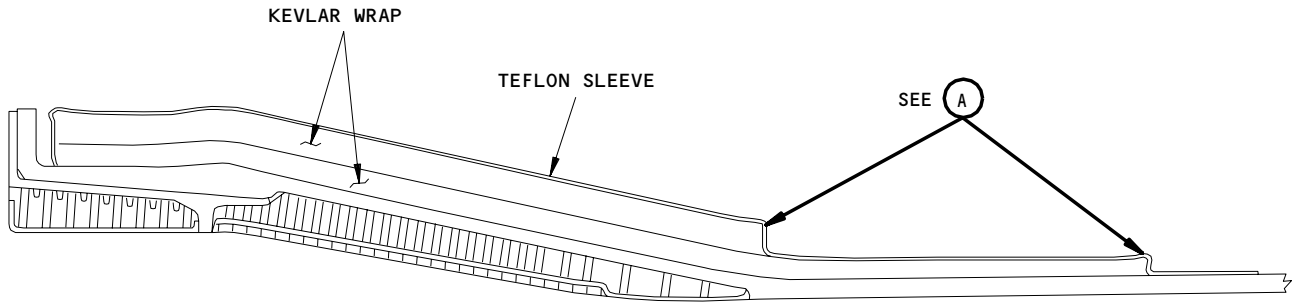
WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT LET THE DEGREASING FLUID TOUCH THE KEVLAR. THE KEVLAR WILL ABSORB THE FLUID.

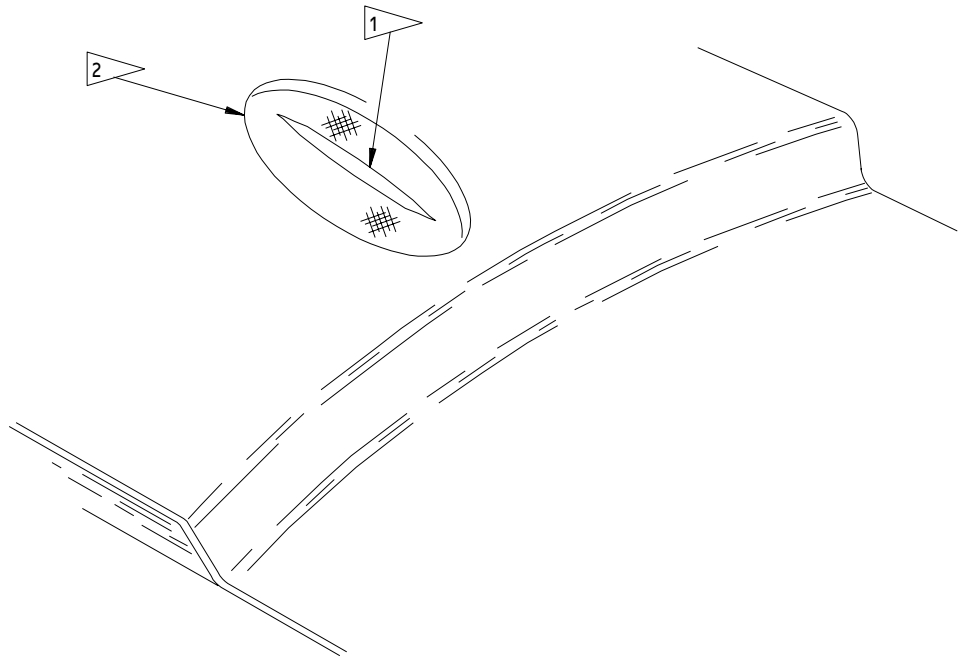
(a) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area to be repaired.
2) Let the surface dry fully.

NOTE: Use warm air to dry the surface quickly.

(b) Do the above steps again to make sure the repair area is clean.
(c) Mix, by weight, 100 parts of resin and 13.5 parts of the hardener.
1) Flush the resin container with a small quantity of M.E.K., before you use it.
2) Make sure you add the correct quantity of the hardener.
(d) Increase the temperature of the resin to 212°F (100°C).
1) Make sure the resin is clear.
2) Decrease the temperature of the resin to a room temperature of 72°F (22°C) before you mix it with the hardener.



EXAMPLE VIEW THROUGH THE LP COMPRESSOR FRONT CASE



EXAMPLE VIEW
A

1 REPAIR THE CUTS IN THE OUTER LAYER OF THE KEVLAR WRAP WITH POLYURETHANE ADHESIVE.

2 REPAIR THE TEFLON SLEEVE.

66228

Repair Outer Layer of KEVLAR Wrap
Figure 803C

Repair The Outer Layer Of The Kevlar Wrapping

(e) Mix the resin and hardener in a new, clean container to prevent contamination.
(f) Fill the cut in the Kevlar wrapping with the polyurethane mixture.
    1) Let it cure at 72°F (22°C) for 24 hours or 203 to 221°F (120 to 130°C) for 4 hours.
    2) For a hot cure, it will be necessary to use heat lamps.
(g) Repair the cut in the teflon sleeve (Ref FRS.5193).
(h) Use a vibro-engraver to write the repair identification number, FRS.5196, adjacent to the part number on the LPC case.

NOTE: Alternatively, FRS.5196 can be marked on the LPC case with a suitable permanent ink.

TASK 72-34-10-308-023-R00

8. LPC Case, Front - Replacement of the Front Acoustic Panels

A. General

(1) The repair to this procedure is FRS.5198.

(2) The procedure gives the instructions to replace the front accoustic panels of the LP compressor case, front.

(3) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on surfaces that bond will result in poor adhesion and unsatisfactory bonding.

(4) Clean cotton or polythene gloves must be worn by all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(5) This repair can be used for the LPC cases with the part numbers that follow:

RB211-535E4: UL16446, UL50007 with SB 72-7832

(6) For this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) Approved workshop tools
(2) Soft hair brush
(3) Scales, 500 gm capacity, accurate to 1.0 gm
(4) Clamping assembly - Local manufacture from battens and clamps
(5) Pressure pad - Rolls Royce, MH16191
(6) Radiant heat source
(7) Vacuum cleaner

C. Consumable Materials

(1) Masking tape
OMat No. 230
(2) Adhesive tape
OMat No. 283
(3) Polyethene sheet
OMat No. 1249
(4) Lint free cloth - local resources

LPC Case, Front - Replacement Of The Front Acoustic Panels

(5) B50009 - Acetone, OMat No. 150
(6) B50018 - Isopropyl alcohol, OMat No. 1/40
(7) B00713 - Degreaser, OMat No. 1/257
(8) Garnet paper grid size 80 grade 0
OMat No. 5/97
(9) Distilled water - Local resources
(10) Acetone
OMat No. 150
(11) Filler two pack EC3524 B/A
OMat No. 874
(12) Adhesive Hysol, (EA934NA)
OMat No. 8/52
(13) Sealant Polysulphide (two pack),
OMat No. 8/107
(14) Compound Polysulphide,
OMat No. 8/136
(15) Epoxy Finish Yellow and Catalyst (two pack),
OMat No. 799

NOTE: When you use OMat 8/107 or 8/107C, the polysulphide must be used before 30 minutes after it was mixed. This time decreases rapidly with ambient temperature more than 25 degrees C., refer to manufacturers data. If this time is insufficient use OMat 8/107A,B,D or OMat 8/136. OMat 8/107 or 8/136 are alternative polysulphide compounds. They can be used as adhesive or filler.

D. Parts
(1) Cellular Core Segment, UL24251 or UL37155 (Item 1)
(2) Cellular Core Segment, Lower, UL24252 or UL37156 (Item 2)

E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

LPC Case, Front - Replacement Of The Front Acoustic Panels

F. LPC Case, Front - Replacement of the Front Acoustic Panels

S 358-024-R00

(1) Remove the Damaged Material (Fig. 804)
  (a) Seal the IPC intake with polythene sheet and masking tape.
  (b) Remove the loose and damaged material from the repair area.
  (c) Make sure that the adjacent acoustic panels are correctly attached.
  (d) Remove all of the bond agent.
  (e) Remove all unwanted material from the repair area with a vacuum cleaner.

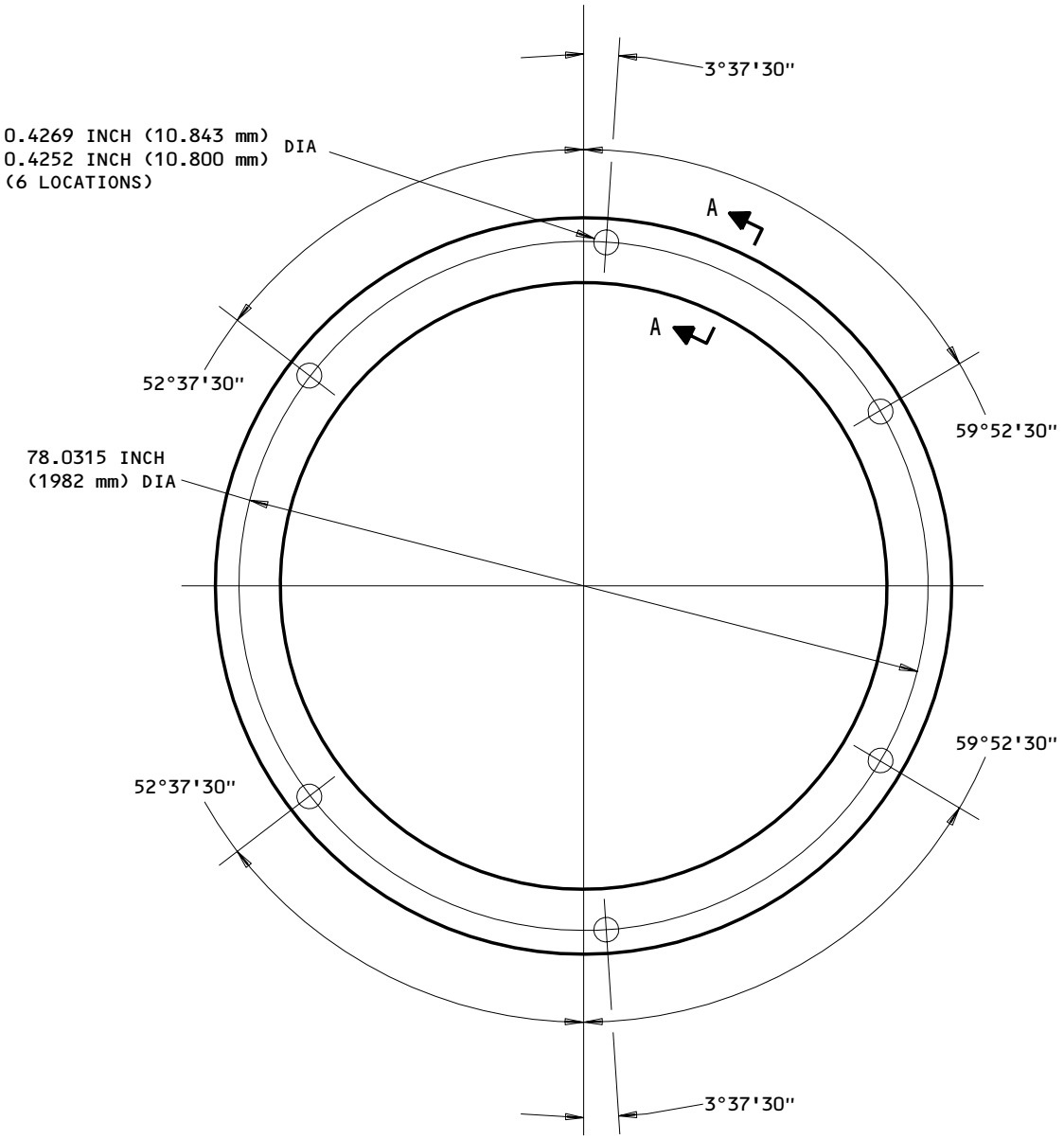
S 358-025-R00

(2) Prepare the repair area (Fig. 804).

WARNING: DO NOT GET THE DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREASING FLUID. KEEP THE DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT LET THE DEGREASING FLUID TOUCH THE KEVLAR. THE KEVLAR WILL ABSORB THE FLUID.

  (a) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
    1) Use this cloth to clean the area that you repair.
    2) You must discard the dirty cloth.
    3) Use a clean cloth each time you clean a new area that you repair.



VIEW ON THE FRONT FLANGE OF THE LP COMPRESSOR FRONT CASE

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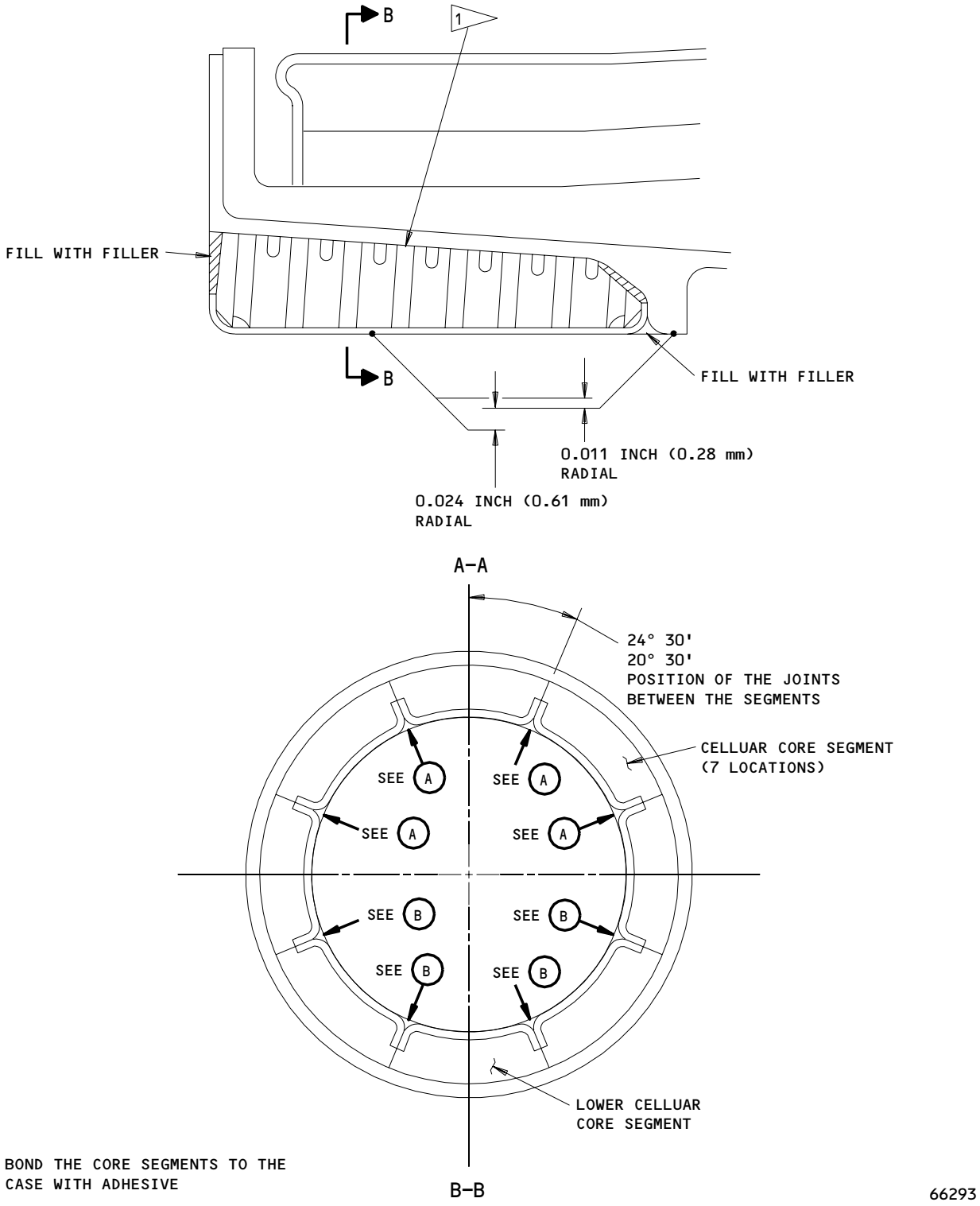
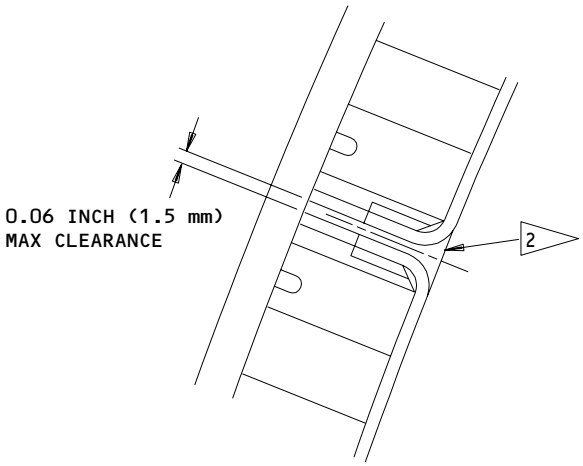
Replace the Front Acoustic Panel
Figure 804 (Sheet 1)



Replace the Front Acoustic Panel
Figure 804 (Sheet 2)



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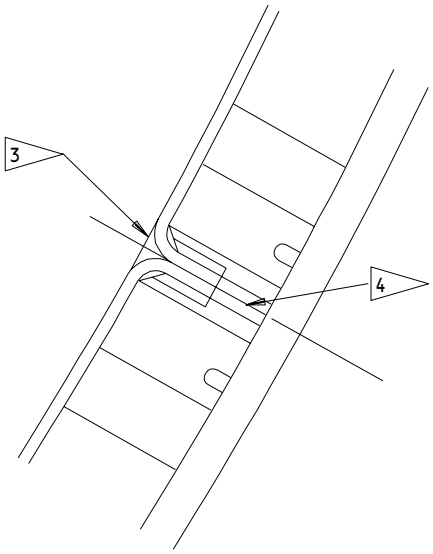


B

2 FILL THE CLEARANCES IN THE ANNULUS PROFILE WITH FILLER

3 FILL WITH FILLER AND GET A SMOOTH SURFACE

4 BOND THE JOINTS WITH ADHESIVE

66294

Replace the Front Acoustic Panel
Figure 804 (Sheet 3)

4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and go back to the bulk liquid container.

(b) Let the repaired area dry fully.

(c) Use abrasive paper to make the bonding area rough.

(d) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area that you repair.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and go back to the bulk liquid container.

(e) Let the repaired area dry fully.

(f) Use a hair brush that is soft and clean to apply a thin layer of distilled water over the area to be bonded.
1) Look at the layer of distilled water, immediately.

NOTE: Look for breaks in the continuity of the layer.

2) If breaks occur in less than 30 seconds, you must clean the surfaces again until you see a continuous layer.
3) Use a clean, lintfree cloth soaked in clean acetone to remove the distilled water.
4) Let the surfaces dry.

NOTE: Do not continue before the surfaces are dry.

S 358-026-R00

(3) Bond the Acoustic Panel to the Compressor Case (Fig. 804)

LPC Case, Front - Replacement Of The Front Acoustic Panels

WARNING: USE EPOXY COMPOUNDS IN THE WORK AREAS WHICH HAVE GOOD VENTILLATION. DO NOT LET THE EPOXY COMPOUNDS TOUCH YOUR SKIN. YOU CAN CAUSE INJURY TO PERSONS.

(a) Prepare the adhesive.
  1) Hysol adhesive, EA934 NA, is a two part epoxy resin of:

    Part A - A grey paste which must be stirred in its container before it is weighed out.
    Part B - An amber liquid is used as supplied.

  2) Mix, by weight, 100 parts of grey paste and 33 parts of amber liquid until it becomes a homogenous paste.

    NOTE: The adhesive has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(b) Use a spatula or palette knife to apply the adhesive.
  1) Do not apply a layer of adhesive that is more than 0.024 inch (0.610 mm) thick.

(c) Put the acoustic panel on the compressor case.
  1) Put the panel in its position and bond with hand pressure.
  2) Make sure that the openings between the edges of the panels is correct.
  3) Use tape to hold the panel in its position.

WARNING: PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. THIS FILLER CAN CAUSE SKIN IRRITATION.

(d) Prepare the filler (EC3524 B/A).
  1) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

    NOTE: This filler has a pot life of approximately one hour at a room temperature of 72°F (22°C).

2) Apply the filler to the openings around the replacement panel(s) with a spatula or palette knife.

(e) Moisten the knife with cold water, if the filler sticks to the blade when you finally smooth it.

NOTE: Do not use too much water with the filler.

(f) You must not let the filler dry fully.

NOTE: Refer to Table 1 for the relation of cure time to temperature.

(g) Make the filler smooth with a palette knife.

(h) Make sure the filler is smooth with the adjacent panel surface.

(i) Use the equipment that follows to hold the panel in the correct position.

1) Clamp assembly (use at ambient temperature)

2) A radiant heat source if required.

(j) Let the adhesive and filler material dry.

NOTE: The cure time must agree with the temperature at the bond line. The minimum cure time is one hour and will not cure at temperatures below 54°F (12°C). The temperature at the bond line must be monitored by a thermometer or convenient method when the cure time is faster with the use of heat. Refer to Table 1 for cure time/temp relationship.

Table 1

Time - Hours	24	16	8	4	2	1
Temp - Deg. F.	72	77	86	96	113	140
Temp - Deg. C.	22	25	30	35	45	60

LPC Case, Front - Replacement Of The Front Acoustic Panels

(k) Remove the clamp assembly and the heat equipment.

NOTE: You can remove the clamp assembly and heat equipment after 8 hours, if you use a cure temperature of 68 to 72°F (20 to 22°C).

(l) Use abrasive paper to make the unwanted material rough.
(m) Mix with the adjacent surfaces.
(n) Do a check of the panel to make sure you attach it correctly.
(o) Do a check for smooth aerodynamics on the panel.
(p) Make sure the slot for the drain is clear.

NOTE: The slot will be in the front face of the core segment at the 6 o'clock position.

(q) Use a vibro-engraver to write the repair identification number, FRS.5198, adjacent to the part number on the LPC case.
(r) On the panels air face between the bolt recesses, stencil the word "BOND STANDARD". The letter size must be at least 25mm, using OMat 799. This indicates no attachment bolts have been installed.

Repair The Attrition Lining With Blue Filler

TASK 72-34-10-308-027-R00

9. Repair the Attrition Lining with Blue Filler

A. General

(1) This procedure, FRS.5201, refers to the repair of the attrition lining with blue filler.

(2) The attrition lining with blue filler on the LP compressor cases with the part number that follows:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) This repair can be applied to the full 360 degrees of fan track lining to the depth of the glass reinforced plastic (GRP) layer (membrane between aluminum and nomex honeycomb).

(4) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

(5) In this procedure the Glass Reinforced Plastic is referred to as the GRP layer.

B. Equipment

(1) Scales, 500 gm capacity, accurate to 2 gm

(2) Protective clothing (face mask and plastic gloves)

(3) Vacuum cleaner

(4) Palette knife

(5) Spatula or small trowel

(6) Feeler gages

C. Consumable Materials

(1) B50009 - Acetone, OMat No. 150

Repair The Attrition Lining With Blue Filler

(2) B50018 - Isopropyl alcohol, OMat No. 1/40
(3) B00713 - Degreaser, OMat No. 1/257
(4) Blue filler EC 3524
OMat No. 874
(5) Abrasive paper, grade 80
OMat No. 5/97
(6) Lint free cloth - local resources

D. References
(1) AMM 72-31-13/401, LP Compressor Rotor Blades

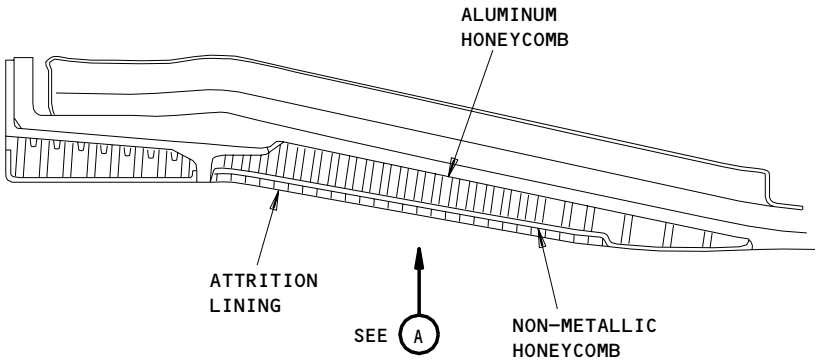
E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. Repair the Attrition Lining with Blue Filler

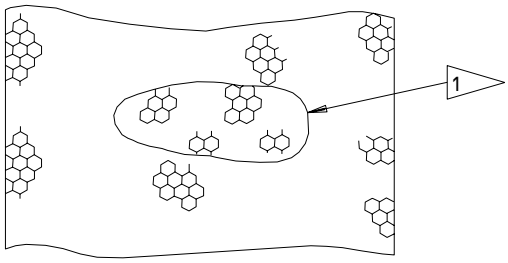
S 358-028-R00

(1) Repair the Damaged Area (Fig. 805)
(a) Make sure the attrition lining is not loose.
1) Lightly push the attrition lining.
2) Lightly hit the attrition lining.
3) A hollow sound is a sign of a defective bond.
4) Remove the material not bonded correctly.
(b) Remove the loose and damaged material, the dust and unwanted material with a vacuum cleaner.
1) You must prevent damage to the GRP layer.
2) Make sure you repair the surface that does not have honeycomb or adhesive on it.
(c) Remove the fan blade for access, if it is necessary (AMM 72-31-13/401).

NOTE: You do not have to remove the fan blades for small areas with blue filler. You must remove the fan blade for larger repairs.



EXAMPLE VIEW THROUGH THE LP COMPRESSOR FRONT CASE



EXAMPLE OF THE DAMAGED AREA

A

NOTE: REPLACE THE DAMAGED NON-METALLIC HONEYCOMBS.

1 FILL THE DAMAGED AREA. THE FILLER MUST BE SMOOTH.

66312

Attrition Lining Repair
Figure 805

Repair The Attrition Lining With Blue Filler

(d) If you have damage that extends below the GRP layer, refer to the FRS.5258 repair.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(e) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area that you repair.
2) Let the repaired area dry.

(f) Prepare the blue filler.

WARNING: MAKE SURE THAT YOU PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. THIS FILLER CAN CAUSE SKIN IRRITATION.

1) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until the same blue color is without streaks.
2) Apply the mixture in a layer 0.5 inch (12.7 mm) in depth, approximately, on a clean surface to release the exothermic heat.
   a) This will give a pot life of approximately 1 hour at a room temperature of 72°F (22°C).

(g) Do these steps to apply the blue filler to the damaged area:
1) Use a spatula or a small trowel to apply the blue filler to the damaged area.

Repair The Attrition Lining With Blue Filler

2) Fill the damaged area and make it smooth.
   a) Make sure there is no air bubbles in the blue filler.

      NOTE: If it is necessary, fill the fan track, start at the bottom and move up the two sides. As the filler at the bottom sets it will give support to the new filler you apply. Use the locally produced supports, if the filler starts to move in a downward direction.

3) Do not let the filler dry fully.
   a) Use a clean palette knife or a spatula to remove the unwanted filler.
   b) Make sure there is sufficient material to mix the material fully.
4) Let the filler dry.

   NOTE: The time for the filler to dry must agree with the temperature. The minimum time the filler gets to dry is 30 minutes. The filler will not dry at temperatures below 54°F (12°C). The maximum temperature that you can apply to the filler is 302°F (150°C). If heat causes the filler to burn, hand abrade the burned filler to remove it. Refer to Table 1 for the dry time/temp ratio.

Table 1

Time - Hours	96	72	36	24	16	8	4	2	1	0.5
Temp.- Deg. C.	12	15	20	22	25	30	35	45	60	100
Deg. F.	54	59	68	72	77	86	95	113	140	212

Repair The Attrition Lining With Blue Filler

WARNING: YOU MUST PUT A FACE MASK ON TO PREVENT THE INHALATION OF DUST WHEN YOU MAKE THE ATTRITION LINING ROUGH. THIS DUST CAN CAUSE INJURY TO PERSONS.

(h) Use abrasive paper and a wooden block to get a satisfactory finish on the surface of the attrition lining.
   1) Use abrasive paper and a wooden block to get a satisfactory finish on the area where you apply the blue filler.
(i) Remove the dust and unwanted material with a vacuum cleaner.
(j) Install the fan blade, if you removed them (AMM 72-31-13/401).
(k) Use a feeler gage to make sure that the minimum tip clearance of the longest blade is 0.040 inch (1.016 mm).
(l) Use a vibro-engraver to write the repair identification number, FRS.5201, adjacent to the part number on the fan case.
(m) Make a record of the repair FRS.5201 in the engine log book.

Repair The Ice Impact Panel With The Cold Cure Adhesive

TASK 72-34-10-308-029-R00

10. Repair the Ice Impact Panel with the Cold Cure Adhesive

A. General

(1) This repair, FRS.5202, refers to the replacement of the ice impact panel on the LP compressor cases with the part numbers that follow:

UL16446
UL50007

(2) You must keep this repair clean.

NOTE: Dirt or grease on a bonding surface will result in poor adhesion and an unsatisfactory bond.

(3) You must be careful during all operations to make sure that all bonds are free from contamination.

(4) Clean cotton or polythene gloves must be put on the hands of all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(5) Use a protection mask to breathe, to prevent the inhalation of dust, when you make rough the repair area.

(6) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) Temperature control unit MH15789 (Rolls-Royce)
(2) Electrical harness MH15865 (Rolls-Royce)
(3) Clamping assembly MH16190 (Rolls-Royce)
(4) Pressure pad MH16191 (Rolls-Royce)
(5) Scales, 500 gm capacity, accurate to 1 gm
(6) Radiant heat source
(7) Vacuum cleaner

C. Consumable Materials

(1) Adhesive tape
OMat No. 283
(2) Polythene sheet
OMat No. 1249
(3) Abrasive paper, garnet, Grade 80
OMat No. 5/97
(4) Abrasive paper, garnet, Grade 60
OMat No. 5/98

Repair The Ice Impact Panel With The Cold Cure Adhesive

(5) Abrasive paper, garnet, Grade 60
OMat No. 5/98
(6) B50009 - Acetone, OMat No. 150
(7) B50018 - Isopropyl alcohol, OMat No. 1/40
(8) B00713 - Degreaser, OMat No. 1/257
(9) Lint free cloth - local resources
(10) Soft hair brush - local resources
(11) Distilled water - local resources
(12) Acetone
OMat No. 1/176
(13) Filler, Blue EC3524 B/A
OMat No. 874
(14) Adhesive, Hysol EA934 NA
OMat No. 8/52

D. Parts
(1) Cellular core segment (ice impact panel), UL17715

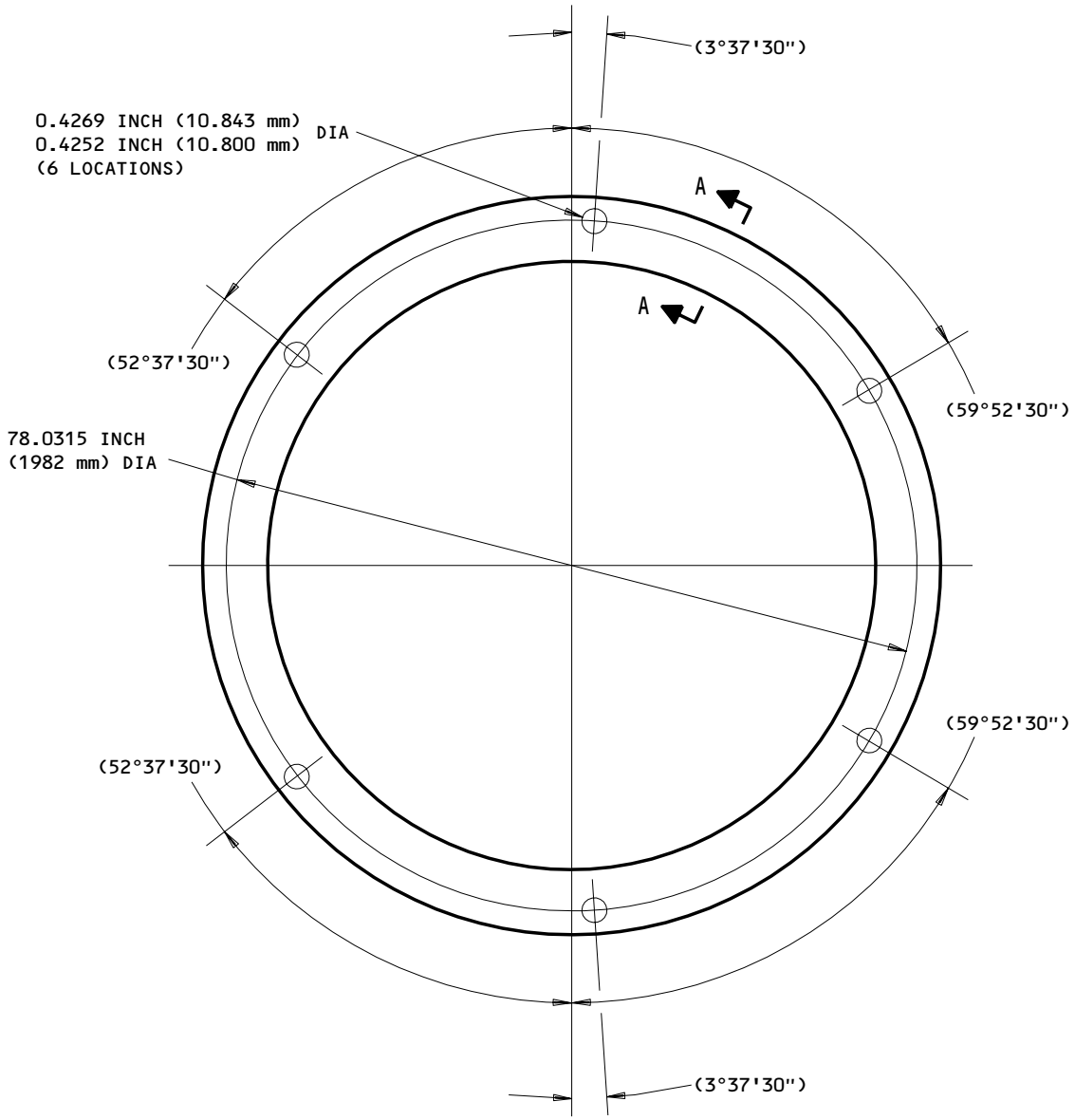
E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. Repair the Ice Impact Panel with the Cold Cure Adhesive

S 358-030-R00
(1) Prepare the Damaged Area (Fig. 806)
(a) Put a cover on the intake to the IP compressor case with adhesive tape and a polythene sheet.
(b) Remove the defective panels from the repair area.
(c) Remove all unwanted material and adhesive from the area that you repair.

NOTE: The tools must have the same radius as the case.

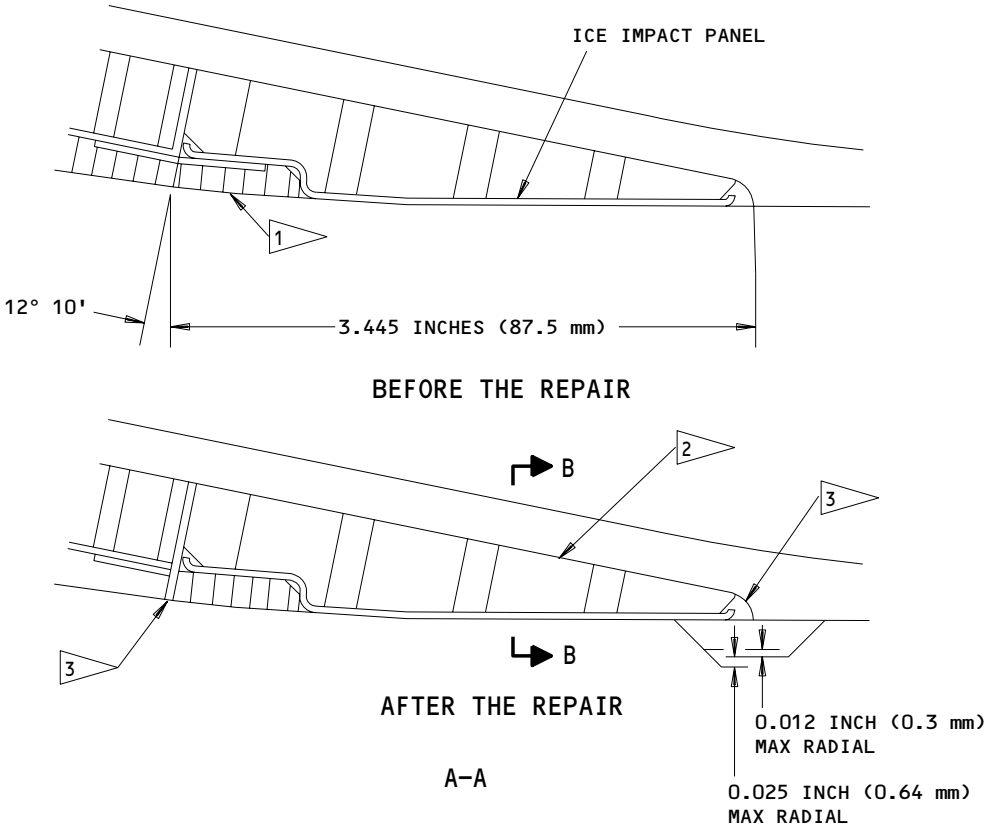
(d) Use a vacuum cleaner to remove the dust and unwanted material.
(e) Use abrasive paper to make the repair area rough.



VIEW ON THE FRONT FLANGE OF THE LP COMPRESSOR FRONT CASE

93768

Replace the Ice Impact Panel
Figure 806 (Sheet 1)



1. REMOVE THE ATTRITION LINING IN LINE WITH THE ICE IMPACT PANEL
2. BOND THE ICE IMPACT PANEL TO THE CASING
3. THE ANNULUS SURFACE MUST BE SMOOTH AT THIS POSITION
4. IF IT IS NECESSARY, TRIM THE FINAL PANEL TO GET THE CLEARANCE
5. FILL THE JOINT TO THE FULL DEPTH (10 LOCATIONS)

Replace the Ice Impact Panel
Figure 806 (Sheet 2)

Repair The Ice Impact Panel With The Cold Cure Adhesive

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(f) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
  1) Use this cloth to clean the area that you repair.
  2) You must discard the dirty cloth.
  3) Use a clean cloth each time you clean a new area that you repair.
  4) Contamination of the bulk liquid is not permitted.
  5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(g) Use abrasive paper to make the repair area rough.

(h) Use a vacuum cleaner to remove grit and dust.

(i) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
  1) Use this cloth to clean the area that you repair.
  2) You must discard the dirty cloth.
  3) Use a clean cloth each time you clean a new area that you repair.
  4) Contamination of the bulk liquid is not permitted.
  5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(j) Let the repair area dry.

NOTE: In order to minimize the possibility of surface contamination, it is essential that the steps to bond the replacement panel be accomplished with minimal delay between steps.

(k) Do these steps to make sure the surface that you bond is clean:
  1) Use a hair brush that is soft and clean to apply a thin layer of distilled water over the area to be bonded.
  2) Look at the layer of distilled water, immediately.
    a) Look for breaks in the continuity of the layer.
  3) You must clean the surfaces again, if breaks occur in less than 30 seconds.
  4) Use clean acetone to remove the distilled water.
  5) Let the surface dry.

Repair The Ice Impact Panel With The Cold Cure Adhesive

S 358-031-R00

(2) Do these steps to bond the ice impact panel to the compressor case:

WARNING: PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. DO NOT LET THE FILLER TOUCH YOUR SKIN. THIS FILLER CAN CAUSE IRRITATION.

(a) Prepare the filler.
1) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

NOTE: This filler has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(b) Apply the filler, with a spatula, to the openings in the edges of the panels adjacent to these:
1) The repair area.
2) The new, nomex honeycomb in the ice impact panel.
3) The exposed end of the cells.
4) Fill the nomex honeycomb level with the surface.

(c) Prepare the adhesive.

NOTE: Hysol adhesive, EA934 NA, is a two part epoxy resin.

Part A - A grey paste which must be stirred in its container before it is weighed out.
Part B - An amber liquid is used as supplied.

1) Mix, by weight, 100 parts of grey paste and 33 parts of amber liquid until it becomes a homogenous paste.

NOTE: The adhesive has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(d) Use a spatula to apply the adhesive.
1) Apply the adhesive no more than 0.024 inch (0.610 mm) thick.
2) Apply the adhesive with a comb.

(e) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area that you repair.
2) You must discard the dirty cloth.

Repair The Ice Impact Panel With The Cold Cure Adhesive

3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(f) Let the repair parts dry.

(g) Put the ice impact panel on the compressor case.
1) Bond with hand pressure to the panel.
2) Keep the radial and axial clearance dimensions.

(h) Put a thermocouple at the panel joint if you use heat to cure the adhesive.

(i) Use the tape to hold the panel in its position.

(j) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

NOTE: This filler has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(k) Apply the filler to the openings around the replacement panel(s) with a spatula or palette knife.
1) Moisten the knife with cold water, if the filler sticks to the blade when you finally smooth it.

NOTE: Do not use too much water with the filler.

(l) Use the equipment that follows to hold the panel in the correct position.
1) Clamp assembly
2) Heated pressure plates.
3) Electrical harness.
4) Heat control unit.

Repair The Ice Impact Panel With The Cold Cure Adhesive

(m) Let the adhesive and filler material dry.

NOTE: The cure time must agree with the temperature at the bond line. The minimum cure time is one hour and will not cure at temperatures below 54°F (12°C). The temperature at the bond line must be monitored by thermocouples or convenient method when the cure time is faster with heat. Refer to Table 1 for cure time/temp relationship.

Table 1

Time - Hours	24	16	8	4	2	1
Temp - Deg. C.	22	25	30	35	45	60
Temp - Deg. F.	72	77	86	96	113	140

(n) Remove the clamp assembly and hot pressure plates.
(o) Cut off the thermocouple level with the panel surface, if you use it.
(p) Use abrasive paper, grade 80, to make the unwanted material rough.
1) Mix with the adjacent surfaces.
(q) Make sure the area is stable.
(r) Make sure the area is aerodynamically smooth.
(s) Remove all the masking tape from the intake to the IPC.
(t) Use a vibro-engraver to write the repair identification number, FRS.5202, adjacent to the part number on the LP compressor case.

Repair The Ice Impact Panel Dents With Blue Filler

TASK 72-34-10-308-032-R00

11. Repair the Ice Impact Panel Dents with Blue Filler

A. General

(1) This repair, FRS.5203, repairs the dents in the ice impact panel with blue filler.

(2) This procedure is used on the LP compressor cases with the part numbers that follows:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) In this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) Scales, 500 gm capacity, accurate to 1 gm

(2) Radiant heat source

C. Consumable Materials

(1) Adhesive tape
OMat No. 230

(2) Polyethene sheet
OMat No. 1249

(3) Lint free cloth - local resources

Repair The Ice Impact Panel Dents With Blue Filler

(4) B50009 - Acetone, OMat No. 150
(5) B50018 - Isopropyl alcohol, OMat No. 1/40
(6) B00713 - Degreaser, OMat No. 1/257
(7) Abrasive paper, garnet, grade 80
OMat No. 5/97
(8) Soft hair brush - local resources
(9) Distilled water - local resources
(10) Filler, Blue EC3524 B/A
OMat No. 874

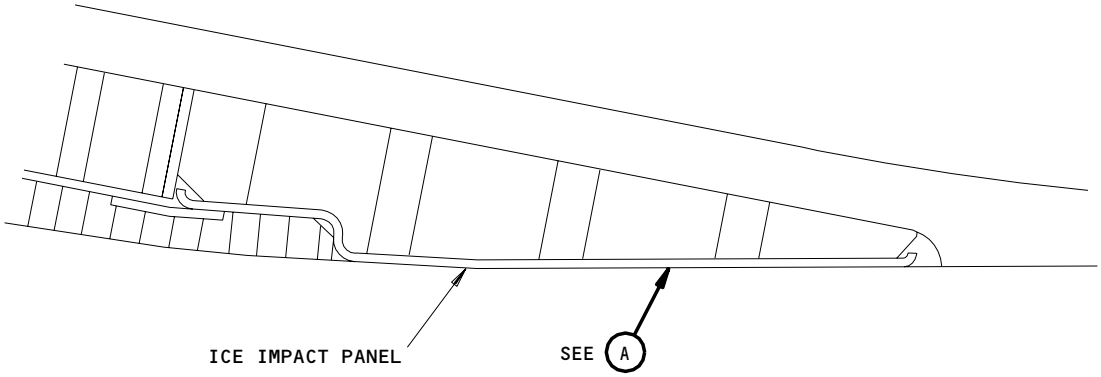
D. Access
(1) Location Zones
410 Power Plant
420 Power Plant

E. Repair the Dents in the Ice Impact Panel with Blue Filler

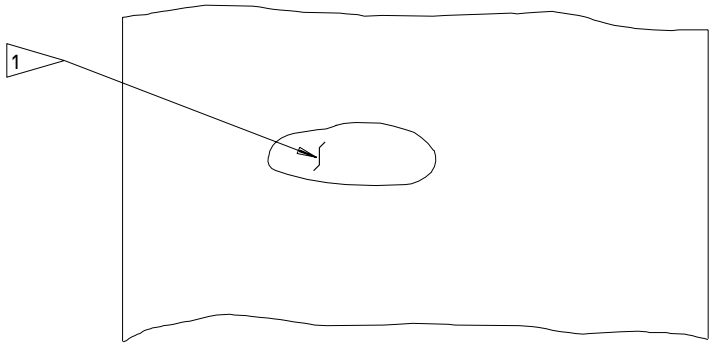
S 358-033-R00
(1) Prepare the damage area (Fig. 807)
(a) Put the adhesive tape and a polythene sheet on the intake of the IP compressor.
(b) Remove all unwanted material from the area that you repair.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area that you repair.



EXAMPLE VIEW THROUGH THE LP COMPRESSOR FRONT CASE



EXAMPLE OF THE DAMAGE AREA

A

1 FILL THE AREA THAT IS DAMAGED

66313

Ice Impact Panel Repair Area
Figure 807

Repair The Ice Impact Panel Dents With Blue Filler

2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(d) Let the repaired area dry fully before you continue.

(e) Use abrasive paper to make the surface of the infill panel rough.

(f) Make a clean, dry, lintfree cloth moist with degreasing fluid.
1) Use this cloth to clean the area that you repair.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.

(g) Use a hair brush that is soft and clean to apply a thin layer of distilled water over the area that is bonded.
1) Look at the distilled water layer, immediately.
a) Look for breaks in the continuity of the layer.
2) You must clean the surfaces again, if breaks occur in less than 30 seconds.
3) Remove the distilled water with clean acetone.
4) You must let the surface dry.

S 358-034-R00

(2) Repair the Damaged Area

WARNING: YOU MUST PUT PLASTIC GLOVES ON YOUR HANDS DURING THE PREPARATION AND APPLICATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. THIS FILLER CAN CAUSE SKIN IRRITATION.

(a) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

NOTE: This will give a pot life of approximately 1 hour at a room temperature of 72°F (22°C).

Repair The Ice Impact Panel Dents With Blue Filler

(b) You must use a palette knife to apply the filler.
1) Moisten the knife with cold water, if the filler sticks to the blade when you finally smooth it.

NOTE: Do not use too much water with the filler.

(c) You must not let the filler dry fully, make the filler smooth with a palette knife.
1) Make sure the filler is smooth with the adjacent surface of the LPC case.

NOTE: The time for the filler to dry is dependent on temperature (Ref Table 1). The minimum time it gets for the filler to dry is 30 minutes. The filler will not dry at temperatures below 54°F (12°C). The maximum temperature you can apply to the filler is 302°F (150°C). If heat causes the filler to burn, hand abrade the burned filler to remove it. Ref Table 1 for the dry time/temp relationship.

Table 1

Time - Hours	96	72	36	24	16	8	4	2	1	0.5
Temp.- Deg. C.	12	15	20	22	25	30	35	45	60	100
Deg. F.	54	59	68	72	77	86	95	113	140	212

(d) Use abrasive paper to make the repaired area smooth aerodynamically.

Repair The Ice Impact Panel Dents With Blue Filler

(e) Examine the repair area for smooth aerodynamics to make sure you did not make steps.
(f) Remove all masking tape from the IPC intake.
(g) Use a vibro-engraver to write the repair identification number, FRS.5203, adjacent to the part number on the LPC case.

Repair The Attrition Lining Below The GRP With Blue Filler

TASK 72-34-10-308-035-R00

12. Repair the Attrition Lining Below the GRP with Blue Filler

A. General

(1) This procedure, FRS.5258, refers to the repair of the attrition lining below the glass reinforced plastic (GRP) layer.

(2) The attrition lining below the glass reinforced plastic (GRP) layer with blue filler on the LP compressor cases with the part number that follows:

RB211-535E4 and E4-B Engines
UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-B003
UL37316 post RR SB 72-B185
UL31317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) This repair can be applied only once due to the area limitations.

(4) You can repair areas to a maximum of 25 square-inches (16,129 sq. mm) if that the total circumferential length is not more than 6.0 inches (152.4 mm).

(5) In this procedure the Low Pressure Compressor case is referred to as the LPC case.

(6) In this procedure the Glass Reinforced Plastic is referred to as the GRP layer.

(7) You must do Ref FRS.5201 with this repair.
FRS.5201 LP Compressor Case - Front - Repair the Attrition Lining with Blue Filler

B. Equipment

(1) Scales, 500 gm capacity, accurate to 1 gm

(2) Protective clothing (face mask and plastic gloves)

(3) Vacuum cleaner

(4) Palette knife

Repair The Attrition Lining Below The GRP With Blue Filler

(5) Spatula or small trowel
(6) Feeler gages

C. Consumable Materials
(1) B50009 - Acetone, OMat No. 150
(2) B50018 - Isopropyl alcohol, OMat No. 1/40
(3) B00713 - Degreaser, OMat No. 1/257
(4) Blue filler EC 3524
OMat No. 874
(5) Abrasive paper, grade 80
OMat No. 5/97
(6) Lint free cloth - local resources

D. References
(1) AMM 72-31-13/401, LP Compressor Rotor Blade
(2) AMM 72-34-10/801, LP Compressor Case

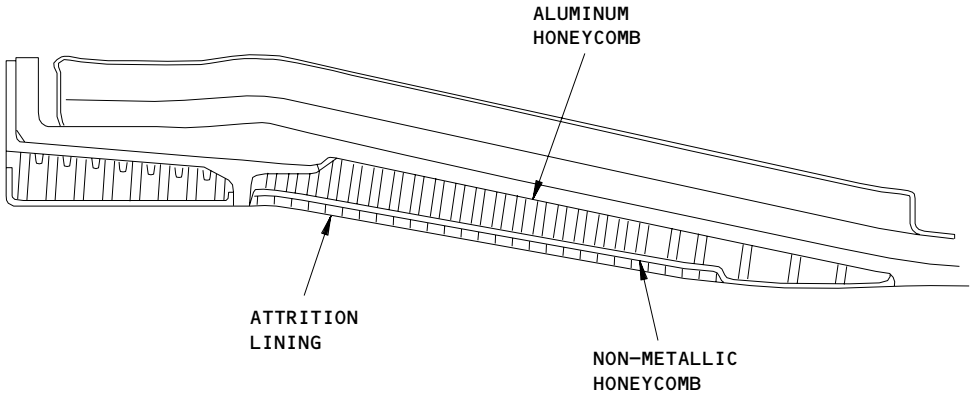
E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. Repair the Attrition Lining Below the GRP with Blue Filler

S 358-036-R00

(1) Remove the Damaged Attrition Lining (Fig. 808)
(a) Make sure the attrition lining is not loose.
1) Lightly push the attrition lining.
2) Lightly hit the attrition lining.
3) If a hollow sound occurs, the panel is not bonded correctly.
4) Remove the material that is not bonded correctly.
(b) You must remove the damaged unwanted material that is loose.
1) Remove the dust and unwanted material with a vacuum cleaner.
2) Make sure that the surface you repair does not have honeycomb or adhesive on it.
(c) Remove the fan blade for access, if it is necessary (AMM 72-31-13/401).

NOTE: You do not have to remove the fan blades for small repairs with blue filler. You must remove the fan blade for larger repairs.



EXAMPLE VIEW THROUGH THE LP COMPRESSOR FRONT CASE

NOTE: 1. REPLACE THE DAMAGED NON–METALLIC HONEYCOMBS.

2. YOU CAN REPLACE A MAXIMUM OF 25 SQUARE–INCHES (16,129 SQ. mm) OF ALUMINUM HONEYCOMB WITH BLUE FILLER.

66421

Repair Attrition Lining Below the GRP Layer with Blue Filler
Figure 808

Repair The Attrition Lining Below The GRP With Blue Filler

(d) Do a dimension check of the repair surface.

NOTE: The fan track can be repaired to its full depth. You can repair more areas, but the total area can not be more than 25 square-inches (16,129 sq. mm). The total circumference length must not be more than 6.0 inches (152.4 mm). If the repair area is more than these limits - Reject.

S 358-037-R00

(2) Repair the Damaged Area

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lintfree cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area to be repaired.
2) Let the repaired area dry.

(b) Do these steps to prepare the blue filler:

WARNING: MAKE SURE YOU WEAR PLASTIC GLOVES DURING THE PREPARATION AND APPLICATION. DO NOT LET THIS FILLER TOUCH YOUR SKIN. THIS FILLER CAN CAUSE SKIN IRRITATION.

1) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

Repair The Attrition Lining Below The GRP With Blue Filler

2) Apply the mixture in a layer 0.5 inch (12.7 mm) in depth, approximately, on a clean surface.
3) Let the exothermic heat release.

NOTE: This will give a pot life of approximately 1 hour at a room temperature of 72°F (22°C).

(c) Use a spatula or a small trowel to apply the blue filler to the damaged area.
1) Lightly fill the damaged area until you can make it smooth.
2) Make sure there is no air bubbles in the blue filler.
(d) Do the fan track repair, FRS.5201.
(e) Use a vibro-engraver to write the repair identification number, FRS.5258, adjacent to the part number on the fan case.

LPC Case Support Structure ('A' Frame) - Temporary Repair Of

TASK 72-34-10-308-038-R00

13. LPC Case Support Structure ('A' Frame) - Repair

A. General

(1) The repair to this procedure is FRS.5947.

(2) The procedure gives instructions to attach loose material on the 'A' frame support structure.

(3) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on surfaces that bond will result in poor adhesion and unsatisfactory bonding.

(4) The procedure is used on the LP compressor cases with the part numbers that follow:

UL15246
UL15248
FW12459 SB 72-C268
FW12460 SB 72-C628

(5) Clean cotton or polythene gloves must be worn by all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(6) For this procedure the Low Pressure Compressor Case is referred to as the LPC case.

B. Equipment

(1) Approved workshop tools
(2) Infra-red heat lamps (explosion proof)
(3) Scales, 500 gm capacity, accurate to 1 gm

C. Consumable Materials

(1) Garnet paper grid size 80 grade 0
OMat No. 5/97
(2) Garnet paper grid size 60 grade 1/2
OMat No. 5/98
(3) B50009 - Acetone, OMat No. 150
(4) B50018 - Isopropyl alcohol, OMat No. 1/40
(5) B00713 - Degreaser, OMat No. 1/257
(6) Resin, Araldite MY. 750
OMat No. 803
(7) Resin, Shell Epon 828
OMat No. 8/8
(8) Hardener, Araldite HY. 951
OMat No. 802
(9) Shell curing agent 'T'
OMat No. 8/9
(10) Fiberglass cloth
OMat No. 887

LPC Case Support Structure ('A' Frame) - Temporary Repair Of

D. Access
(1) Location Zones
410 Power Plant
420 Power Plant

E. Repair of the LPC Case Support Structure ('A' Frame)

S 358-039-R00
(1) Prepare the repair area.
(a) Remove the loose and damaged material from the repair area.

WARNING: DO NOT GET THE DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT LET THE DEGREASING FLUID TOUCH THE KEVLAR. THE KEVLAR WILL ABSORB THE FLUID.

(b) Make a clean, dry, lint-free cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area that you repair.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Do not let the liquid touch the cloth and return to the bulk liquid container.
6) Let the repair area dry fully.
(c) Make the area to be bonded rough, more than 1.0 inch (25.4 mm) larger than the repair area, with garnet paper.
(d) Make a clean, dry, lintfree cloth moist with degreasing fluid.
1) Use this cloth to clean the area that you repair.
2) You must discard the dirty cloth.
3) Use a clean cloth each time you clean a new area that you repair.
4) Contamination of the bulk liquid is not permitted.
5) Put the liquid on the cloth away from the container.
6) Let the repair area dry fully.

LPC Case Support Structure ('A' Frame) - Temporary Repair Of

S 358-040-R00

(2) Do the Repair.

(a) Prepare the resin.

1) Mix, by weight, 100 parts (pbw) Araldite MY. 750 resin with 10 pbw Araldite HY.951 hardener.
2) Alternatively, mix 100 pbw Shell Epon 828 with 20 pbw Shell curing agent 'T'.
3) Mix the resin until you get a constant mixture.
4) Apply the resin to all of the repair area with a brush.
5) Apply two layers of fiberglass cloth and resin to the repair area.
   a) Make sure that the fiberglass cloth is moist equally.
   b) Make sure that air bubbles are not between the layers.
   c) The last layer must have an overlap of the repair area by 1.0 inch (25.4 mm).
6) Let the repair dry at room temperature, minimum 64°F (18°C) for 24 hours.
   a) Alternatively, let the repair dry at room temperature for 2 hours.
   b) Use an infra-red heat lamp to dry the adhesive for 3 hours at 140°F (60°C).
7) Cut all loose fibers off.
8) Make a visual inspection of the repair to make sure that you bond it correctly.
9) Use a vibro-engraver to write the repair number, FRS.5947, adjacent to the part number on the 'A' frame.

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

TASK 72-34-10-308-041-R00

14. L.P. Compressor Front Case - Repair of Disconnected Front Acoustic Panel Perforate Skin

A. General

(1) The repair in this procedure is FRS.5965.

(2) The repair in this procedure gives the instructions for the repair of the front acoustic panels to the L.P. compressor case.

(3) This repair has two procedures (refer to inspection / check for repair limits).

(a) You must identify the area of perforated skin that does not connect.

1) Repair Procedure A

a) Do the repair to put an adhesive or an adhesive and filler into the drilled access holes.

2) Repair Procedure B

a) To do the repair, remove the perforate skin and fill the area.

(4) This repair is applicable to RB211-535E4 engines.

(a) This procedure can be used to repair the front acoustic panels with the part numbers that follow:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(b) When you use OMat 8/107 or 8/107c the polysulphide must be used before 30 minutes after it was mixed. This time decreases rapidly with ambient temperatures more than 25 degrees C. Refer to manufacturer's data. If this time is insufficient use OMat 8/107 A, B, D or OMat 8/136.

(c) OMat 8/107 or 8/136 are alternative polysulphide compounds. They can be used as adhesive and filler.

(d) OMat 8/107 or 8/136 are alternatives to OMat 8/52 adhesive throughout the repair scheme.

(e) OMat 8/74 blue filler is the recommended alternative. OMat 8/107 or 8/136 polysulphide may be used as a filler but do not use large volumes if possible.

B. Equipment

(1) Approved tools
(2) Portable drilling equipment
(3) Injection equipment
(4) Vibro-engraver equipment

C. Consumable Materials

(1) Cleaning Solvent
OMat No. 1/257
(2) EA934NA Adhesive, 2 pack
OMat No. 8/52
(3) Polyester tape, clear
OMat No. 2/88
(4) EC3524 Blue filler, 2 pack
OMat No. 874
(5) Garnet paper 80 Grit
OMat No. 5/97
(6) Garnet paper 60 Grit
Omat No. 5/98
(7) Sealant PR1436 G B1/2
OMat No. 8/107

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(8) Sealant PR1422 B2
OMat No. 8/136

NOTE: OMat 8/107 and 8/136 are alternatives to OMat 8/52. OMat 8/52 is recommended.

D. Access
(1) Location Zones
410 No. 1 Engine
420 No. 2 Engine

E. Repair Procedure A

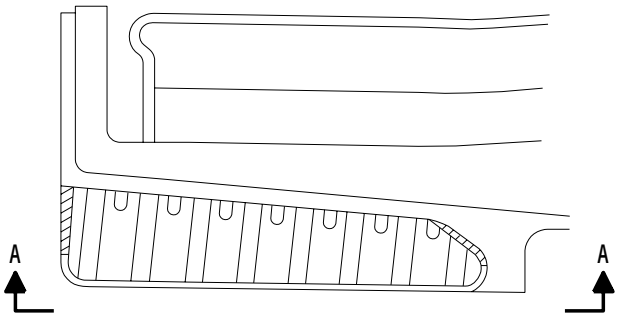
S 358-042-R00
(1) Drill a group of access holes in the perforated skin in the positions necessary to do the repair (Fig. 809).
(a) Use a coin to lightly hit the damaged area.
1) An area that does not connect will usually make a hollow sound.
2) Make a decision on how much of the panel does not connect.
(b) Use the portable drilling equipment to drill the access holes in the perforate skin.
1) If it is possible, drill the access holes in the center of the honeycomb cell.

NOTE: If you used the polysulphide you must drill each cell in the area that is not bonded.

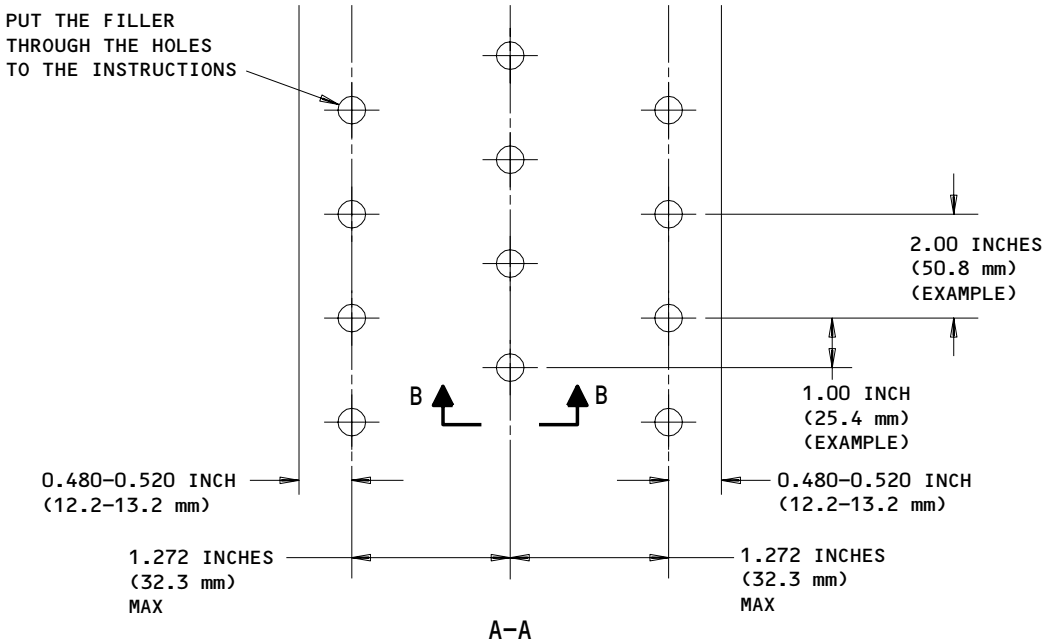
S 358-043-R00
(2) Prepare the repair area to apply the adhesive and filler.
(a) Use an air jet to remove all the unwanted material from the honeycomb cells.

NOTE: The air jet must not contain oil or water. You must apply the air jet at high pressure and it must be clean.

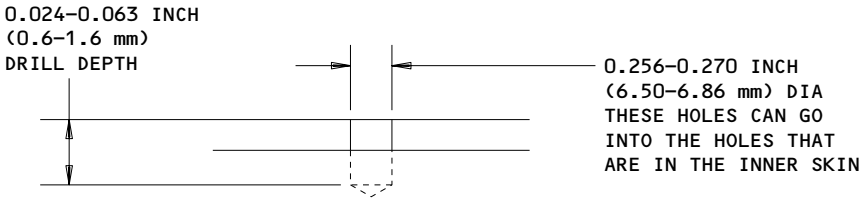
REPAIR METHOD 1:



SECTION THROUGH THE FRONT LP COMPRESSOR CASE



A–A



B–B

Repair Details to the Front Accoustic Panel Perforate Skin
Figure 809 (Sheet 1)

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(b) Use the cleaning Solvent OMat 1/257 to clean the repair area.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

1) Apply the Cleaning Solvent OMat 1/257 with a spray gun on the area that does not connect.

NOTE: Make sure you apply the cleaning solvent as a liquid. Do not mix the cleaning solvent into the air.

2) Carefully blow air into the repair area.
   a) Apply sufficient air pressure to move the degreasing fluid into all the isolated areas of the repair area.
   b) The air jet must not contain oil or water.
   c) You must apply the air jet at high pressure and it must be clean.

(c) Use an air jet to remove all the degreasing fluid from the honeycomb cells.
1) The air jet must not contain oil or water.
2) You must apply the air jet at high pressure and it must be clean.

CAUTION: YOU MUST PERMIT THE REPAIR AREA TO DRY AFTER THE PROCEDURE TO REMOVE THE GREASE IS COMPLETED. DO NOT PERMIT THE DEGREASING FLUID TO BECOME CAUGHT IN THE ISOLATED AREAS OF THE REPAIR AREA. THIS WILL CAUSE CORROSION AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Let the repair area dry for one hour.

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(e) Apply the polyester tape to the repair area.
1) Make sure the tape you apply extends for a minimum of 1.0 inch (25.4 mm) more than the outer most holes (Fig. 809).

NOTE: Do not use the tape on the repair area if you use the polysulphide material.

(f) Identify the initial positions of the access holes in the polyester tape.
1) Make the initial dimension of the access holes in the polyester tape at these positions.
2) Use the approved tools.

S 348-044-R00

CAUTION: USE PREPARATION PROCEDURE A ONLY WHEN YOU REPAIR THE THREE LOWER PANELS. USE PREPARATION PROCEDURE B ONLY WHEN YOU REPAIR THE UPPER PANELS. YOU CAN USE PREPARATION PROCEDURE C WHEN YOU REPAIR PANELS AT ALL POSITIONS, BUT A AND B ARE RECOMMENDED. IF YOU DO NOT OBEY THIS PRECAUTION DAMAGE TO THE EQUIPMENT CAN OCCUR.

(3) Prepare the adhesive and filler.

NOTE: There are three preparation procedures; A, B, and C.

Preparation procedure A is for the adhesive OMat 8/52. Use this procedure when you repair the three lower acoustic panels.

Preparation procedure B is for the mixture of adhesive OMat 8/52 and blue filler OMat 874. Use this procedure when you repair the upper panels.

Preparation procedure C is for the sealant OMat 8/107 or the compound OMat 8/136. These are polysulphide materials.
Use this procedure if:
- You cannot get the materials for preparation procedures A or B.
- The volume to be filled is small.

You can use this procedure at all panel positions.

If polysulphide materials were used to repair the panel before, you must use them again.

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(a) Preparation procedure A

WARNING: DO NOT LET THE ADHESIVE COMPOUND TOUCH YOUR SKIN. YOU MUST USE THE CORRECT HAND PROTECTION. AFTER YOU USE THE COMPOUND, CLEAN THE SKIN SATISFACTORILY WITH A CREAM THAT REMOVES THE RESIN. DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE YOU PREPARE OR USE THESE MATERIALS. YOU MUST PREPARE AND USE THE MATERIALS IN THE AREAS WITH GOOD AIR FLOW. IF YOU DO NOT OBEY THIS PRECAUTION, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

1) Prepare the adhesive.

NOTE: Hysol adhesive, EA934 NA, is a two part epoxy resin.

Part A - A grey paste which must be stirred in its container before it is weighed out.
Part B - An amber liquid is used as supplied.

a) Mix, by weight, 100 parts of grey paste and 33 parts of amber liquid until it becomes a homogenous paste.

NOTE: The adhesive has a pot life of approximately one hour at a room temperature of 72°F (22°C).

(b) Preparation procedure B

WARNING: DO NOT LET THE ADHESIVE OR BLUE FILLER COMPOUNDS GET ON YOUR SKIN. YOU MUST USE THE CORRECT HAND PROTECTION. AFTER YOU USE THE COMPOUND, CLEAN THE SKIN SATISFACTORILY WITH A CREAM THAT REMOVES THE RESIN. DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE YOU PREPARE OR USE THESE MATERIALS. YOU MUST PREPARE AND USE THE MATERIALS IN THE AREAS WITH GOOD AIR FLOW. IF YOU DO NOT OBEY THIS PRECAUTION, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

1) Get the two parts of the 0Mat 8/52 adhesive pack.

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

2) Get the two parts of the OMat 874 blue filler pack.
3) Prepare the adhesive as specified in the Preparation procedure A.
4) Prepare the blue filler.
   a) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

      NOTE: This will give a pot life of approximately 1 hour at a room temperature of 72°F (22°C).

5) Weigh an equal quantity of the adhesive and the blue filler compounds.
6) Mix the two compounds together.
   a) Make sure you mix the two compounds correctly.

(c) Preparation procedure C

WARNING: DO NOT LET THE REPAIR MATERIALS GET ON YOUR SKIN. YOU MUST USE THE CORRECT HAND PROTECTION. AFTER USE, WASH THE SKIN SATSIFACTORILY WITH A CREAM THAT REMOVES RESIN.

DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE THESE MATERIALS ARE PREPARED OR USED.

MATERIALS MUST BE PREPARED AND USED IN AREAS WITH GOOD AIR MOVEMENT.

IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURY CAN OCCUR.

1) Use the manufacturer's instructions to mix the sealant or compound.

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

S 348-045-R00

(4) Put the repair materials into the repair area.

(a) Put the repair materials into the prepared area.

1) Use the approved injection equipment.

2) Make sure you fill each honeycomb cell full.

3) If you use polysulphide materials, stop when it extrudes from the holes in the perforate.

(b) Remove the polyester tape.

(c) If you used the polysulphide material, make the repair area smooth before the material is cured.

S 348-046-R00

(5) Cure the repair materials.

CAUTION: YOU MUST MONITOR THE TEMPERATURE AT THE BOND LINE WITH THERMOCOUPLES WHEN YOU APPLY HEAT TO DECREASE THE CURE TIME. IF YOU DO NOT OBEY THIS PRECAUTION, DAMAGE TO THE PANELS CAN OCCUR.

(a) Cure the adhesive compound or a mixture of the adhesive and filler compounds as specified in Tables 1 and 2:

NOTE: The minimum cure time for the adhesive is one hour. The minimum cure time for the filler is 30 minutes. The adhesive will not cure at temperatures below 12°C (54°F). The filler will not cure at temperatures below 12°C (54°F). The maximum temperature you can apply to the filler is 100°C (212°F).

Table 1 (OMat 8/52) - Cure Times - EA934 NA Adhesives

Time - Hours	168	96	40	24	16	8	4	2	1
Temp.- Deg. C.	12	15	20	22	25	30	35	45	60
Deg. F.	54	59	68	72	77	86	96	113	140

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

Table 2 (OMat 874) Cure times - EC3524 Blue filler										
Time - Hours	96	72	36	24	16	8	4	2	1	0.5
Temp.- Deg. C.	12	15	20	22	25	30	35	45	60	100
Deg. F.	54	59	68	72	77	86	95	113	140	212

(b) Cure the polysulphide sealant or polysulphide compound as specified in Tables 1 and 2.

NOTE: The minimum cure time for the polysulphide sealant is one hour. The minimum cure time for the compound is 2.25 hours.

Table 1 (OMat 8/107) - Cure Times - PR1436 G B1/2 Sealant						
Time - Hours	30	15	7.5	4	2	1
Temp - Deg. C.	25	30	35	40	45	50
Temp - Deg. F.	77	86	95	104	113	122

Table 2 (OMat 8/136) - Cure Times - PR1422B2 Compound *[1] *[2]						
Time - Hours	72	36	18	9	4.5	2.25
Temp - Deg. C.	25	30	35	40	45	50
Temp - Deg. F.	77	86	95	104	113	122

*[1] Let the polysulphide material become dry to the touch before you heat it.

*[2] Do not heat the polysulphide material to more than 50 degrees C (122 degrees F).

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

S 358-047-R00

(6) Make the repair area smooth.
(Not applicable to polysulphide material.)
(a) Make sure the repair area is smooth to the contour of the panel.
1) Use 60 or 80 grit garnet paper.

S 218-048-R00

(7) Examine the bond.
(a) Use a coin to lightly hit the repaired area.
1) An area of disconnected panel will usually make a hollow sound.
2) If you identify a disconnected area which has aready been repaired to procedure A, refer to Repair Procedure B.
3) If the repair is satisfactory use a vibro-engraver to write the repair identification number, FRS.5965, adjacent to the part number on the LPC case.

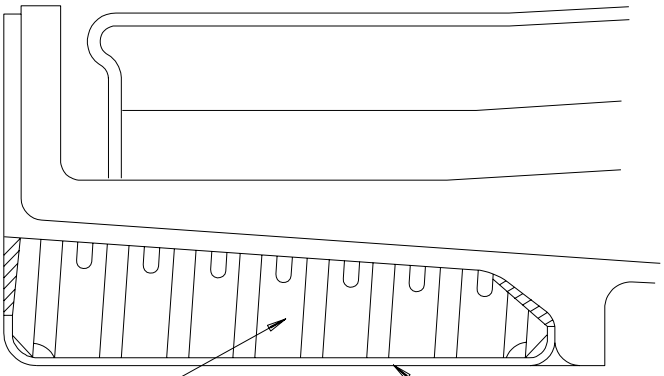
F. Repair Procedure B

S 358-049-R00

(1) For pre SB72-9562 panels only, prepare the damaged area to apply the repair material.
(a) Carefully remove the full length of the perforate skin, remove honeycomb thatis not bonded and unwanted adhesive.
(b) Use the approved tools to remove all the loose material.
(c) For post SB72-9562 panels and subsequuent, carefully remove damaged skin or perforate skin that is not bonded and loose honeycomb or unwanted adhesive.

NOTE: It is not necessary to remove perforate skin which has a satisfactory bond.

REPAIR METHOD 2



SECTION THROUGH THE FRONT LP COMPRESSOR CASE

Repair Details to the Front Accoustic Panel Perforate Skin
Figure 809 (Sheet 2)

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(d) Use the cleaning solvent OMat 1/257 to clean the repair area.

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

1) Apply the cleaning solvent OMat 1/257 with a spray gun on the repair area.

NOTE: Make sure you apply the trichloroethane as a liquid. Do not mix the cleaning solvent nto the air.

2) Carefully blow air on the repair area.
   a) Apply a sufficient air pressure to move the degreasing fluid into all the isolated areas of the repair area.
   b) The air jet must not contain oil or water.
   c) You must apply the air jet at high pressure and it must be clean.

(e) Use an air jet to remove all the degreasing fluid from the honeycomb cells.
1) The air jet must not contain oil or water.
2) You must apply the air jet at high pressure and it must be clean.

CAUTION: YOU MUST PERMIT THE REPAIR AREA TO DRY AFTER THE PROCEDURE TO REMOVE THE GREASE IS COMPLETED. DO NOT PERMIT THE DEGREASING FLUID TO BECOME CAUGHT IN THE ISOLATED AREAS OF THE REPAIR AREA. THIS WILL CAUSE CORROSION AND DAMAGE TO EQUIPMENT CAN OCCUR.

(f) Let the repair area dry for one hour before you apply the filler.

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

S 348-050-R00

WARNING: DO NOT LET THE REPAIR MATERIAL GET ON YOUR SKIN. YOU MUST USE THE CORRECT HAND PROTECTION. AFTER USE WASH THE SKIN SATISFACTORILY WITH A CREAM THAT REMOVES RESIN.

DO NOT SMOKE OR EAT AT THE WORK LOCATION WHERE THESE MATERIALS ARE PREPARED OR USED.

MATERIALS MUST BE PREPARED AND USED IN AREAS WITH GOOD AIR MOVEMENT.

IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURY CAN OCCUR.

(2) Apply the repair material to the repair area:

NOTE: OMat 874 blue filler, OMat 8/107 sealant and OMat 8/136 compound are alternatives you can use in this procedure.

NOTE: OMat 874 blue filler is recommended. Do not use OMat 8/107 or 8/136 for large repairs if possible.

(a) Prepare the OMat 874 blue filler (recommended material).
1) Get the blue filler pack.
2) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together until a constant blue color is without streaks.

NOTE: This filler has a pot life of approximately one hour at a room temperature of 72°F (22°C).

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(b) Mix the OMat 8/107 or 8/136 polysulphide material (alternative).
  1) Use the manufacturer's instructions to mix the sealant or compound.

(c) Fill the honeycomb area with repair material
  1) Use a spatula or pallet knife to apply the repair material to the repair area.
    a) After you apply the last of the repair material , its surface must be immediately above the height of the honeycomb.

      NOTE: Apply the blue filler in more than one layer, approximately 0.500 inch (12.7 mm) in depth on a clean surface. If too much blue filler is applied at once an exothermic reaction will occur. Moisten the knife with cold water, if the filler sticks to the blade. Do not use too much water. Too much water will cause a reaction with the filler.

  2) If you used the polysulphide material, make the repair area smooth before the material cures.
  3) If you used the blue filler, use your fingers to feel if the filler is dry.
    a) Use the blade of the application tool to remove the unwanted filler.

(d) Cure the repair material.
  1) Cure the blue filler compound as specified in Table 1.

Table 1 (OMat 874) - Cure times - EC3524 Blue filler

Time - Hours	96	72	36	24	16	8	4	2	1	0.5
Temp.- Deg. C.	12	15	20	22	25	30	35	45	60	100
Deg. F.	54	59	68	72	77	86	95	113	140	212

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

2) Cure the polysulphide sealant or polysulphide compound as specified in Tables 1 and 2.

NOTE: The minimum cure time for the polysulphide sealant is one hour. The minimum cure time for the compound is 2.25 hours.

Table 1 (OMat 8/107) - Cure Times - PR1436 G B1/2 Sealant						
Time - Hours	30	15	7.5	4	2	1
Temp - Deg. C.	25	30	35	40	45	50
Temp - Deg. F.	77	86	95	104	113	122

Table 2 (OMat 8/136) - Cure Times - PR1422B2 Compound *[1] *[2]						
Time - Hours	72	36	18	9	4.5	2.25
Temp - Deg. C.	25	30	35	40	45	50
Temp - Deg. F.	77	86	95	104	113	122

*[1] Let the polysulphide material become dry to the touch before you heat it.
*[2] Do not heat the polysulphide material to more than 50 degrees C (122 degrees F).

(e) Use 60 or 80 grit garnet paper to make the blue filler smooth to the contour of the initial skin.
(Not applicable to polysulphide materials.)

L.P. Compressor Front Case - Repair Of Disconnected Front Acoustic Panel Perforate Skin

(f) Make a visual inspection of the repaired area.
1) Make sure the repair material has the same contour as the perforate skin.

(g) Use a vibro-engraver to write the repair identification number, FRS.5965, adjacent to the part number on the LPC case.

L.P. Compressor Front Case - Repair The Teflon Sleeve With A Teflon Insert

TASK 72-34-10-308-051-R00

15. L.P. Compressor Front Case - Repair the Teflon Sleeve with a Teflon Insert

A. General

(1) This procedure, FRS.5972, refers to the repair of damaged teflon sleeves.

(2) A teflon insert is used to repair the damaged teflon sleeve on L.P. Compressor cases with the part numbers that follow:

RB211-535E4 and E4-B Engines

UL16446
UL50007 post RR SB 72-7832
UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL31314 post RR SB 72-9188
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-B185
UL38887 post RR SB 72-B961
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

(3) This repair is a temporary repair.

(4) The teflon sleeve must be replaced when an overhaul to the L.P. Compressor case is done.

(5) Use this repair procedure when the damaged area is too large to be repaired by FRS.5193.

(6) You must remove the H.P. gearbox units, accessory mount straps and electrical harnesses, when it is necessary, to do the repair.

(7) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on surfaces that bond will result in poor adhesion and unsatisfactory bonding.

(8) Clean cotton or polythene gloves must be worn by all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

L.P. Compressor Front Case - Repair The Teflon Sleeve With A Teflon Insert

(9) In this procedure the L.P. Compressor is referred to as the LPC.

B. Equipment
(1) Hot air gun (3.0 Kilowatts)

C. Consumable Materials
(1) B50009 - Acetone, OMat No. 150
(2) B50018 - Isopropyl alcohol, OMat No. 1/40
(3) B00713 - Degreaser, OMat No. 1/257
(4) Teflon adhesive tape, 2.00 inches (50.80 mm) wide
OMat No. 2/106

D. Parts
(1) UL16370 Protective Sleeve

E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. Repair the Teflon Sleeve

S 948-052-R00
(1) Remove all the repair material that remains from the damaged area and the repairs that were done before.

S 118-053-R00
(2) Clean the teflon sleeve.

L.P. Compressor Front Case - Repair The Teflon Sleeve With A Teflon Insert

WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM DEGREASING FLUID. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Make a clean, dry, lint-free cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
  1) Use this cloth to clean the teflon sleeve and the area of the cases that you repair.
  2) You must discard the dirty cloth.
  3) Use a clean cloth each time you clean a new area that you repair.
  4) Contamination of the bulk liquid is not permitted.
  5) Do not let the liquid touch the cloth and return to the bulk liquid container.

S 348-054-R00

(3) Remove the damaged area of the teflon sleeve.
  (a) Cut the teflon sleeve to remove the damaged area.
    1) After you have removed the damaged area, the corners must have a minimum radius of 1.0 inch (25.4 mm).
    2) The axial length of the damage area must be less than or equal to 15.0 inches (381.0 mm).

S 348-055-R00

(4) Make a teflon insert.
  (a) Use the teflon sleeve (UL16370) to make a teflon insert.
    1) Make sure the contour of the teflon insert is the same as the sleeve.
    2) The outer edge of the teflon insert must make an overlap of not less than 1.0 inch (25.4 mm) to the edge of the damaged area.

S 348-056-R00

(5) Install the teflon insert.
  (a) Put the teflon insert in the correct position on the teflon sleeve.
    1) Make sure the outer edges of the insert are put below the teflon sleeve.
  (b) Use the PTFE tape to temporarily hold the teflon insert in the correct position.

L.P. Compressor Front Case - Repair The Teflon Sleeve With A Teflon Insert

(c) Be careful when you apply heat to the repair area.
1) Apply sufficient heat to the teflon insert to make it smaller.
2) Use a hot air gun.
a) Hold the hot air gun 3.0 - 4.0 inches from the surface of the teflon sleeeve.
b) When you apply heat to the surface of the sleeve the maximum surface temperature is 338 °F (170 °C).

S 118-057-R00

(6) Clean the repair area and the sleeve surface.
(a) Make a clean, dry, lint-free cloth moist with degreasing fluid (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the repair area and the surface of the teflon sleeve that you repair.
2) Make the surfaces dry before the fluid becomes a gas.

NOTE: Do not continue before the surfaces are dry.

3) You must discard the dirty cloth.
4) Use a clean cloth each time you clean a new area that you repair.
5) Contamination of the bulk liquid is not permitted.
6) Do not let the liquid touch the cloth and return to the bulk liquid container.

S 348-058-R00

(7) Apply tape to the repair area.
(a) Apply the PTFE tape to the repaired area.
1) Make sure the tape is on all the repaired area.
a) Make sure the tape you applied to the repaired area makes an overlap of approximately 1.0 inch (25.4 mm) to the teflon sleeve.

S 938-059-R00

(8) Use a vibro-engraver to write the repair identification number, FRS.5972, adjacent to the part number on the LPC case.

NOTE: Alternatively, FRS.5972 can be marked on the LPC case with a suitable permanent ink.

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

TASK 72-34-10-308-060-R00

16. LPC Case, Front - Replacement of Mechanically Fastened Acoustic Panels

A. General

(1) The repair in this procedure is FRS.6588.

(2) The procedure gives the instructions to replace the front accoustic panels of the LP compressor case.

(3) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on surfaces that bond will result in poor adhesion and unsatisfactory bonding.

(4) Clean cotton or polythene gloves must be worn by all persons that touch the parts to be bonded.

NOTE: Parts must not be touched on the prepared surfaces.

(5) This repair can be used for the LPC cases with the part numbers that follow:

RB211-535E4 and E4-B Engines

UL32667 post RR SB 72-9562
UL37154 post RR SB 72-B003
UL37316 post RR SB 72-B185
UL37317 post RR SB 72-9188
UL37823 post RR SB 72-B961
UL37854 post RR SB 72-B961
UL38887 post RR SB 72-B961
FW17008 post RR SB 72-C942
FW17038 post RR SB 72-C942
FW11645 post RR SB 72-C942
FW11646 post RR SB 72-C942
FW11647 post RR SB 72-C942
FW11648 post RR SB 72-C942
FW11649 post RR SB 72-C942
FW11650 post RR SB 72-C942
FW11651 post RR SB 72-C942
FW11652 post RR SB 72-C942

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

(6) For this procedure the Low Pressure Compressor Case is referred to as the LPC case.
(7) This repair is to be used for post RR SB 72-9562 and 72-B003 LPC cases. For pre RR SB 72-9562 LPC cases use FRS.5198.

B. Equipment
(1) Approved workshop tools
(2) Degreasing Equipment
(3) Non Metallic Scraper
(4) Portable Abrasive Blasting Equipment
(5) Spatula Comb
(6) Vacuum Cleaner
(7) Vibro-engraving Equipment
(8) Radiant Heat Source
(9) Clamp Plate - Rolls-Royce, MH16185, Qty. 8
(10) Clamp - Rolls-Royce, MH16186, Qty. 32
(11) Pressure Pad - Rolls-Royce, MH16187, Qty. 12
(12) Thermometer

C. Consumable Materials
(1) Masking tape
OMat No. 230
(2) Adhesive tape
OMat No. 283
(3) Polyethene sheet
OMat No. 1249
(4) Lint free cloth - local resources
(5) B50009 - Acetone, OMat No. 150
(6) B50018 - Isopropyl alcohol, OMat No. 1/40
(7) B00713 - Degreaser, OMat No. 1/257
(8) Garnet paper
OMat No. 5/93

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

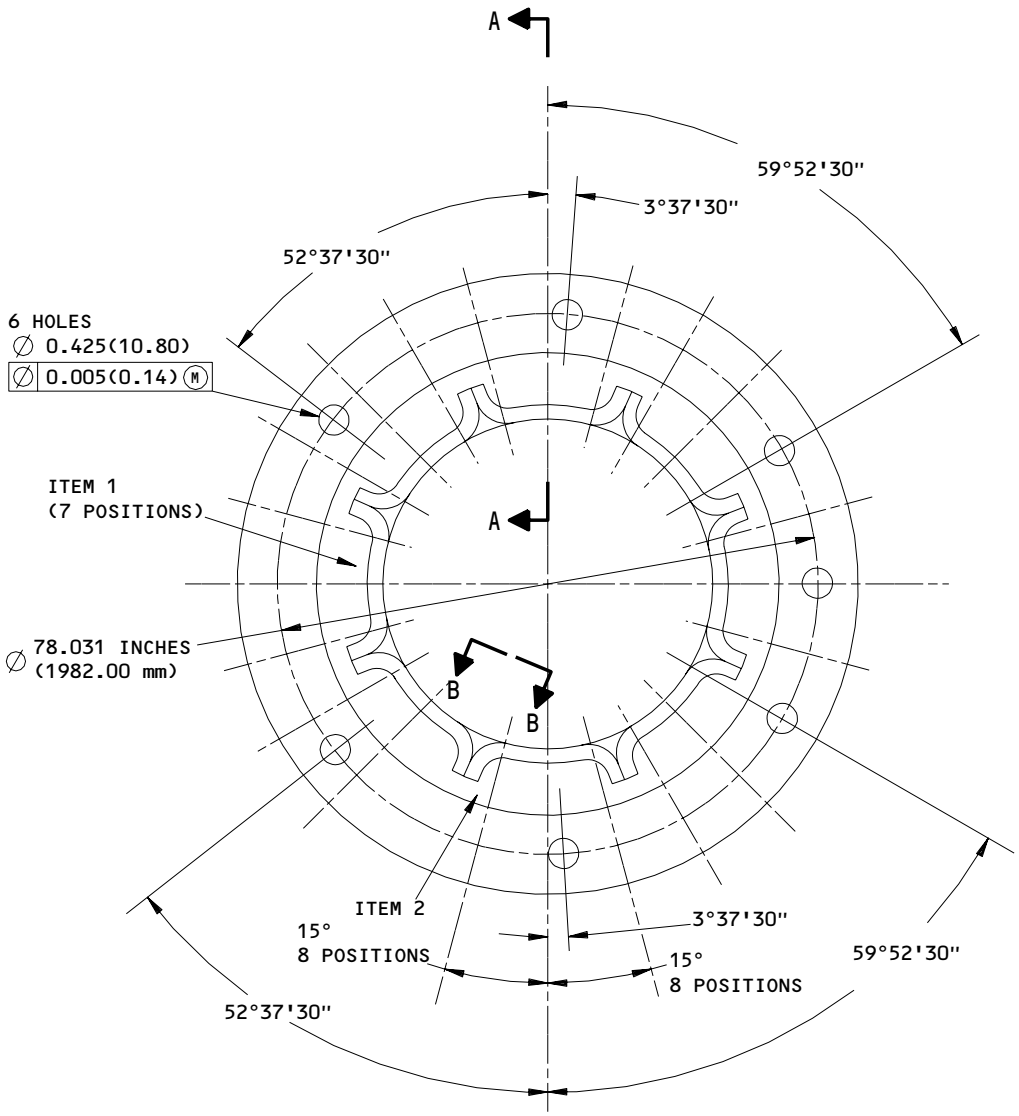
(9) Garnet Paper
OMat No. 5/98
(10) Sealant - Polysulphide (two pack),
OMat No. 8/107
(11) Compound - Polysulphide,
OMat No. 8/136
(12) Compound - Release,
OMat No. 8/32

D. Parts
(1) Cellular Core Segment - front, UL37155 (Item 1)
(2) Cellular Core Segment - Front Lower, UL37156 (Item 2)
(3) Bolt, AS20909 (Item 3)
(4) Washer, LK69359 (Item 4)
(5) Nut - Self Locking, AS20624 (Item 5)

E. Access
(1) Location Zones
410 Power Plant
420 Power Plant

F. LPC Case, Front - Replacement of the Front Acoustic Panels

S 358-061-R00
(1) Remove the Damaged Material (Fig. 810)
(a) Seal the IPC intake with polythene sheet and masking tape.
(b) Remove the filler from the bolt head/nut recesses using workshop tools. Remove any debris with a vacuum cleaner.
(c) Remove all bolts or nuts and washers holding the panel to the case as needed.
(d) Remove the acoustic panels that are damaged. Take care not to damage the aluminum case.
(e) ENGINES POST RR SB 72-9562;
Insert plugs into the open holes to stop debris from collecting.

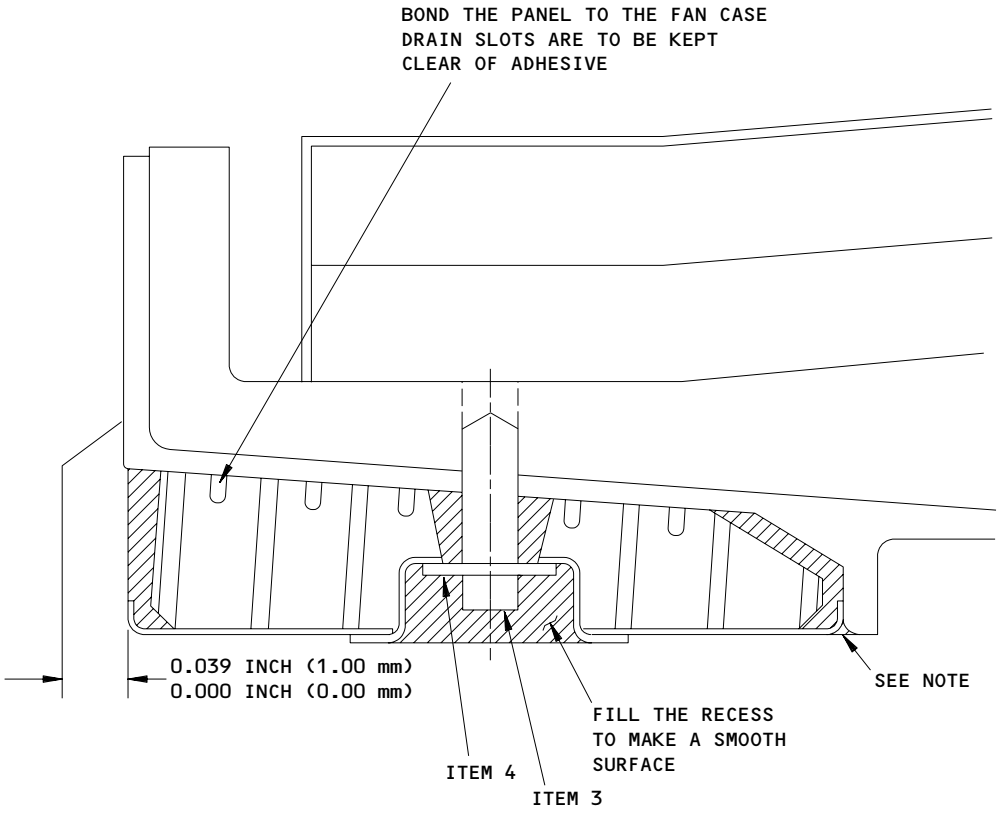


VIEW ON THE FRONT FLANGE OF
L.P. COMPRESSOR FRONT CASE

NOTES: FILL WITH ADHESIVE TO INSTRUCTIONS
TO MAKE A SMOOTH SURFACE
ALL BONDS ARE GROUP 2
DIMENSIONS ARE IN INCHES (MILLIMETERS)
GEOMETRIC SYMBOLS ARE GIVEN IN THE ISO MANUAL (R1101-1969)

DE000C4762

Replace the Mechanically Fastened Acoustic Panel
Figure 810 (Sheet 1)

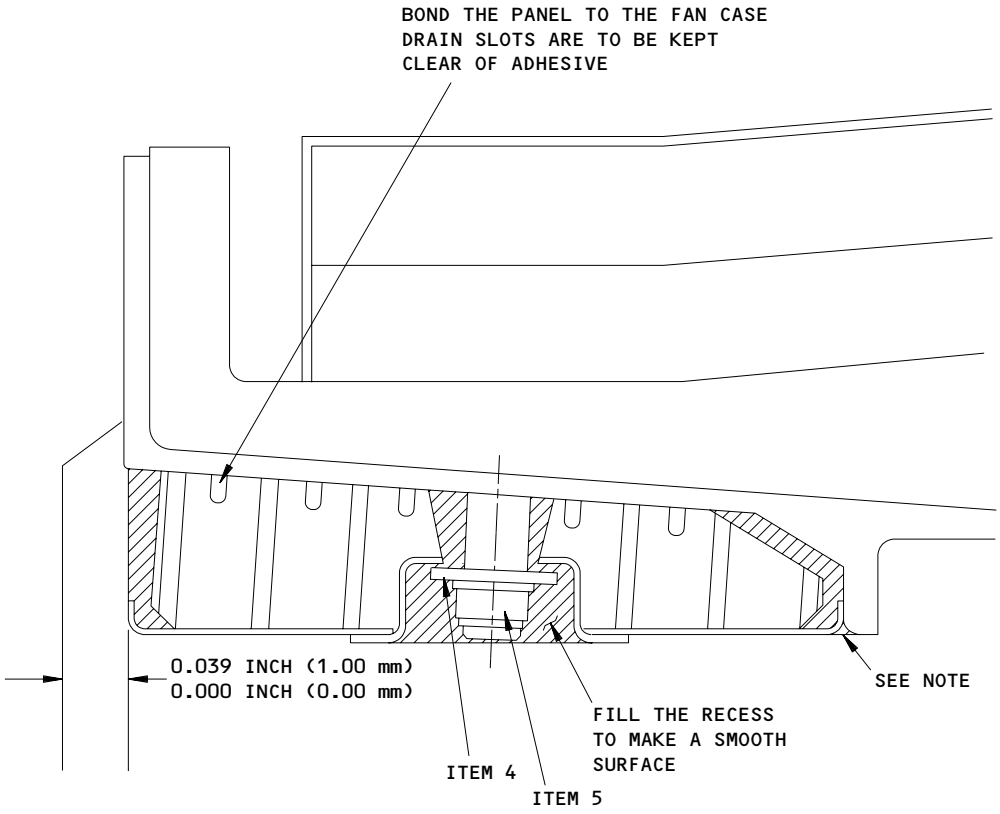


EXAMPLE 24 LOCATIONS
(3 LOCATION PER PANEL)
A-A

NOTES: FILL WITH ADHESIVE TO INSTRUCTIONS
TO MAKE A SMOOTH SURFACE
ALL BONDS ARE GROUP 2
DIMENSIONS ARE IN INCHES (MILLIMETERS)

DE000C4764

Replace the Mechanically Fastened Acoustic Panel
Figure 810 (Sheet 2)

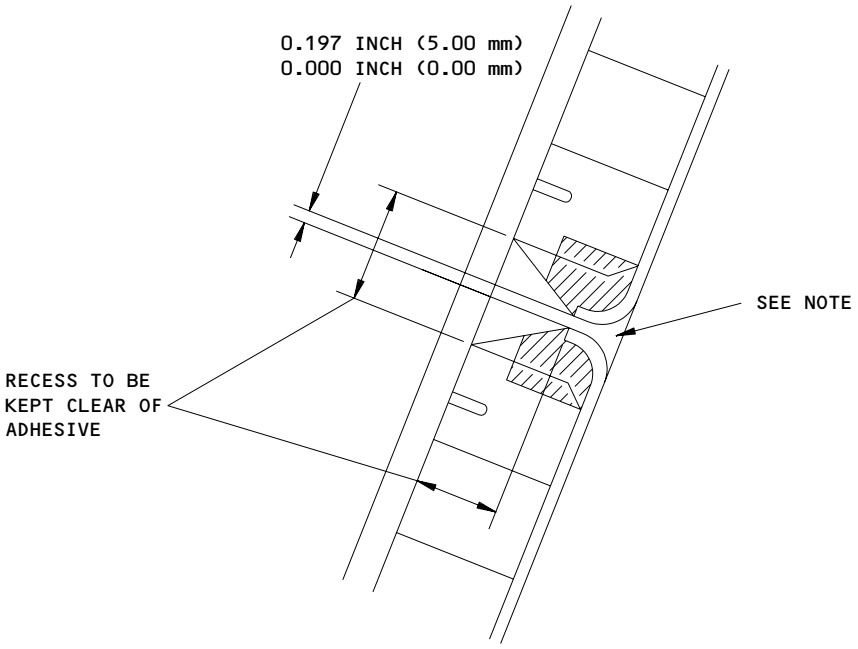


EXAMPLE 24 LOCATIONS
(3 LOCATIONS PER PANEL)
A-A

NOTES: FILL WITH ADHESIVE TO INSTRUCTIONS
TO MAKE A SMOOTH SURFACE
ALL BONDS ARE GROUP 2
DIMENSIONS ARE IN INCHES (MILLIMETERS)

DE000C4765

Replace the Mechanically Fastened Acoustic Panel
Figure 810 (sheet 3)

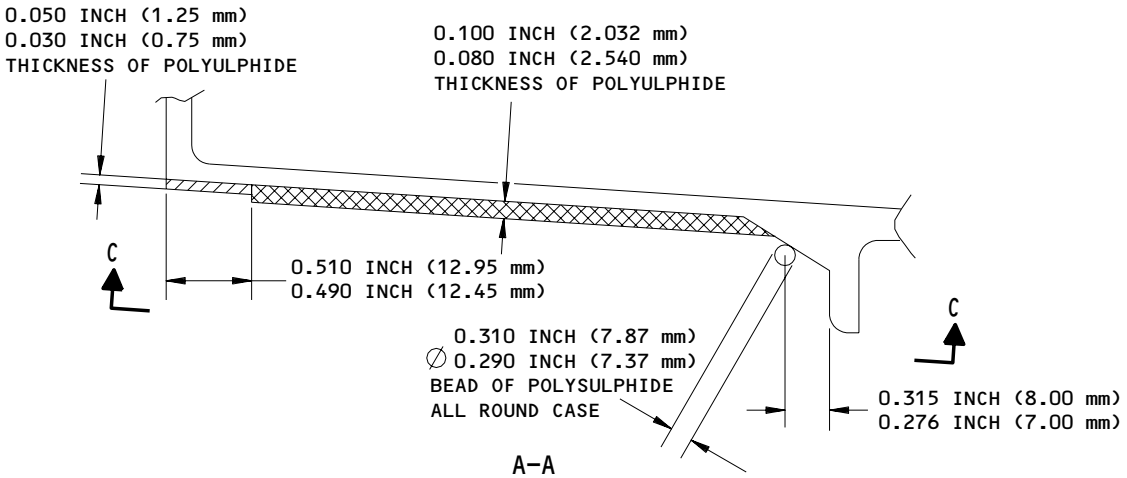


B–B
(8 LOCATIONS)

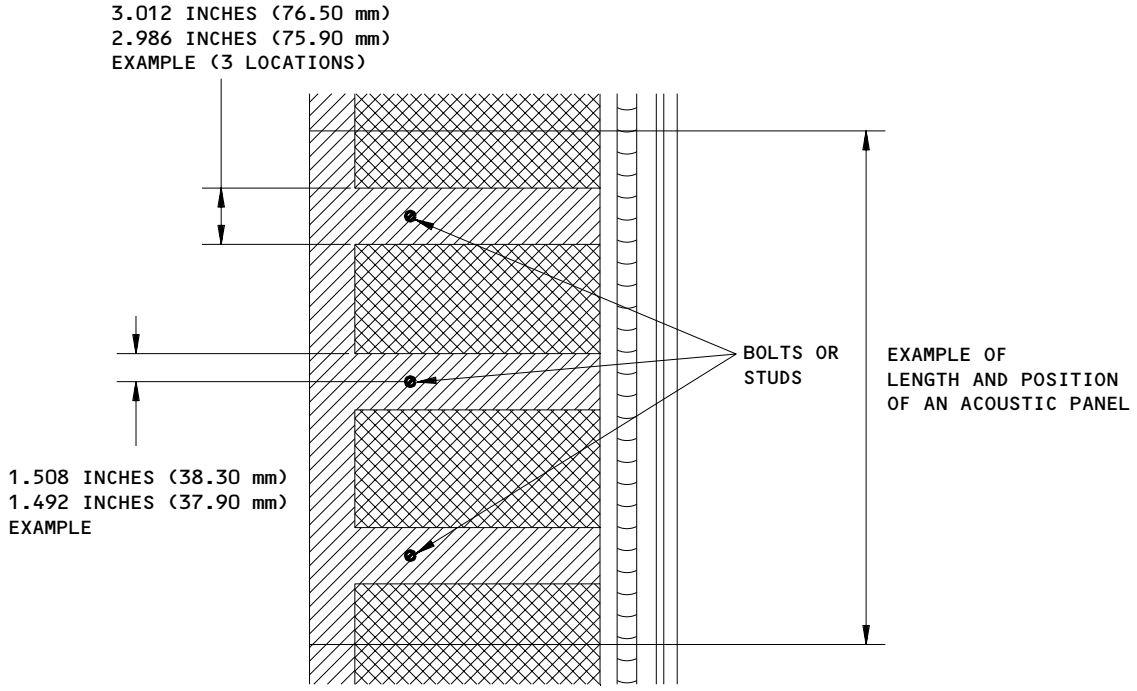
NOTES: FILL WITH ADHESIVE TO INSTRUCTIONS
TO MAKE A SMOOTH SURFACE
ALL BONDS ARE GROUP 2
DIMENSIONS ARE IN INCH (MILLIMETERS)

DE000C4767

Replace the Mechanically Fastened Acoustic Panel
Figure 810 (Sheet 4)



A–A
SHOWING FAN CASE ONLY



POLYSULPHIDE APPLICATION DETAILS
C–C

DER0000655

Replace the Mechanically Fastened Acoustic Panel
Figure 810 (Sheet 5)

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

(f) Make sure that the adjacent acoustic panels are correctly attached.

WARNING: YOU MUST USE A BREATHING MASK DURING THIS INITIAL PREPARATION. BREATHING THE DUST CAN DAMAGE YOUR LUNGS.

CAUTION: DO NOT SCRATCH THE LPC WITH A CHISEL OR SCRAPER. THE MATERIAL IS SOFT ALUMINUM AND THE LPC CAN BECOME UNSERVICEABLE.

(g) Remove all of the bond agent using a non metallic scraper. An alternative method is to use portable abrasive blasting equipment after masking the surrounding area.
(h) Remove all unwanted material from the repair area with a vacuum cleaner.
(i) Inspect the LPC for damage. Reject the LPC if damage is found.

S 358-062-R00

(2) Prepare the repair area (Fig. 810).
(a) Use the garnet paper or abrasive blast at 20 p.s.i. (140 kPa) to make the repair area rough.

WARNING: DO NOT GET THE DEGREASING AGENT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING AGENT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREASING AGENT. KEEP THE DEGREASING AGENT AWAY FROM SPARKS, FLAMES AND HEAT. DEGREASING AGENTS ARE A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Make a clean, dry, lint-free cloth moist with degreasing agent (Acetone, OMat No. 150 or Isopropyl Alcohol, OMat No. 1/40 or Degreaser, OMat No. 1/257).
1) Use this cloth to clean the area that you repair.

2) You must discard the dirty cloth.

NOTE: It is important that a clean, lint free cloth is used for each serarate degreasing operation and that the cloth is moistened by means of a dispenser. This prevents contamination of the original container of degreasing agent.

(c) Let the repaired area dry fully.
(d) Use a hair brush that is soft and clean to apply a thin layer of distilled water over the area to be bonded.
1) Look at the layer of distilled water, immediately (less than 30 seconds).

NOTE: Look for breaks in the continuity of the layer.

2) If breaks occur in less than 30 seconds, you must clean the surfaces again until you see a continuous layer.
3) Use a clean, lintfree cloth soaked in clean acetone to remove the distilled water.
4) Let the surfaces dry.

NOTE: Do not continue before the surfaces are dry.

(e) Use the degreasing agent to clean the contact area of the replacement panel or panels (Item 1 or Item 2).

NOTE: Do not touch the repair area or the replacement panel after cleaning.

(f) Remove the plugs from the bolt holes if installed earlier.

S 358-063-R00
(3) Bond the Acoustic Panel to the Compressor Case (Fig. 810)

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

WARNING: USE EPOXY COMPOUNDS IN THE WORK AREAS WHICH HAVE GOOD VENTILLATION. DO NOT LET THE EPOXY COMPOUNDS TOUCH YOUR SKIN. YOU CAN CAUSE INJURY TO PERSONS.

(a) Prepare the adhesive.
1) Mix the polysulphide OMat No. 8/107 or 8/136 to the manufacturers instructions.

NOTE: OMat No. 8/107 suffix 1/2 polysulphide has a 30 minute working life at 25 degrees centigrade. Each 5 degree increase in temperature halves the working life.

(b) Use workshop tools and a spatula comb to apply the adhesive to areas where the unfilled honeycomb of the panel is installed. Do not apply a layer more than 0.080 in. (2.032 mm) to 0.100 in. (2.54 mm) (Fig. 810).
(c) Apply adhesive around the front of the panel and the bolt hole/stud position where the honeycomb is filled. Do not apply a layer more than 0.030 in. (0.75 mm) to 0.050 in. (1.25 mm) (Fig. 810).
(d) Apply adhesive to the short edges of the panel. Do not apply a layer more than 0.080 in (2.032 mm) to 0.100 in. (2.54 mm) (Fig. 810).
(e) Apply a 0.300 in.(7.62 mm) diameter bead to the ramp at the rear of the repair area (Fig. 810).

S 428-064-R00
(4) Put the acoustic panel on the compressor case (Fig. 810).
(a) ENGINES POST RR SB 72-9562;
Install the replacement panels over the threaded bolt holes.
(b) ENGINES POST RR SB 72-B003;
Install the replacement panels over the studs on the LPC.
(c) Press the panel onto the LPC by hand and make sure that all faces of the honeycomb are wetted with adhesive by moving the panel in small circular motions.

NOTE: It is important to make sure that all of the faces of the honeycomb cell walls are wetted with polysulphide. This will make sure that the panels will bond to the LPC correctly.

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

(d) Do not allow the panels to spring up before the clamps are fitted. Use hand pressure or transparent tape to temporarily secure them.

(e) ENGINES POST RR SB 72-B003;
Fill the three conical recesses of each panel installed with OMat No. 8/107 or 8/136 (Fig. 810).
1) Install the washer and nuts onto the studs. Beginning with the center stud, torque the nuts to 30 pound-inches (3.39 Newton-meters).

(f) ENGINES POST RR SB 72-9562;
Screw the bolts in the threads for two turns and fill the conical recesses under the washers (Fig. 810).
1) Beginning with the center bolt, torque the bolts to 30 pound-inches (3.39 Newton-meters).

(g) Coat any surfaces of the clamping tools that may come in contact with the adhesive in Release Agent, Omat No. 8/32.

(h) Mechanically clamp the the panels to the LPC. Make sure the full length of the panel is in contact with the LPC. Locally manufactured clamps may be used.

(i) Adjust the clamp plate to clamp the outboard of the outer bolt/stud in each panel and between each outer bolt/stud and the center bolt/stud.

NOTE: Do not overload the clamps. Only use enough pressure to ensure the acoustic panel touches the LPC over its full length.

(j) Refer to the manufacturers instructions for the cure times of the adhesive.

NOTE: To reduce the cure time a local radiant heat source may be used if the adhesive is not tacky. Use a thermometer to stop the cure temperature from exceeding 50 degrees centigrade. Do not let the heat source of hot surfaces contact the polythene sheet used to seal the IP compressor intake.

(k) Remove the clamping tools after the adhesive has cured.

(l) Lightly tap the new panel with a coin to test the bond. Reject the bond if a distinctive hollow sound is heard.

S 428-065-R00

(5) Restore the airflow surface (Fig. 810)

(a) Fill the bolt head/nut recesses and gaps around the panel with Omat No. 8/107 or 8/136. Smooth the adhesive to match the airface contour.

NOTE: To reduce the cure time a local radiant heat source may be used if the adhesive is not tacky. Use a thermometer to stop the cure temperature from exceeding 50 degrees centigrade. Do not let the heat source of hot surfaces contact the polythene sheet used to seal the IP compressor intake.

(b) Remove the polythene sheet and masking tape from the IP compressor intake.

S 218-066-R00

(6) Inspect the repair area (Fig. 810)

(a) Make sure the front edge of the panel does not overhang the front edge of the LPC.

(b) Make sure the slot for the drain is clear.

NOTE: The slot will be in the front face of the core segment at the 6 o'clock position.

(c) Use a vibro-engraver to write the repair identification number, FRS.6588, adjacent to the part number on the LPC case.

TASK 72-34-10-728-067-R00

17. Repair to LP Compressor Rear Case, Damage to the Outer Skin

A. General

(1) This procedure (FRS. 5614) details the method for a patch repair for holes in the LP compressor rear case outer skin.

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

(2) In this procedure the low pressure compressor case is referred to as the LPC case.

B. Equipment
(1) Standard shop tools
(2) Drills and drill equipment
(3) Riveting equipment
(4) Vibro-engraving equipment
(5) Spatula
(6) Syringe

C. Consumable Materials
(1) B50009 - Acetone, OMat 150
(2) B50018 - Isopropyl alcohol, OMat 1/40
(3) B00713 - Cleaning solvent, OMat 1/257
(4) G50100 - Fluorescent penetrant developer powder, OMat 606
(5) G02401 - Fluorescent penetrant, medium sensitivity, water washable, OMat 653
(6) A01073 - Adhesive, Hysol, OMat 8/52

D. Parts
(1) EU52929 - Patch, titanium sheet 0.028 inch (22 S.W.G.)
CR2539P4-1 - Blind rivet (RR3407141)

NOTE: The rivets that are given are suitable for an assembly of nominal dimensions. The build up of tolerances can change the length of rivets needed. Use a gauge to find the correct length of rivet to be installed.

E. Access
(1) Location Zones
410 Left Powerplant
420 Right Powerplant

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

F. Repair of a puncture of the LPC rear case outer skin

S 868-068-R00

(1) Use this procedure on LPC rear cases with these part numbers:

RB211-535E4 and E4-B Engines

UL16433
UL17489 post RR SB 72-7335

UL17495 post RR SB 72-7335	UL17496 post RR SB 72-7336
UL17497 post RR SB 72-7341	UL17494 post RR SB 72-7559
UL16450 post RR SB 72-7602	UL16454 post RR SB 72-7602
UL17552 post RR SB 72-7765 Pt 1	UL17551 post RR SB 72-7765 Pt 2
UL17550 post RR SB 72-7765 Pt 3	UL17549 post RR SB 72-7765 Pt 4
UL17548 post RR SB 72-7765 Pt 5	UL19031 post RR SB 72-7765 Pt 6
UL27455 post RR SB 72-7765 Pt 7	UL16465 post RR SB 72-7767 Item H
UL16470 post RR SB 72-7767 Item H	UL17567 post RR SB 72-7818 Item D
UL17571 post RR SB 72-7818 Item D	UL17546 post RR SB 72-7847
UL17540 post RR SB 72-7847 Pt 1	UL19047 post RR SB 72-8170 Pt 1
UL19048 post RR SB 72-8170 Pt 1	UL19040 post RR SB 72-8170 Pt 2
UL19046 post RR SB 72-8170 Pt 2	UL19039 post RR SB 72-8170 Pt 3
UL19045 post RR SB 72-8170 Pt 3	UL19038 post RR SB 72-8170 Pt 4
UL19044 post RR SB 72-8170 Pt 4	UL19043 post RR SB 72-8170 Pt 5
UL19042 post RR SB 72-8170 Pt 6	UL19041 post RR SB 72-8170 Pt 7
UL19037 post RR SB 72-8170 Pt 8	UL21903 post RR SB 72-8170 Pt 31
UL21909 post RR SB 72-8170 Pt 31	UL21904 post RR SB 72-8170 Pt 32
UL21905 post RR SB 72-8170 Pt 33	UL21906 post RR SB 72-8170 Pt 34
UL21907 post RR SB 72-8170 Pt 35	UL21908 post RR SB 72-8170 Pt 36
UL21910 post RR SB 72-8170 Pt 37	UL27456 post RR SB 72-8170 Pt 38
UL28520 post RR SB 72-9290 Pt 1	UL29612 post RR SB 72-9290 Pt 2
UL29613 post RR SB 72-9290 Pt 3	UL29614 post RR SB 72-9290 Pt 4
UL29615 post RR SB 72-9290 Pt 5	UL29616 post RR SB 72-9290 Pt 6
UL29617 post RR SB 72-9290 Pt 7	UL29618 post RR SB 72-9290 Pt 8
UL29619 post RR SB 72-9290 Pt 9	UL29620 post RR SB 72-9290 Pt 10
UL29621 post RR SB 72-9290 Pt 11	UL29622 post RR SB 72-9290 Pt 12
UL29623 post RR SB 72-9290 Pt 13	UL29624 post RR SB 72-9290 Pt 14
UL34089 post RR SB 72-9675 Pt 1	UL31047 post RR SB 72-9516
UL37775 post RR SB 72-9188	UL37776 post RR SB 72-9188

UL39115 post RR SB 72-C355

LPC Case, Front - Replacement Of Mechanically Fastened Acoustic Panels

S 358-070-R00

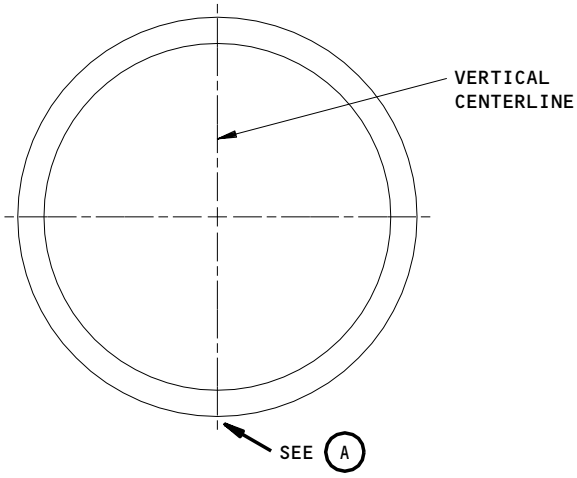
(2) Prepare the damaged area for repair.
  (a) Cut out the damaged area.
    1) Cut a circular hole in the outer skin to remove the damaged area (Fig. 811). Remove only the minimum amount of material.
    2) Remove the skin. Leave as much honeycomb in position as possible.
    3) Make a repair patch (refer to dimensions on Fig. 811).
    4) Drill the rivet holes through the patch and the outer skin (refer to dimensions on Fig. 811).

S 168-071-R00

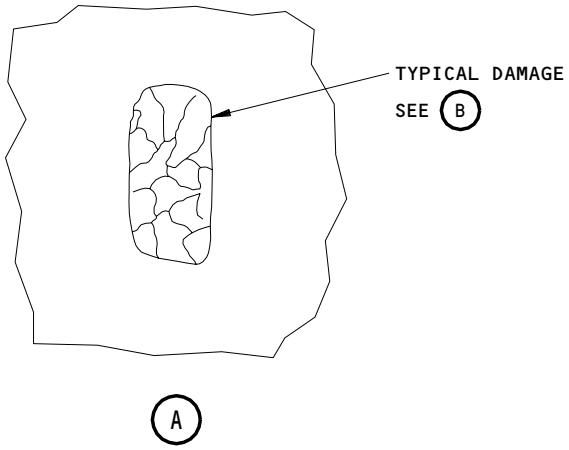
(3) Clean the repair area.
  (a) Degrease the repair area of the case and the patch. Use acetone, isopropyl alcohol, or cleaning solvent.
  (b) Do a test for cracks.
    1) Do a penetrant test of both the repair area and the patch to check for cracks. Use the developer powder (OMat 606) and the medium sensitivity water washable fluorescent penetrant (OMat 653).
    2) Degrease the repair area of the case and the patch using acetone, isopropyl alcohol, or cleaning solvent.
  (c) Install the patch.
    1) Apply the adhesive.

      WARNING: USE THE ADHESIVE ONLY IN WORK AREAS WITH GOOD VENTILATION AND OBEY THE PRECAUTIONS TO PREVENT CONTACT WITH THE SKIN.

      a) Prepare the hysol adhesive.
      b) Use the spatula to fill the honeycomb with the adhesive. To apply the adhesive to the enclosed area, inject the adhesive with the syringe through the holes in the inner skin perforate.



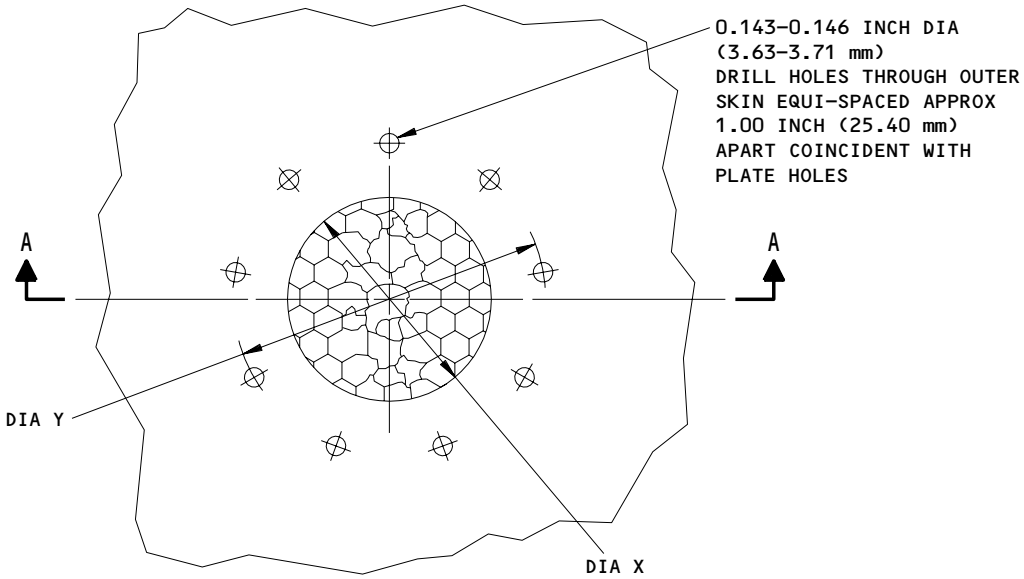
(CROSS SECTION THROUGH REAR
LP COMPRESSOR CASE)



NOTE: HONEYCOMB TO BE FILLED (POTTED) TO INSTRUCTIONS.

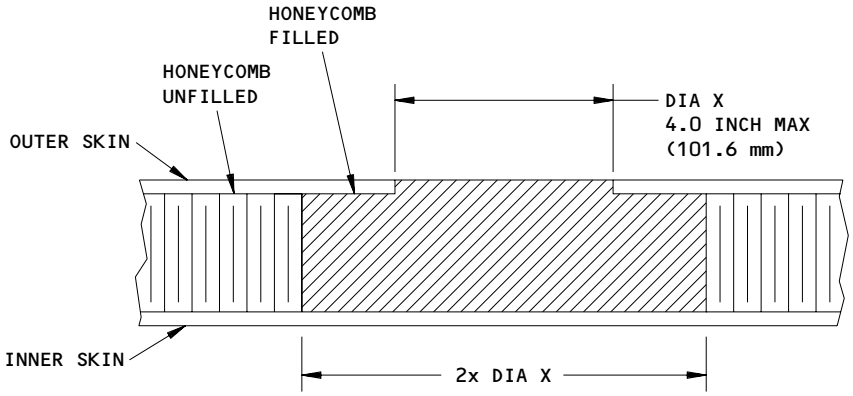
D92042

LP Compressor Rear Case Repair Details and Dimensions
Figure 811 (Sheet 1)



SKIN REMOVED

B

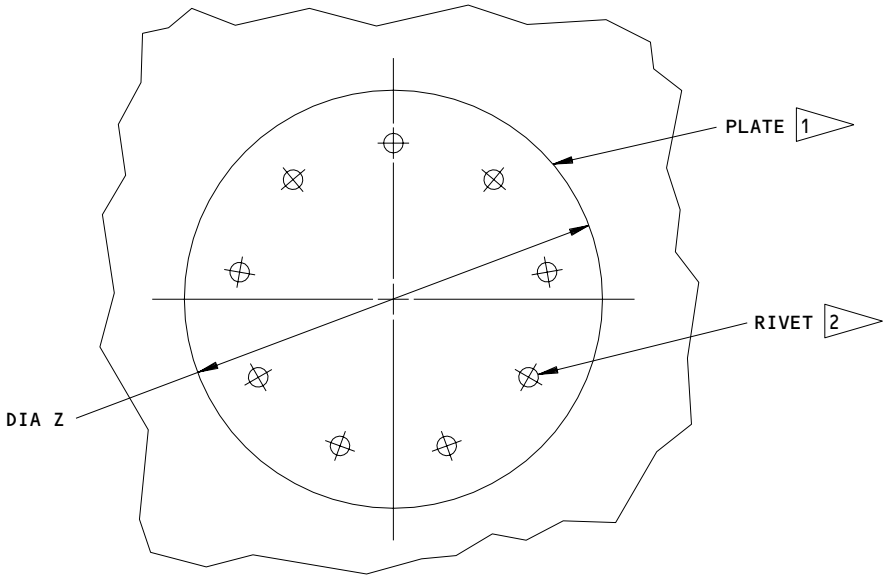


A–A

NOTE: CUT MIN CIRCULAR HOLE THROUGH OUTER SKIN TO REMOVE DAMAGE (DIA X).
DIA Y = DIA X+1.00 INCH (25.40 mm)

D92043

LP Compressor Rear Case Repair Details and Dimensions
Figure 811 (Sheet 2)



SKIN REPAIRED

(B)

NOTE: DIA Z (SIZE OF PLATE) = DIA Y+1.00 INCH (25.40 mm)

1 BOND AND RIVET TO INSTRUCTIONS

2 INSTALL RIVET ALL HOLES

D92044

LP Compressor Rear Case Repair Details and Dimensions
Figure 811 (Sheet 3)

c) Apply the adhesive to the mating faces of the case and the patch.

2) Install the patch.

a) Put the patch in the correct position on the case (Fig. 811). Align the rivet holes and remove any unwanted adhesive from the inside of the case.

b) Install the rivets that attach the patch to the case.

NOTE: The rivets given are suitable for an assembly of nominal dimensions. The build up of tolerances can change the length of rivets needed. Use a gauge to find the correct length of rivets to be installed.

3) Let the adhesive cure.

(d) Visually inspect the repair.

(e) Record the repair.

1) Vibro-engrave FRS 5614 adjacent to the part number.

Rear Diaphragm Assembly - Replacement of Stiffeners

TASK 72-34-10-358-072-R00

18. Diaphragm Assembly, Rear - Replacement of Stiffeners

A. General

(1) The repair in this procedure is FRS 4938.

(2) The procedure gives the instructions to replace the stiffeners on the rear diaphragm assembly.

(3) During this repair, you must keep the work area clean.

NOTE: Dirt or grease on the surfaces you will bond will cause a poor bond.

(4) You must put on clean cotton or polythene gloves when you touch the parts that you will bond.

NOTE: Do not touch the prepared surfaces.

(5) You can use this repair for diaphragm assemblies with the part numbers that follow:

UL15300	
UL15286	
UL20341	S.B. 71-8079
UL20342	S.B. 71-8079
UL37446	S.B. 72-B314

RB211-535E4, RB211-535E4-B AND, RB211-535E4-C	
PART NUMBER	SERVICE BULLETIN
UL37448	S.B. 72-B314
UL37449	S.B. 72-B314
UL37450	S.B. 72-B314
UL38961	S.B. 72-C466

B. Equipment
   (1) Portable power drill
   (2) Pneumatic rivet equipment
   (3) Hand scraper
   (4) Cold chisel

C. Consumable Materials
   (1) OMat 5/97 Garnet paper or
   (2) OMat 5/98 Garnet paper
   (3) OMat 150 Acetone or
   (4) OMat 1/40 Isopropyl alcohol or
   (5) OMat 1/257 Cleaning solvent
   (6) Distilled water
   (7) OMat 149 Toluene
   (8) OMat 876A Primer
   (9) OMat 872 Cold curing silicone compound
   (10) OMat 4/47 Jointing compound
   (11) OMat 789 Two-pack epoxy finish, grey BSC-1963 and catalyst
   (12) OMat 805 Resin

D. Parts

   NOTE: IPC references are to 72-34-11.

RR I.P.C. FIG. ITEM	PART NUMBER	DESCRIPTION	ITEM

RR I.P.C. FIG. ITEM	PART NUMBER	DESCRIPTION	ITEM
02 380	UL14420	L.H. top front stiffener	1
02 639	AS16585	Rivet	2
02 642	AS16092	Rivet	3
02 384	UL14421	R.H. top front stiffener	4
02 388	UL14422	L.H. upper center front stiffener	5
02 636		Rivet (RR1309525)	6
02 392	UL14423	R.H. upper center front stiffener	7
02 396	UL19288	L.H. lower center front stiffener	8
02 400	UL19287	R.H. lower center front stiffener	9
02 404	UL14426	L.H. lower front stiffener	10
02 362		L.H. sealing block (RR1502224)	11
02 362		L.H. sealing block (RR1502225)	12
02 362		L.H. sealing block (RR1502226)	13
02 408	UL14427	R.H. lower front stiffener	14
02 366		R.H. sealing block (RR1502287)	15
02 366		R.H. sealing block (RR1502289)	16

RR I.P.C. FIG. ITEM	PART NUMBER	DESCRIPTION	ITEM
02 366		R.H. sealing block (RR1502288)	17
01 400	LK83030	Bottom front stiffener assembly NOTE: LK83030 comprises the parts that follow:	18
01 416	LK83031	Bottom stiffener, front	
01 414		Seal (RR1502227)	
01 414		Seal (RR1502228)	
01 414		Seal (RR1502229)	
01 415		Seal (RR1502224)	
01 415		Seal (RR1502225)	
01 415 or 01 413		Seal (RR1502226) Seal (RR1502298) Seal (RR1502301) Seal (RR1502310)	
01 408	AS41411	Bolt	19
01 404		Washer, flat (RR1906044)	20
01 402	AS20624	Nut, Bi-hex	21
02 438	UL14428	L.H. upper rear stiffener	22
02 358		Sealing block (RR1502216)	23
02 358		Sealing block (RR1502251)	24
02 442	UL14429	R.H. upper rear stiffener	25
02 446	UL14430	L.H. upper rear stiffener	26
02 450	UL14431	R.H. upper center rear stiffener	27
02 454	UL14432	L.H. lower center rear stiffener	28

RR I.P.C. FIG. ITEM	PART NUMBER	DESCRIPTION	ITEM
02 458	UL14433	R.H. lower center rear stiffener	29
02 466	UL14434	R.H. lower rear stiffener	30
02 462	UL14435	L.H. lower rear stiffener	31
02 630		Rivet (RR2109656)	32
02 470	UL14437	Bottom rear stiffener (S.B. 72-7021)	33
02 633		Rivet (RR2109657)	34
02 648	AS16580	Rivet	35
02 645	AS16582	Rivet	36
02 656	HL70-6	Collar (RR3408507)	37
02 658	HL19PB-6-12	Pin (RR3408687)	38
02 368	LK80273	Outer diaphragm spacer block	39

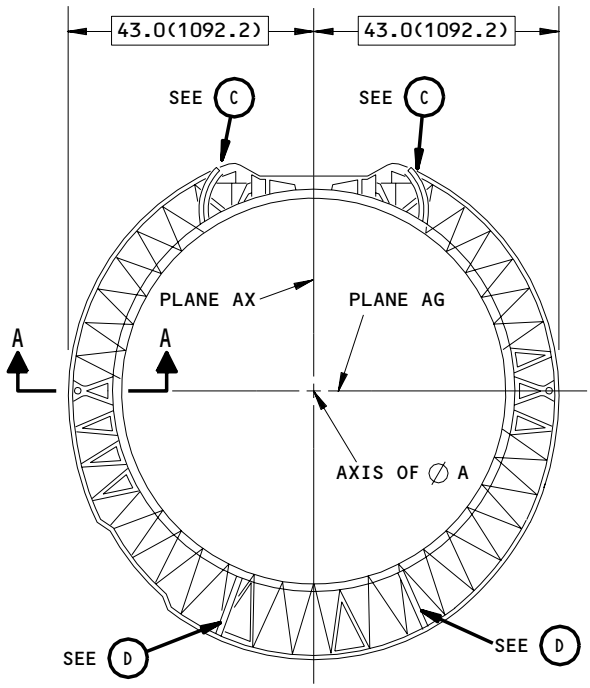
E. Reference
(1) AMM 71-11-04/401, Fan Cowl Panels

F. Access
(1) Location Zones
410 Power Plant
420 Power Plant

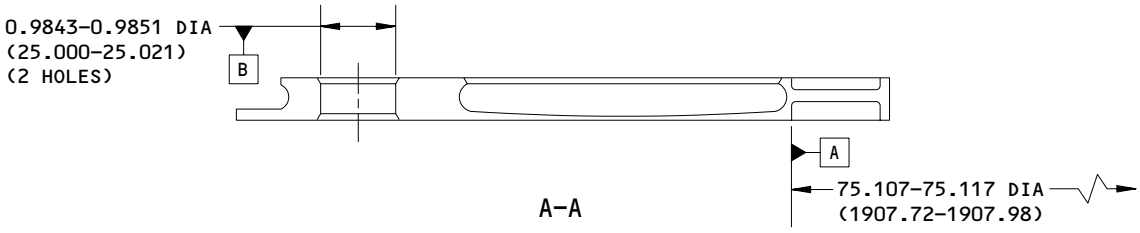
G. Replace the stiffeners (Fig. 812)

S 968-076-R00

(1) Replace the stiffeners at positions 5, 7, 8, 9, 26, 27, 28 and 29 (Fig. 812).
(a) Drill and remove the rivet head from the stiffener side and remove the stiffeners as necessary.
(b) Make sure that the holes in the diaphragm are not made larger.
(c) Drill the holes in the replacement stiffener.
1) Put the stiffener in position on the diaphragm and attach with a clamp.
2) Use the holes in the diaphragm as a guide and drill the rivet holes in the stiffener.
3) Remove the stiffener.
4) Remove all sharp edges.



REAR DIAPHRAGM STIFFENERS
(VIEW IN THE FORWARD DIRECTION)



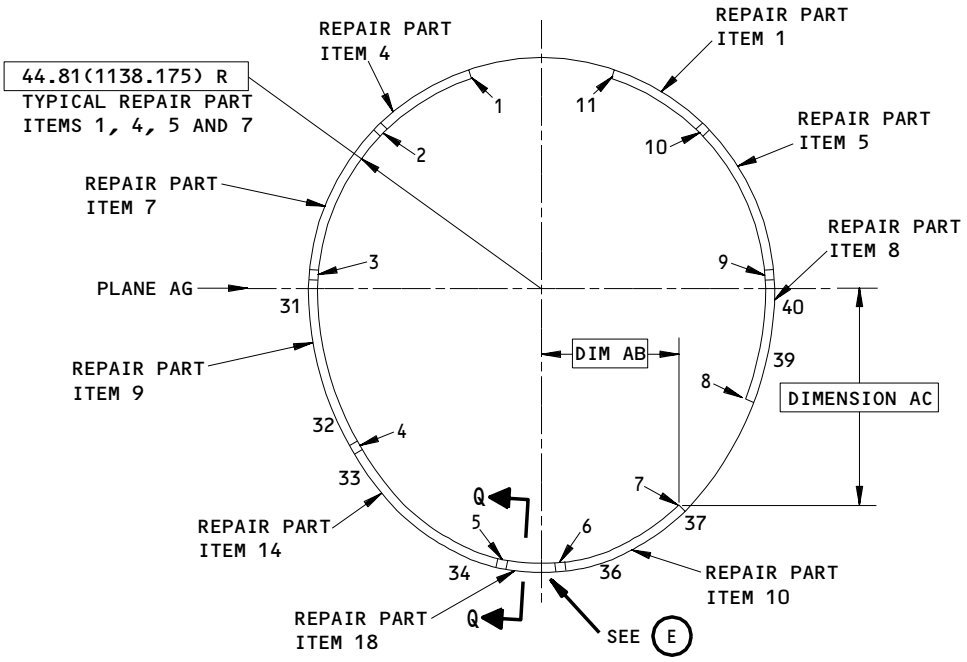
NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

RIVET HOLES IN REPLACEMENT STIFFENERS TO BE DRILLED IN LINE WITH EXISTING.
GEOMETRIC SYMBOLS CONFORM TO ISO R1101–1969.

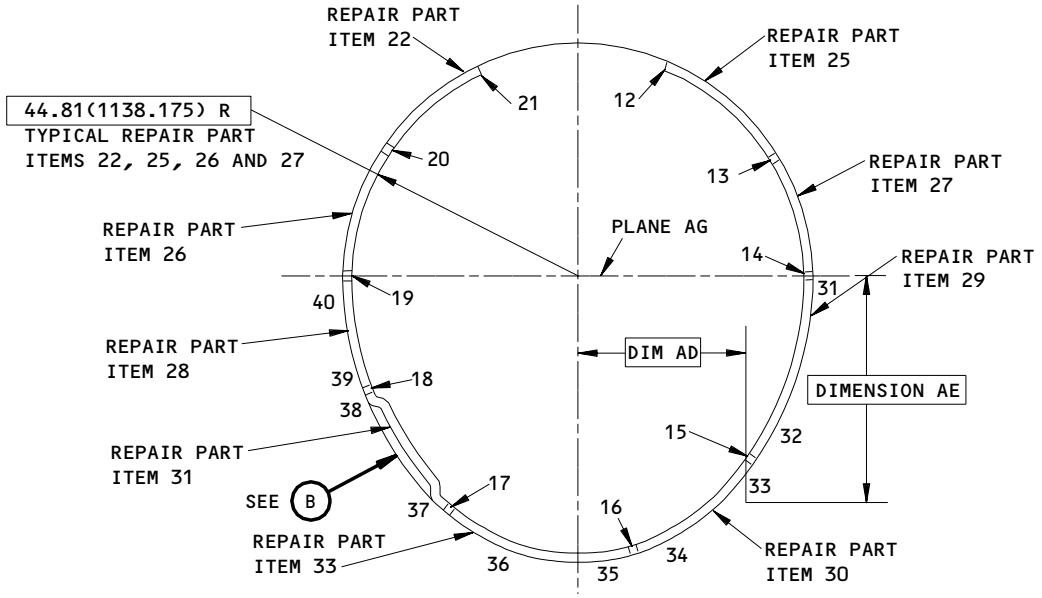
ALL REPLACEMENT STIFFENERS EXCEPT REPAIR PART ITEMS 1 AND 4 TO BE COATED ALL OVER WITH GREY ENAMEL PER INSTRUCTIONS WITH THE EXCEPTION OF RIVET HOLES AND SURFACES DESIGNATED BS.

DE00060388

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 1)



FRONT SIFFENERS
(VIEW IN THE AFT DIRECTION)



REAR STIFFENERS
(VIEW IN THE FORWARD DIRECTION)

DE000603898A

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 2)

DIMENSIONS AD AND AE FOR POINTS X, Y, AND Z						
POINT NO.	X		Y		Z	
	DIMENSION AD	DIMENSION AE	DIMENSION AD	DIMENSION AE	DIMENSION AD	DIMENSION AE
31	44.6922 (1135.182)	4.1998 (106.676)	44.6913 (1135.182)	4.1956 (106.567)	44.6907 (1135.143)	4.1931 (106.506)
32	38.4353 (976.256)	26.8336 (681.573)	38.4344 (976.236)	26.7679 (679.904)	38.4340 (976.223)	26.7132 (678.516)
33	31.2845 (794.627)	37.0483 (941.028)	31.2839 (794.611)	36.9618 (938.830)	31.2835 (794.600)	36.8900 (937.007)
34	13.4077 (340.555)	48.8576 (1240.982)	13.4074 (340.547)	48.7516 (1238.290)	13.4072 (340.543)	48.6638 (1238.060)
35	8.9384 (227.036)	50.0939 (1272.385)	8.9383 (227.032)	49.9866 (1269.660)	8.9381 (227.029)	49.8976 (1267.398)
36	13.4077 (340.555)	48.8576 (1240.982)	13.4074 (340.547)	48.7516 (1238.290)	13.4072 (340.543)	48.6638 (1236.060)
37	25.0276 (635.702)	42.7242 (1085.194)	25.0271 (635.688)	42.6275 (1082.738)	25.0268 (635.680)	42.5472 (1080.700)
38	40.2230 (1021.664)	23.0889 (586.459)	40.2221 (1021.642)	23.0316 (585.003)	40.2216 (1021.629)	22.9838 (583.789)
39	42.0107 (1067.071)	18.3235 (465.416)	42.0098 (1067.049)	18.2769 (464.234)	42.0092 (1067.034)	18.2382 (463.251)
40	44.6922 (1135.182)	4.1998 (106.676)	44.6913 (1135.158)	4.1956 (106.567)	44.6907 (1135.143)	4.1931 (106.506)

NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

DE00060390

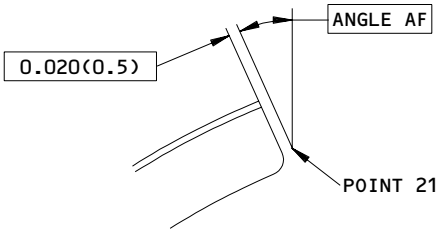
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 3)

DIMENSIONS AC AND AB ALSO ANGLE AF FOR POINTS 1–21							
POINT NO.	FRONT STIFFENERS			POINT NO.	REAR STIFFENERS		
	DIMENSION AC	DIMENSION AB	ANGLE AF		DIMENSION AC	DIMENSION AB	ANGLE AF
1	42.0298 (1067.558)	13.8404 (351.546)	18°14'	12	40.6565 (1032.675)	17.4674 (443.672)	23°15'
2	31.2895 (794.753)	31.2895 (794.753)	45°	13	24.7443 (628.505)	36.6849 (931.797)	56°
3	2.5905 (65.798)	44.1741 (1122.022)	86°39'	14	0 (0)	44.2500 (1123.950)	90°
4	31.3482 (31.3482)	35.0119 (889.301)	55°36'	15	33.4713 (850.172)	33.4713 (850.172)	52°28'
5	49.7912 (1264.697)	6.8898 (175.000)	9°25'	16	49.2217 (1250.232)	9.7021 (246.433)	13°29'
6	50.1404 (1273.565)	4.2520 (108.000)	5°29'	17	43.1774 (1096.705)	23.2726 (591.125)	34°22'
7	41.6147 (1057.014)	25.4125 (645.477)	37°54'	18	21.0294 (534.147)	40.4331 (1027.000)	68°45'
8	23.4836 (596.483)	39.4074 (1000.947)	65°52'	19	0 (0)	44.2500 (1123.95)	90°
9	2.5905 (65.798)	40.2371 (1022.022)	86°39'	20	24.7443 (628.505)	36.6849 (931.797)	56°
10	31.2895 (794.753)	31.2895 (794.753)	45°	21	40.6565 (1032.675)	17.4674 (443.672)	23°15'
11	42.0298 (1067.558)	13.8404 (351.546)	18°14'				

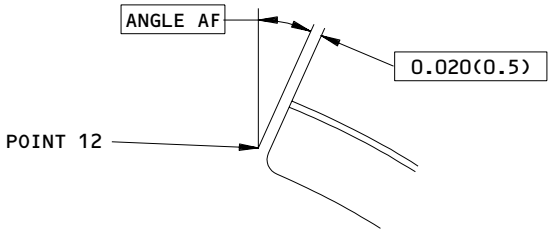
NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

DE00060391

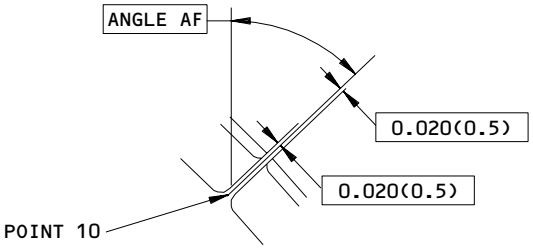
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 4)



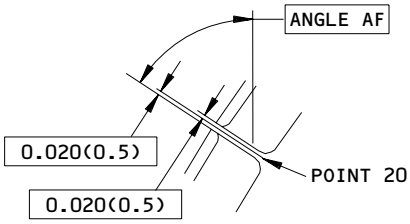
DETAIL AT POINT 21
(ALSO TYPICAL FOR POINT 1)



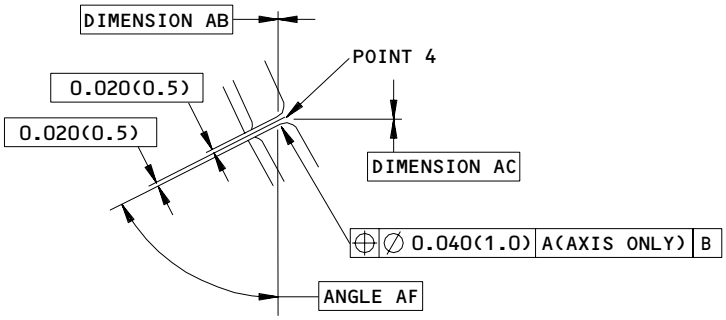
DETAIL AT POINT 12
(ALSO TYPICAL FOR POINT 11)



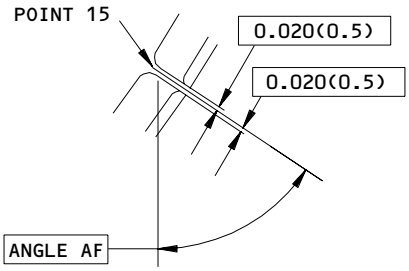
DETAIL AT POINT 10
(ALSO TYPICAL FOR POINTS
9, 13, AND 14)



DETAIL AT POINT 20
(ALSO TYPICAL FOR POINTS
2, 3, AND 19)



DETAIL AT POINT 4
(ALSO TYPICAL FOR POINTS 17 AND 18)

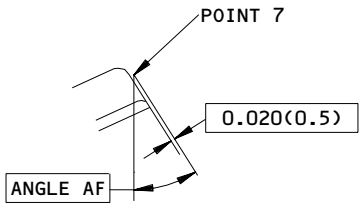


DETAIL AT POINT 15
(ALSO TYPICAL FOR POINT 16)

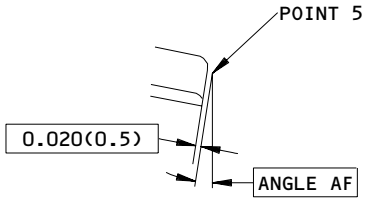
NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

DE00060392

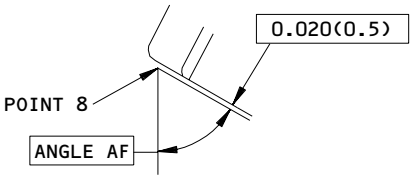
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 5)



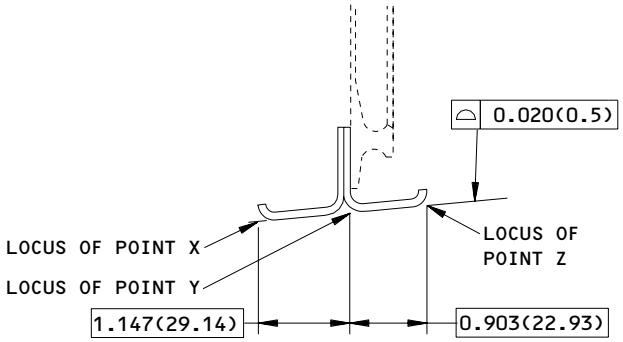
DETAIL AT POINT 7



DETAIL AT POINT 5



DETAIL AT POINT 8
(ALSO TYPICAL FOR POINT 6)

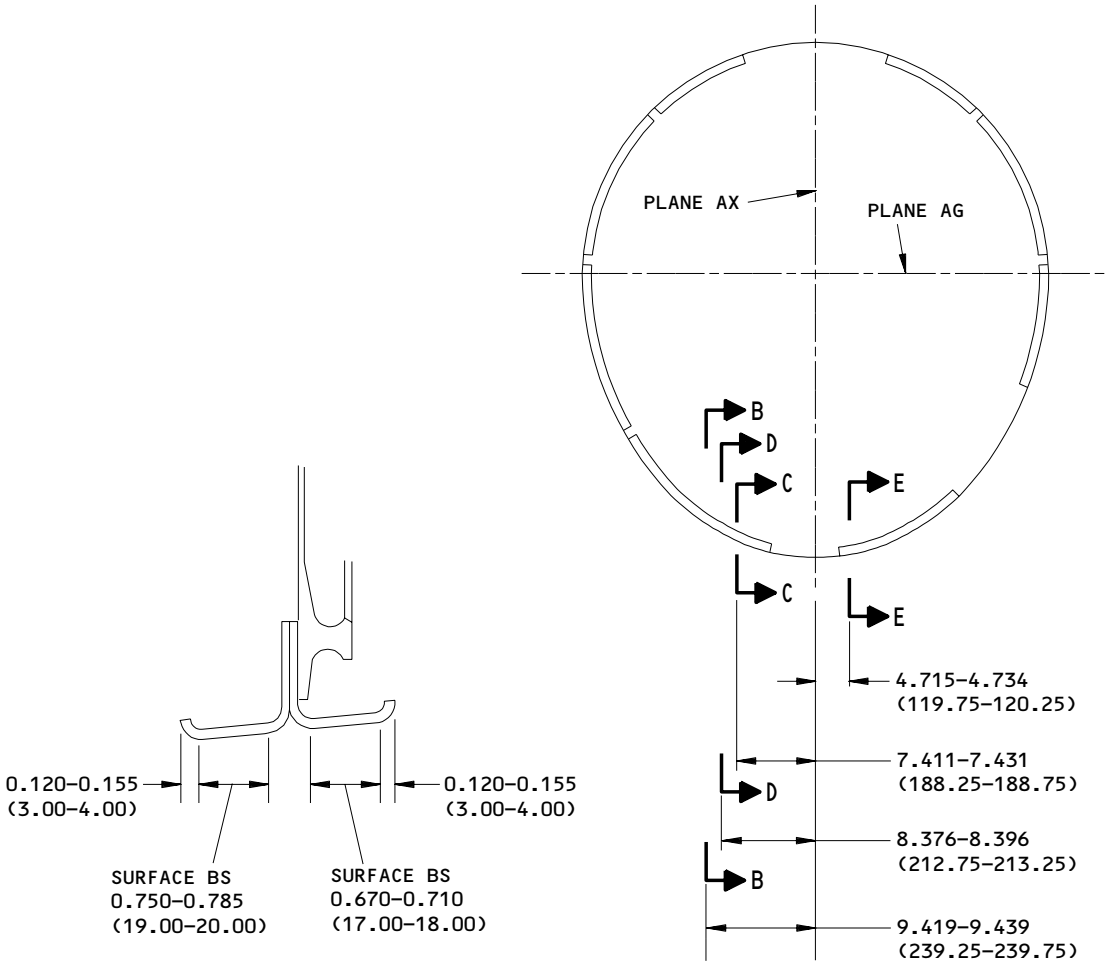


RADIAL SECTION THROUGH
FRONT AND REAR STIFFENERS BELOW PLANE AG
(EXAMPLE)
(LOCUS OF POINTS X, Y AND Z APPLY
TO REPAIR PART ITEMS
8, 9, 10, 14, 28, 29, 30, 31, AND 33)

NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

DE00060393A

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 6)



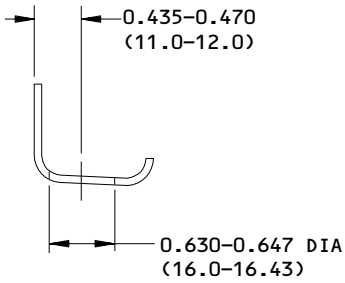
SECTION THROUGH FRONT AND REAR STIFFENERS (EXAMPLE)

(VIEW IN THE AFT DIRECTION)

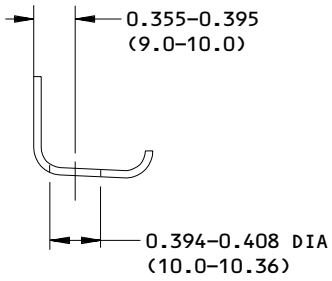
NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES).

DE00060394

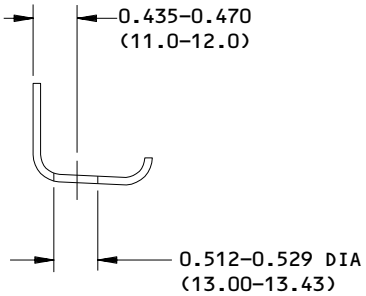
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 7)



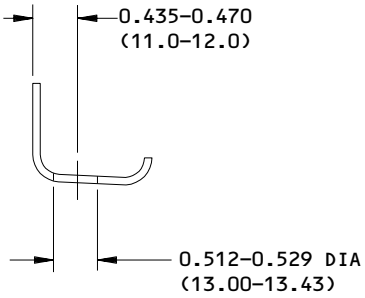
(REPAIR PART ITEM 14 ONLY)
B–B



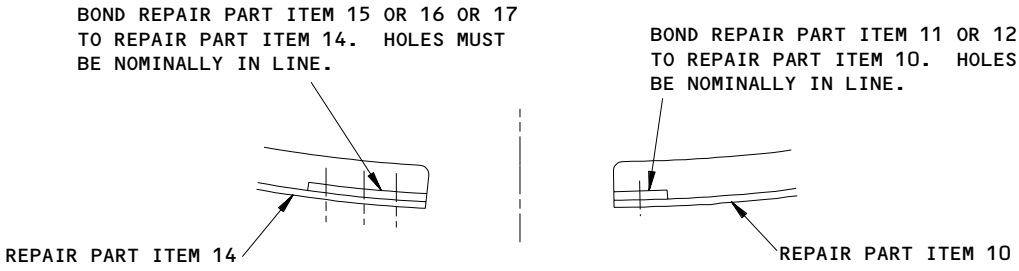
(REPAIR PART ITEM 14 ONLY)
C–C



(REPAIR PART ITEM 14 ONLY)
D–D



(REPAIR PART ITEM 10 ONLY)
E–E

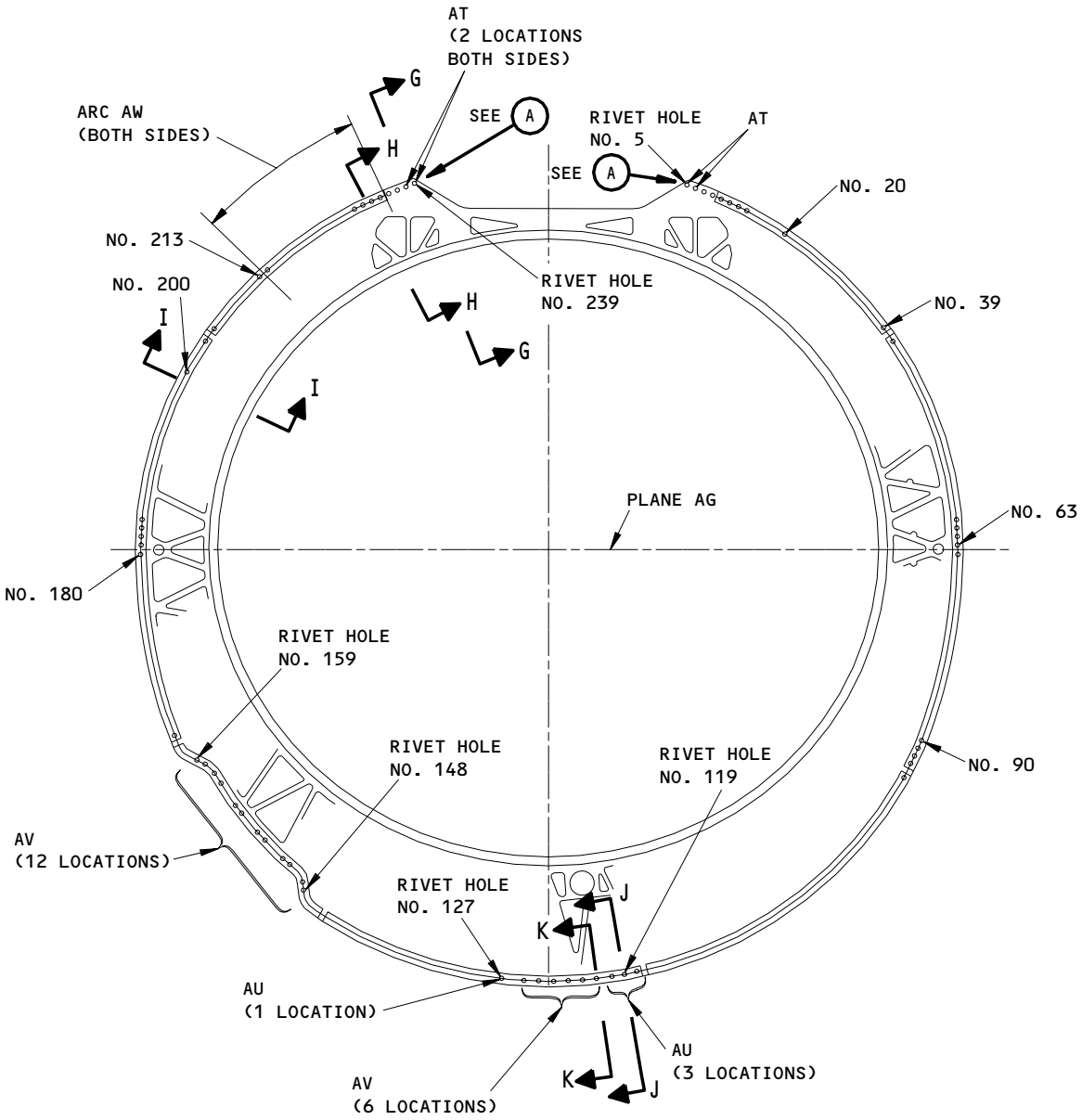


BOND REPAIRS
(VIEW IN THE AFT DIRECTION)

NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES)

DE00060395

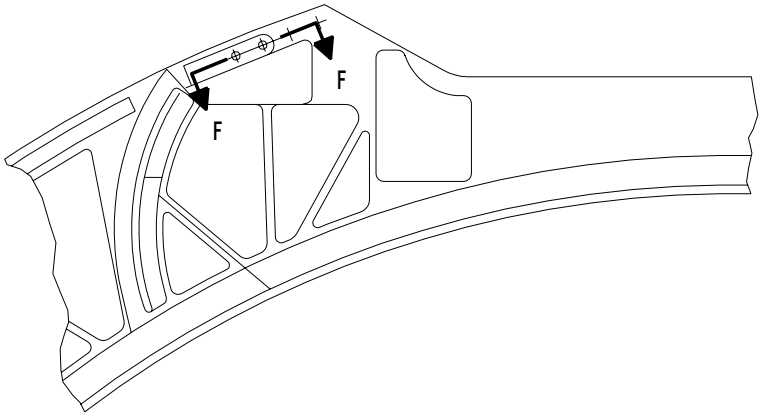
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 8)



RIVET INFORMATION
(VIEW IN THE FORWARD DIRECTION)

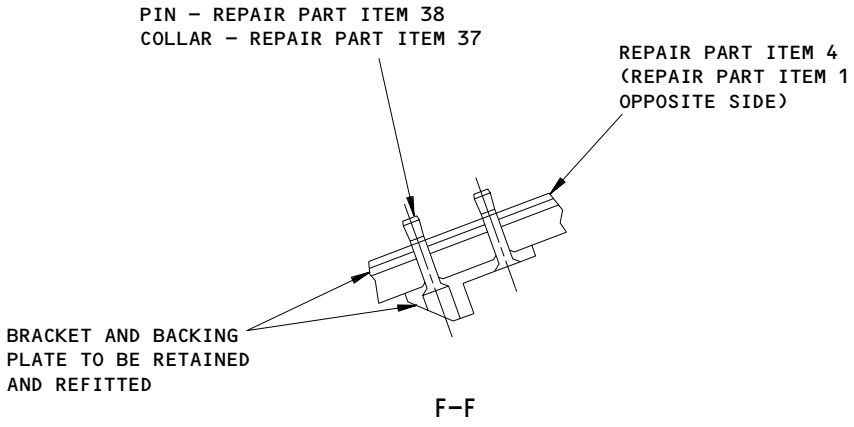
DE00060396

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 9)



(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

(A)

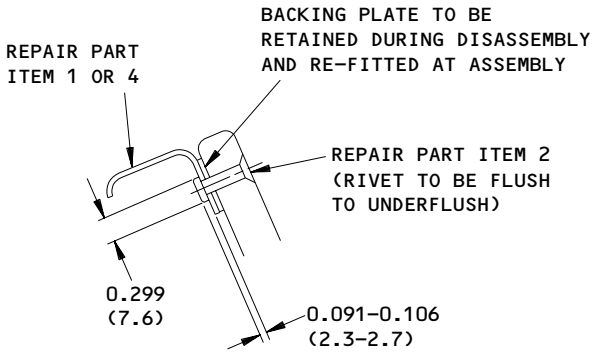


F–F

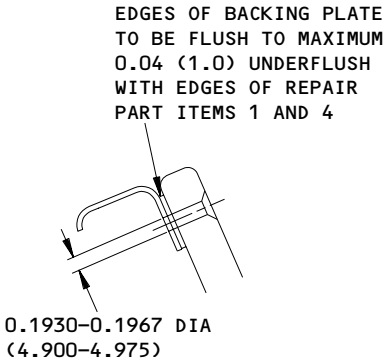
NOTE: PINS AND COLLARS, REPAIR ITEMS 37 AND 38 TO BE WET ASSEMBLED PER INSTRUCTIONS.

DE00060397A

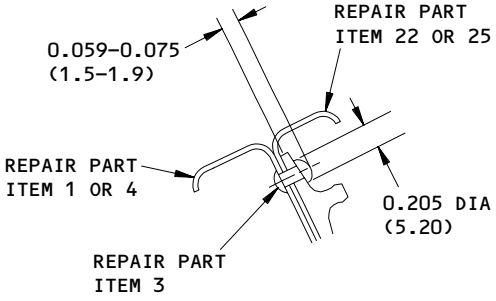
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 10)



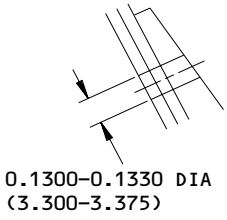
(EXAMPLE, 4 LOCATIONS MARKED AT)
G-G



(BEFORE INSTALLATION OF
REPAIR PART ITEM 2)
G-G



(TYPICAL FOR RIVETS
WITHIN ARC AW)
H-H

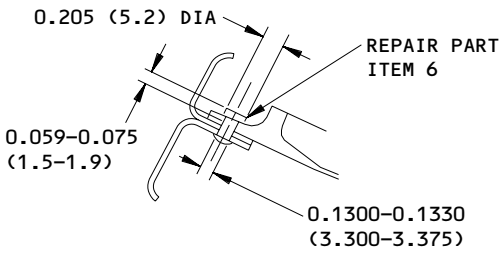


(WITH REPAIR PART ITEMS
1, 3, AND 22 REMOVED)
H-H

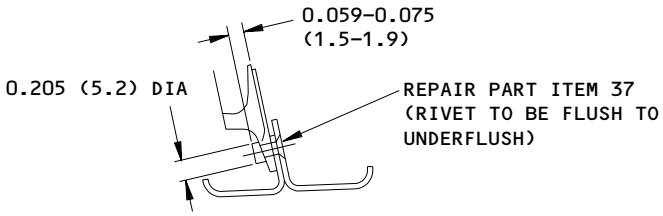
NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES)

DE00060398A

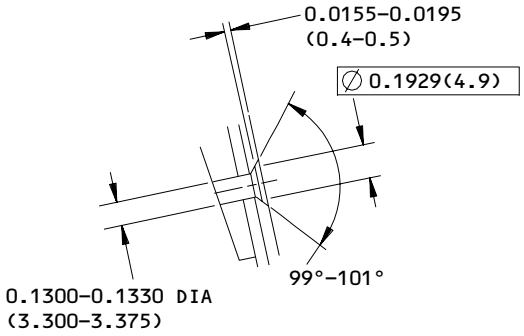
Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 11)



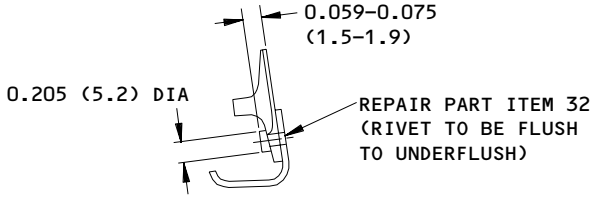
(TYPICAL FOR ALL RIVET HOLES
UNLESS OTHERWISE STATED)
I–I



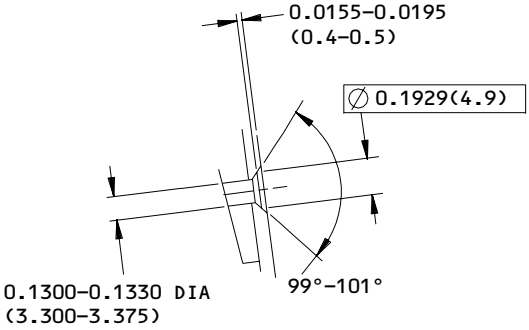
(EXAMPLE, 4 LOCATIONS MARKED AU)
J–J



(BEFORE INSTALLATION
OF REPAIR PART ITEM 34)
J–J



(EXAMPLE, 18 LOCATIONS MARKED AV)
K–K

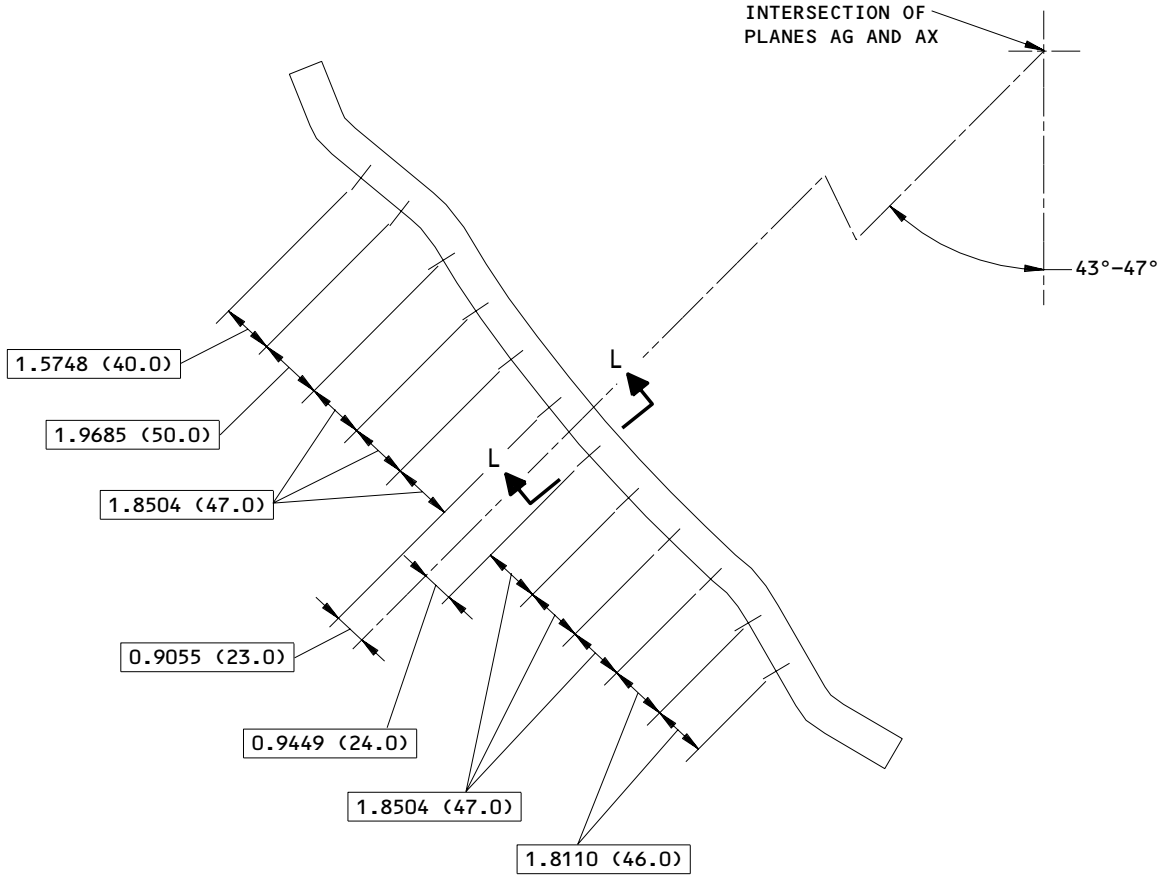


(BEFORE INSTALLATION
OF REPAIR PART ITEM 32)
K–K

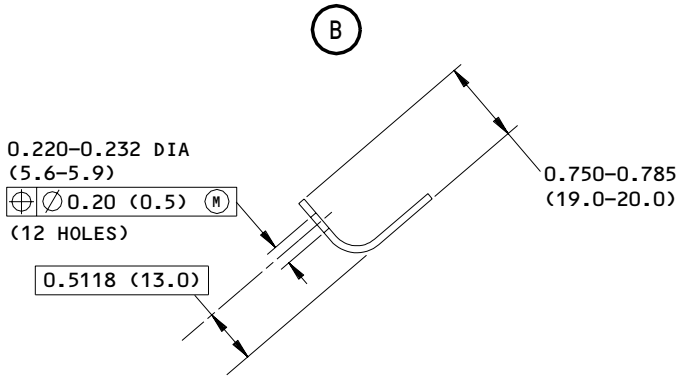
NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES)

DE00060399A

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 12)



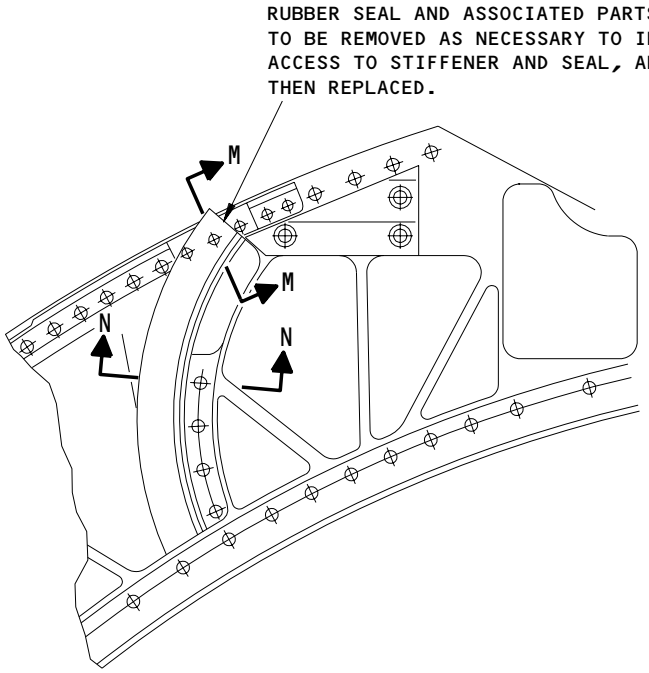
REPAIR PART ITEM 31



NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES)

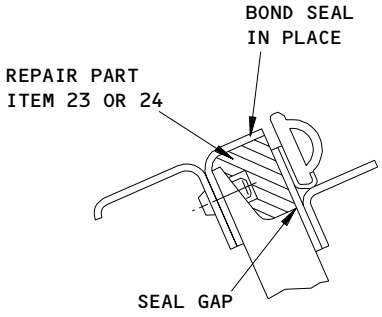
DE00060400

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 13)

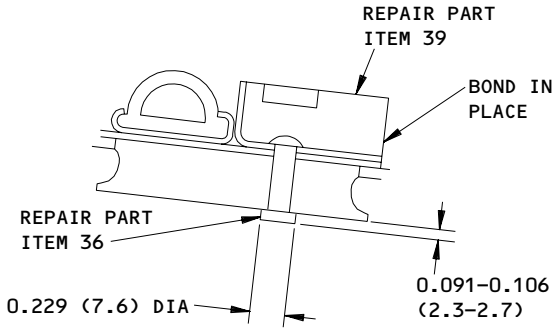


RUBBER SEAL
(VIEW IN THE FORWARD DIRECTION)
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

C



M–M

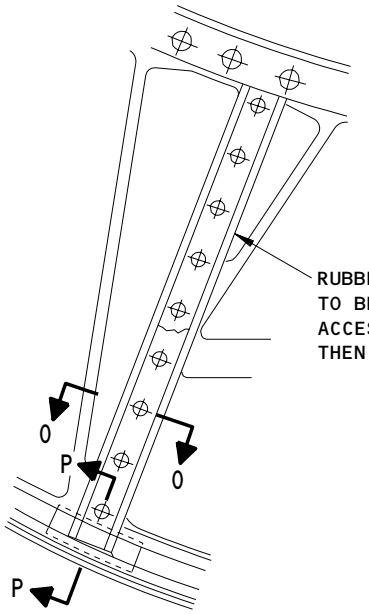


(EXAMPLE, 7 LOCATIONS)
N–N

NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES)

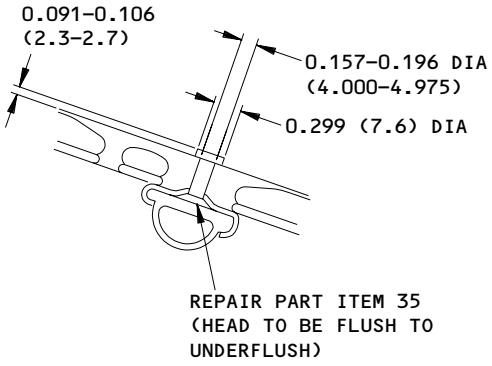
DE00060401A

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 14)

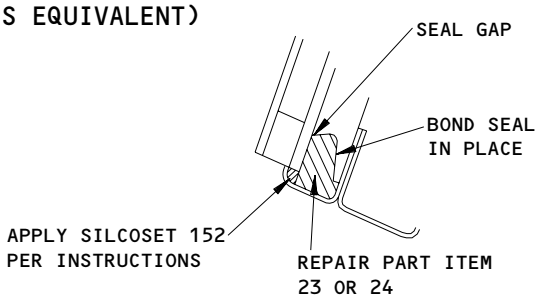


RUBBER SEAL
(VIEW IN THE FORWARD DIRECTION)
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)

D



(EXAMPLE, 9 LOCATIONS)
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)
O–O

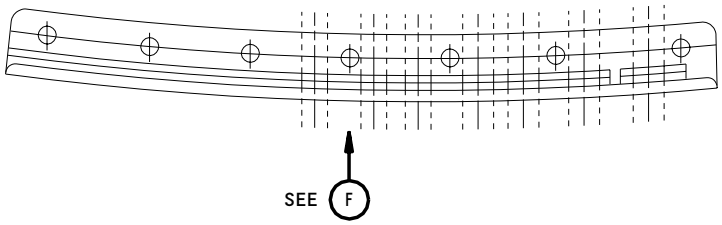


(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)
P–P

NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES)

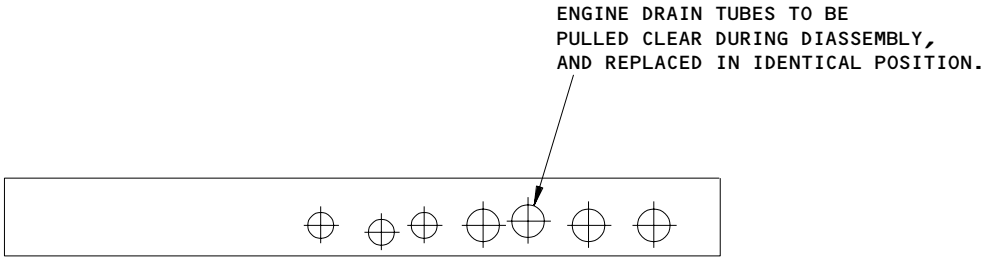
DE00060402A

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 15)

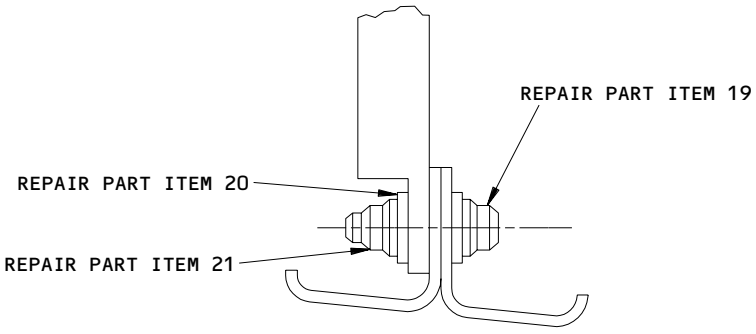


REPAIR PART ITEM 18

E



F



(EXAMPLE, 7 LOCATIONS)

Q-Q

DE00060403

Replacement of Rear Diaphragm Stiffeners
Figure 812 (Sheet 16)

(d) Install the replacement stiffener.
1) Apply a layer of OMat 4/47 jointing compound to the stiffeners and wet assemble to the diaphragm.
2) Rivet the stlffeners to the diaphragm. Use repair part, Item 6.
(e) Do an inspection for correct position and attachment of the stiffeners.
(f) Repair the surface protection on the stiffeners.

S 378-077-R00
(2) Apply one layer of OMat 789 two-pack epoxy finish. Use a brush or spray procedure.
(a) Let the finish dry in air for at least one hour at 16° C (61° F) minimum.
(b) If it is necessary, apply a second layer of the finish.
1) Let the last layer dry in air at a minimum temperature of 16° C (61° F) for at least 4 hours.
(c) Vibro-engrave FRS 4938 adjacent to the part number.

S 968-078-R00
(3) Replace the stiffeners at positions 1, 4, 22, and 25 (Fig. 812).
(a) Remove the fan cowl panel (AMM 71-11-04/401).
(b) If necessary, remove the seal retainer and the spacer block that is bonded to it to get access to the stiffener rivets.
1) Drill and remove the rivet bead from the seal side.
2) Make sure that the holes in the diaphragm are not made larger.
3) Use a cold chisel and remove the spacer block at the bond line.
4) Remove the remaining bonding agent.
(c) Remove the damaged stiffener, bracket stop and backing plate.
1) Drill and remove the rivet head from the stiffener side and remove the stiffener.
2) Make sure that the holes in the diaphragm are not made larger.

(d) Drill the holes in the replacement stiffener.
1) Put the stiffener in position on the diaphragm and attach with a clamp.
2) Use the holes in the diaphragm as a guide and drill the rivet holes in the stiffener.
3) Remove all sharp edges.

(e) Install the replacement stiffener.
1) Apply a layer of OMat 4/47 jointing compound to the stiffeners and wet assemble the stiffeners, the bracket stop and the backing plate to the diaphragm.
2) Rivet the stiffeners to the diaphragm. Use repair parts, Items 2, 3, 6, 37 and 38.

S 358-079-R00

(4) Prepare the Stiffeners - Repair Parts 22 and 25 and Sealing Blocks - Repair Parts 23 and 24 for Installation.

(a) Make the bond area rough. Use OMat 5/97 or 5/98 garnet paper.

WARNING: DO NOT GET THE DEGREASING AGENT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING AGENT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREASING AGENT. KEEP THE DEGREASING AGENT AWAY FROM SPARKS, FLAMES, AND HEAT. DEGREASING AGENTS ARE A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Make a clean, lint-free cloth moist with Acetone OMat 150 Isopropyl OMat 1/40 or Cleaning Solvent OMat 1/257.
1) Use this cloth to clean the area that you repair.
2) Discard the dirty cloth.

NOTE: It is important that a clean, lint-free cloth is used for each separate degreasing operation. You must make the cloth moist with a dispenser. This is to prevent contamination of the fluid in the primary container.

(c) Do an inspection of the bond area.
1) Use a hair brush that is soft and clean to apply a thin layer of distilled water over the bond area.
2) Look at the layer of distilled water, immediately (less than 30 seconds).
a) Look for breaks in the continuity of the water layer.
b) If breaks occur in the water layer in less than 30 seconds, you must clean the surfaces again. The layer must be continuous.
c) Use a clean, lint-free cloth that is soaked in clean acetone (0Mat 150) to remove the distilled water.
d) Let the surfaces dry.

S 128-080-R00

(5) Make the sealing block bond area rough. Use 0Mat 5/97 garnet paper or 0Mat 5/98 garnet paper.

S 118-087-R00

WARNING: DO NOT GET THE DEGREASING AGENT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING AGENT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREAS1NG AGENT. KEEP THE DEGREASING AGENT AWAY FROM SPARKS, FLAMES, AND HEAT. DEGREASING AGENTS ARE A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(6) You must do the steps that follow immediately before you bond the sealing block.
(a) Make a clean, lint-free cloth moist with Acetone 0Mat 150, Isopropyl Alcohol 0Mat 1/40, Cleaning Solvent 0Mat 1/257 or Toluene 0Mat 149.
1) Use this cloth to clean the area that you repair.
2) Discard the dirty cloth.

NOTE: It is important that a clean, lint-free cloth is used for each separate degreaslng operation. You must make the cloth moist with a dispenser. This is to prevent contamination of the fluid in the primary container.

S 398-082-R00

(7) Bond the Sealing Blocks - Repair Parts , Items 11 or 12 or 13 and 15 or 16 or 17 and 23 or 24 (Fig. 812).
  (a) Apply OMat 876 primer to the bond surfaces.
  (b) Let the primer dry in air for 30 minutes.
  (c) Apply OMat 872 silicone compound to the surfaces you will bond.
    1) Assemble the sealing blocks in position.
    2) Apply sufficient pressure to make sure there is a good contact, and remove the unwanted silicone compound.
  (d) Assemble the seals that were removed from the seal retainer for access.
    1) Make sure that a fillet of the silicone compound comes out at the ends of the seals.
  (e) Let the silicone compound cure at room temperature for 24 hours.

S 218-083-R00

(8) Do an inspection of the seals for correct position and correct bond.
  (a) Make sure that the seals are not lifted.

S 378-084-R00

(9) Repair the surface protection on the stiffeners.
  (a) Apply one layer of OMat 789 two-pack epoxy finish. Use a brush or spray procedure.
    1) Let the finish dry in air for at least one hour at 16° C (61° F) minimum.
  (b) It it is necessary, apply a second layer of the finish.
    1) Let the last layer dry in air at a minimum temperature of 16° C (61° F) for at least 4 hours.

S 938-085-R00

(10) Vibro-engrave FRS 4938 adjacent to the part number.

S 418-086-R00

(11) Install the fan cowl panels (AMM 71-11-04/401).

TASK 72-34-10-348-099-R00

19. Rebond the Pitot Tubes

A. General

(1) This repair gives the procedure to bond the pitot tubes on the low pressure (LP) Compressor Support Assembly.

(2) This repair is used on pitot tubes with the part numbers that follow:

(a) UL15248 Assembly A

(b) FW12460 assembly B

(c) UL15246 Assembly A

(d) Fw12459 Assembly B.

(3) This repair covers two assembly standards. Assembly A has a layer of GRP on the support strut. Assembly B has a stainless steel fairing (SB-C628).

(4) On assembly B standard components, it is permitted to use Pitot Retention Assembly Plates (SB72-D718) as an alternative to Pitot Tubes. The installation of retention assembly plates to FRS7101 is a part embodiment of SB72-D718. At the next shop visit SB72-D718 must be completed.

B. Consumable Material

(1) OMat 1/257 Cleaning solvent

(2) OMat 150 Acetone

(3) OMat 653 Fluorescent penetrant

(4) OMat 766 Two-pack epoxy primer and catalyst

(5) OMat 8/172 Hardener

(6) OMat 8/208 Adhesive - Epoxy paste

(7) OMat 8/50 Resin

(8) OMat 8/207 Adhesive - Two part

C. Parts

(1) Lk83104 Pitot tube

(2) FW22040 Pitot tube retention assembly plate

D. Replace the Pitot Tubes (Fig. 813 and 814)

S 118-098-R00

WARNING: DO NOT GET THE DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING FLUID. KEEP DEGREASING FLUID AWAY FROM SPARKS, FLAMES, AND HEAT. THE DEGREASING FLUID IS A POISONOUS AND FLAMMABLE SOLVENT THAT CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(1) Clean the repair area.

(a) Remove all traces of adhesive from the pitot location holes and strut surface.

NOTE: Assembly A parts can show loose fibers. These fibers are sealed when the pitot tube is bonded.

(b) Remove all grease from the strut surface.
1) Make a clean, dry lint-free cloth moist with degreasing fluid (Acetone OMat No. 150 or Isopropyl Alcohol No. 1/40 or degreaser 1/257).
2) Use the cloth to clean the repair area.
3) You must discard the dirty cloth.
4) Use a clean cloth each time you clean a new area.
5) Contamination of the bulk liquid is not permitted.
6) Put the liquid on the cloth away from the container.
7) Let the repair area dry fully.

S 228-091-R00

(2) Do a dimensional inspection of the pitot location holes. Make sure that the holes are in the given limits.

S 218-092-R00

(3) Do a visual inspection of the pitot location hole and the adjacent area for cracks and damage. Use five times magnification and reject if cracked or damaged.

S 208-093-R00

(4) Assembly B (Fig. 814):
(a) Do a flourescent crack test of the repair area. Use OMat No. 653 flourescent penetrant. Cracks are not permited.
(b) Prepare the Surfaces for Bonding.
(c) Make sure the air passages of the pitot tube and the pitot retention assembly plate are clear. Use an oil-free air blast.

S 398-094-R00

(5) Bond the pitot tube to the strut (Assemblies A and B) (Fig. 813, Fig. 814).
(a) Prepare the OMat 208 Adhesive - Epoxy paste or OMat No. 207 Adhesive - Two part (refer to the manufacturer's instructions).
(b) Apply the adhesive to the pitot tube and the strut.
(c) Apply more adhesive to give a smooth contour between the pitot tube and the strut.
(d) Let the adhesive cure (refer to the manufacturer's instructions).

S 398-095-R00

(6) Assembly A:
(a) Seal all loose fibers on the GRP layer.
1) Apply a thin layer of the adhesive OMat No. 207 or OMat No. 208 to all areas that have loose fibers.

S 398-096-R00

(7) Assembly B (Fig. 814):

(a) Bond the pitot retension assembly plate to the strut (Fig. 814).

1) Prepare the OMat 208 Adhesive - Epoxy paste or OMat No. 207 Adhesive - Tw part (refer to the manufacturer's instructions).

2) Apply the adhesive to the pitot retention assembly plate and put the plate in position.

a) Make sure that the adhesive makes a seal on the edge of the pitot retention assembly plate.

b) Fill the countersunk holes with adhesive and finish flush.

c) Make sure that no adhesive goes into the holes of the pitot tube.

d) Cure the adhesive (refer to the manufacturer's instructions).

(b) Do a visual inspection of the pitot tubes or pitot retention assembly plate.

1) Make sure the pitot tubes or pitot retention assembly plates are correctly installed and are not blocked.

2) Make sure that the pitot tubes or pitot retention assembly plates are fully sealed to the strut.

S 398-097-R00

(8) Assembly A (Fig. 813):

(a) Apply primer to the repair area.

1) Mix OMat 766 Primer (refer to the manufacturer's instructions).

2) Apply the primer to areas of damage.

3) Make sure that the primer does not go into the holes of the pitot tube.

(b) Apply the polyurethane finish to the repair area.

1) Mix the OMat 8/50 Resin an OMat 8/172 Hardener (refer to the manufacturer's instructions).

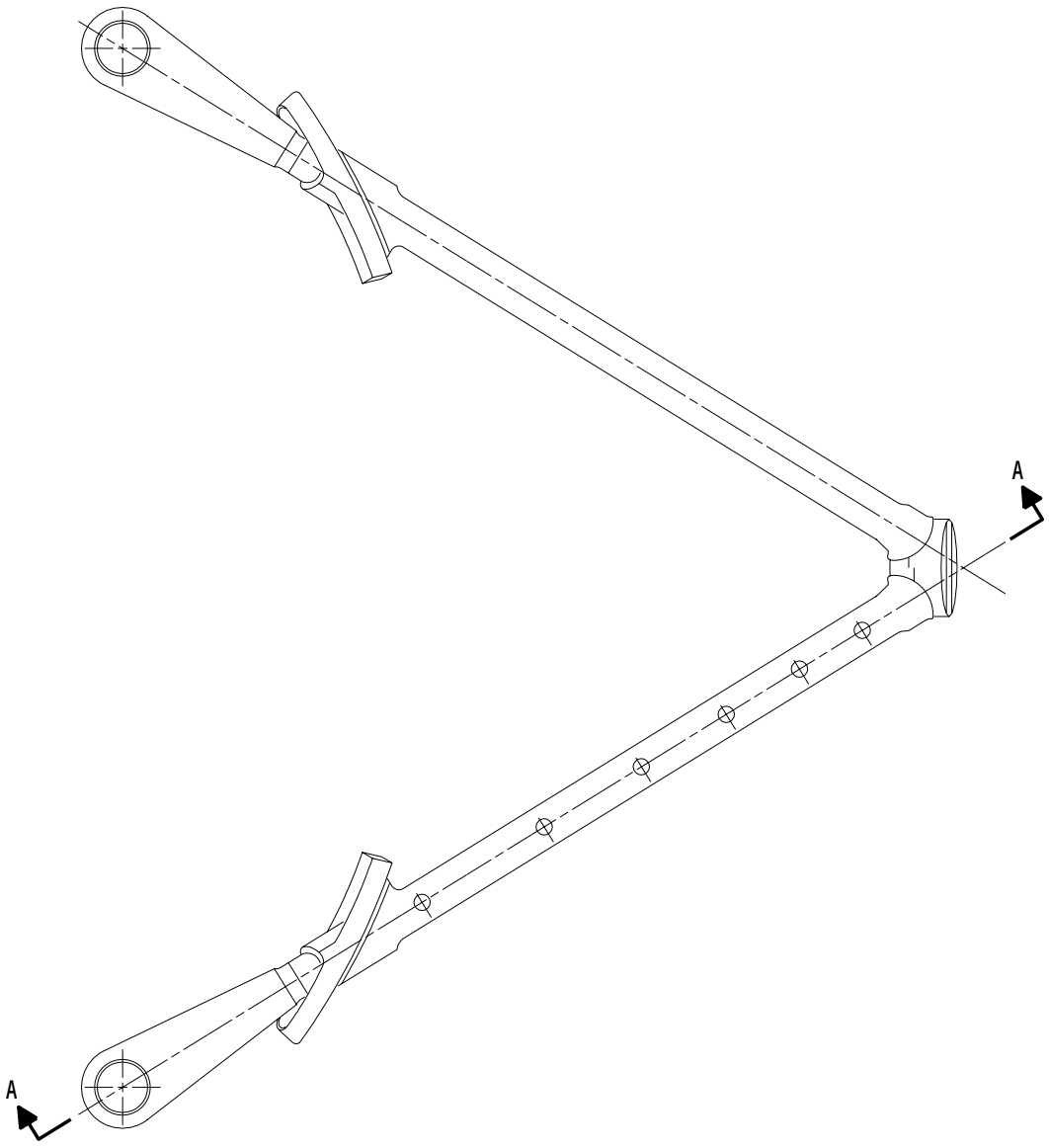
2) Apply the polyurethane to the repair area.

3) Make sure that the primer does not go into the holes of the pitot tube.

(c) Make a record of the repair.

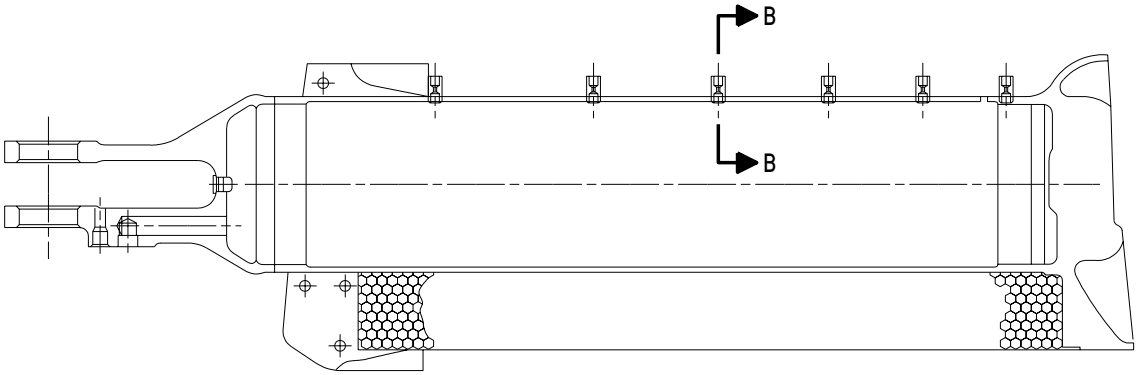
1) Vibro-engrave the repair number (FRS7101) adjacent to the part number.

(d) For assembly B which has had pitot retention assembly plates installed, make an entry in the engine log book to complete embodiment of SB72-D718 at the next shop visit.

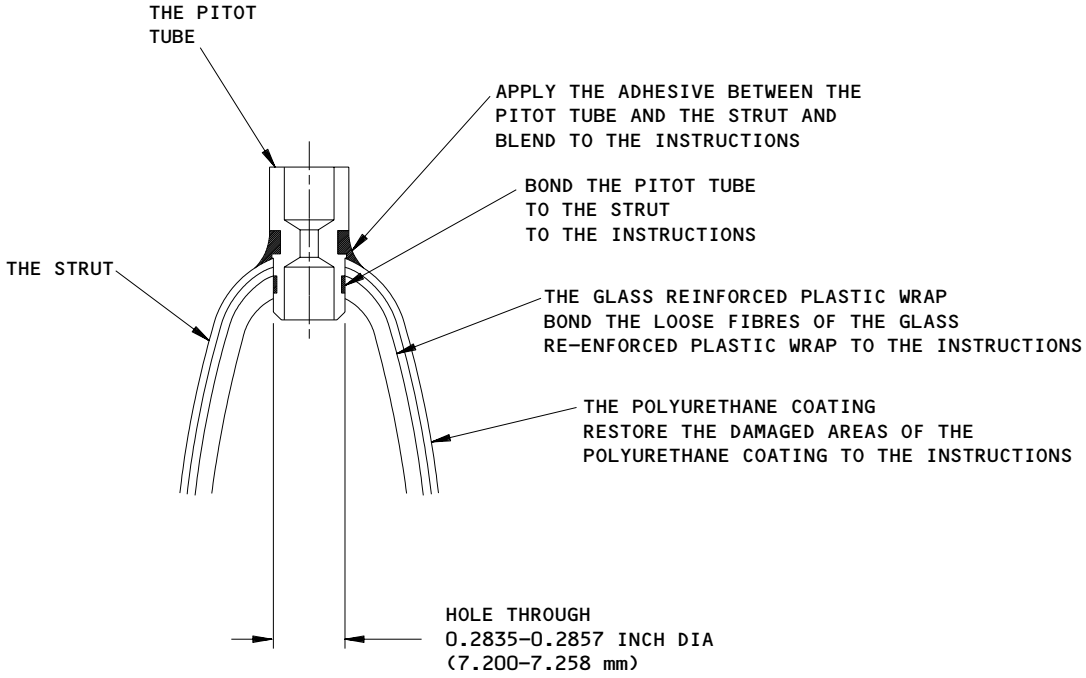


VIEW ON THE LP COMPRESSOR SUPPORT CASE ASSEMBLY
(TYPICAL FOR THE RIGHT ASSEMBLY AND THE LEFT ASSEMBLY)

Repair Details (Assembly A - Bonding of Pitot Tube)
Figure 813 (Sheet 1)



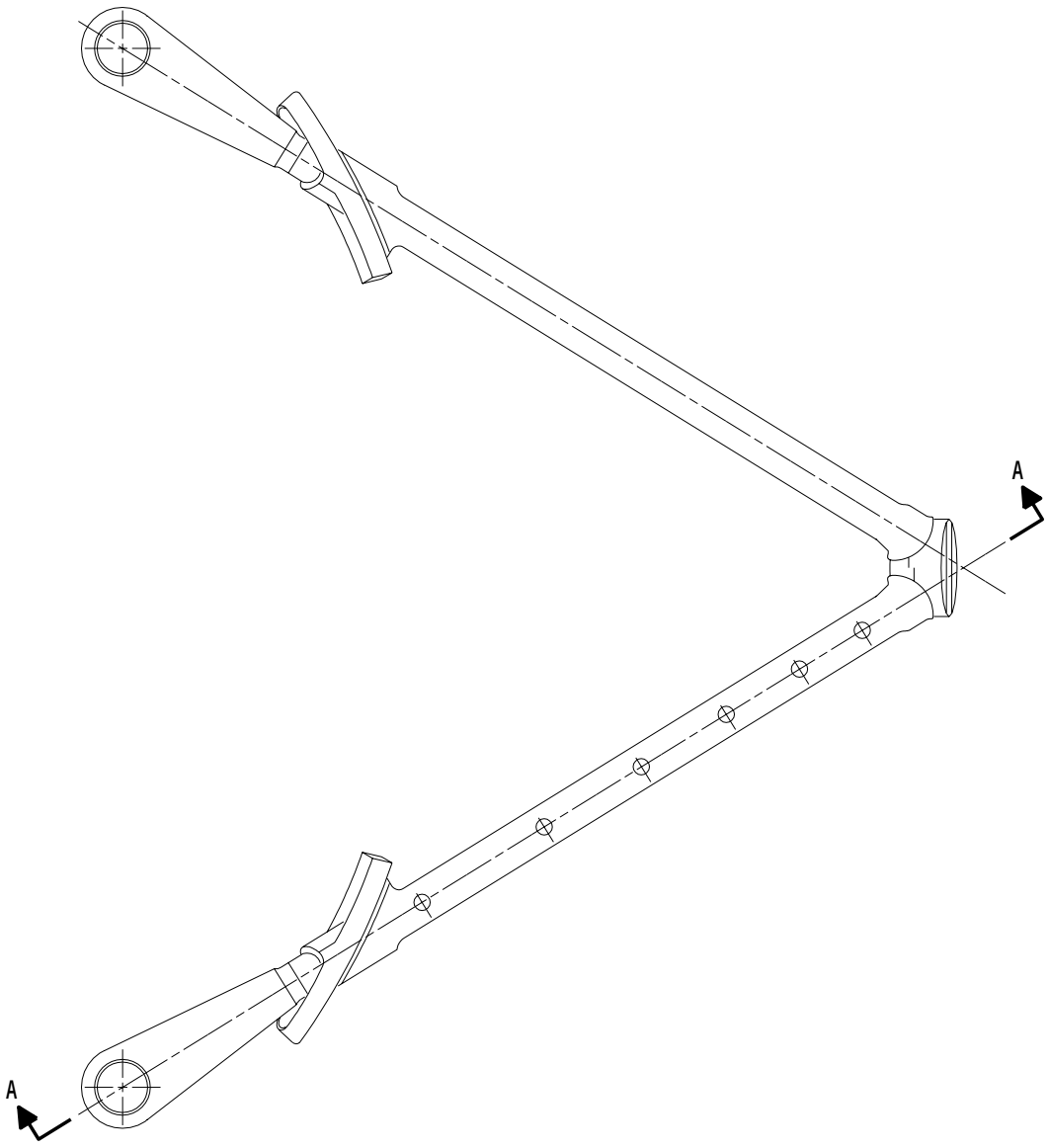
A–A



(TYPICAL, 6 POSITIONS)
B–B

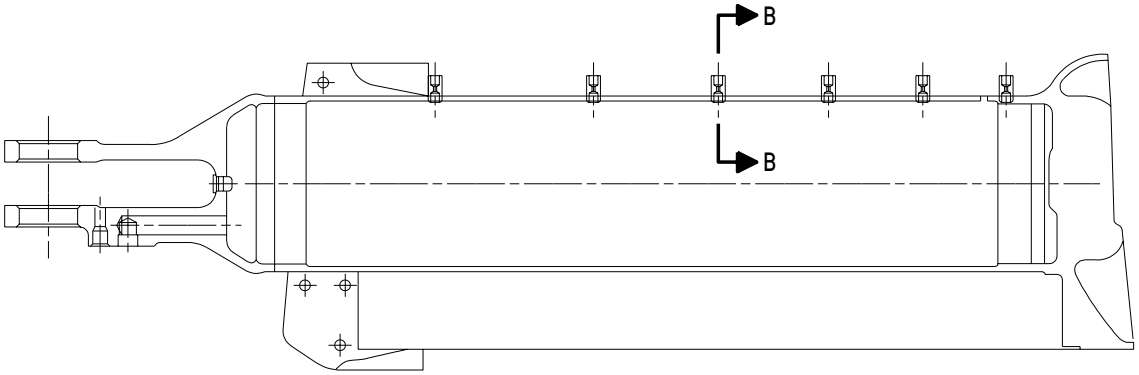
NOTE: PUSH THE PITOT TUBES FULLY HOME BEFORE THE BONDING.

Repair Details (Assembly A – Bonding of Pitot Tube)
Figure 813 (Sheet 2)

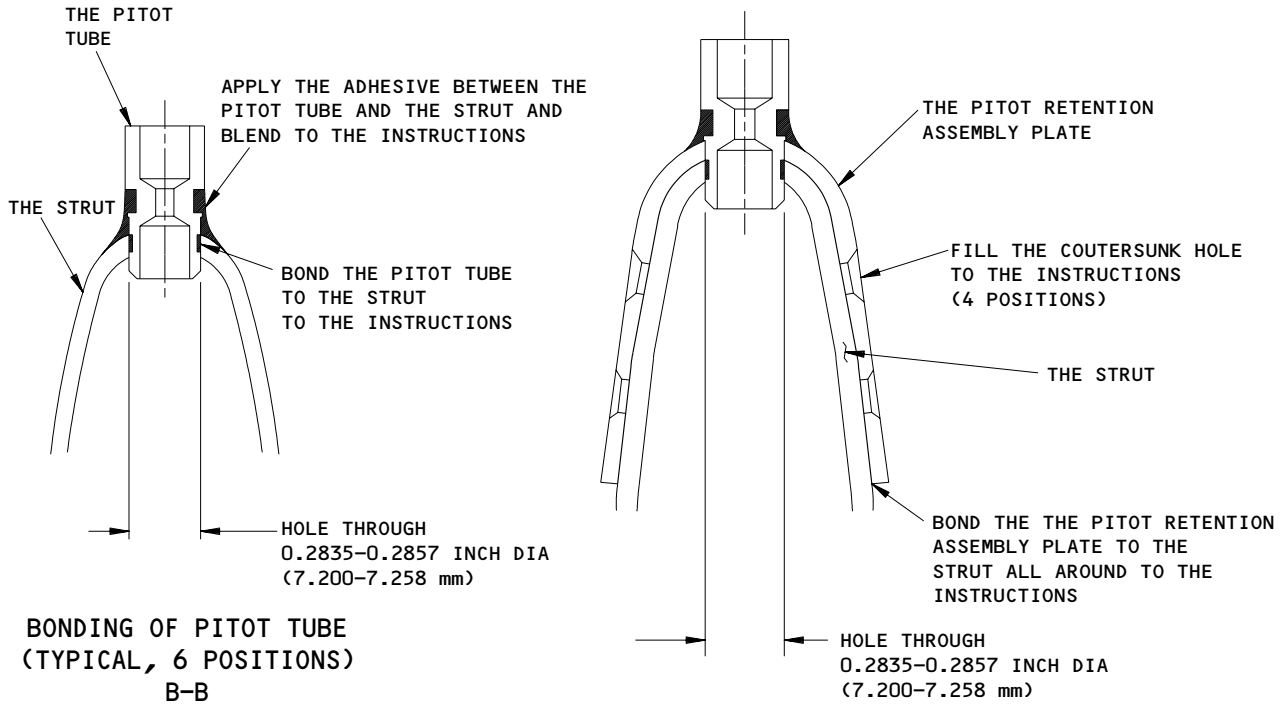


VIEW ON THE LP COMPRESSOR SUPPORT CASE ASSEMBLY
(TYPICAL FOR THE RIGHT ASSEMBLY AND THE LEFT ASSEMBLY)

Repair Details (Assembly B – Bonding of Pitot Tube
or Pitot Retention Assembly Plate)
Figure 814 (Sheet 1)



A-A



BONDING OF PITOT TUBE
(TYPICAL, 6 POSITIONS)
B-B

SHOWING THE REPLACEMENT OF THE PITOT RETENTION ASSEMBLY PLATE WITHOUT USING RIVETS (BONDING ONLY)
(TYPICAL, 6 POSITIONS)
B-B

NOTE: PUSH THE PITOT TUBES FULLY HOME BEFORE THE BONDING.

Repair Details (Assembly B - Bonding of Pitot Tube or Pitot Retention Assembly Plate)
Figure 814 (Sheet 2)

TASK 72-34-10-348-100-R00

20. LP Compressor Front Case Assembly Repair the Teflon Sleeve with a Heat Resistant Patch (Fig. 815)

A. General.

S 348-101-R00

(1) This repair is FRS7230.

S 348-102-R00

(2) You can use this repair for the part numbers that follow:

UL16446	UL38887
UL30964	UL50007
UL31314	FW11645
UL32667	FW11646
UL37136	FW11647
UL37154	FW11648
UL37243	FW11649
UL37317	FW11650
UL38178	FW11651
UL38186	FW11652
UL38193	FW17008
UL38195	FW17038

S 348-103-R00

(3) You can use this repair if the damage to the Teflon Sleeve is not more than 11.8 X 23.6 in. (300 mm X600 mm). If the damaged area is greater than these limits or is more than the area that is affected by heat in front of the starter motor, you must use FRS5972 (AMM 72-34-10/801).

B. Consumable Materials.

S 348-104-R00

(1) Material	Britsh Spec./Ref.	American Spec./Ref.	OMat
Acetone			150
or			
Isopropyl Alcohol			1/40
or			
Cleaning solvent Desoclean			1/257
Lint-Free Cloth			2/101
Polysulfide Compound			8/215
or			
Polysulfide Compound			8/136
Masking Tape			2/96
Aluminum Adhesive Tape			2/298

C. Procedure

S 328-119-R00

CAUTION: WHEELS, STONES , AND ABRASIVE PAPERS USED FOR DRESSING, BLENDING, OR CUTTING MUST BE OF THE SILICON CARBIDE TYPE. IFTHE MECHANICAL CUTTERS ARE USED, ONLY LIGHT CUTS MUST BE MADE TO AVOID OVERHEATING THE MATERIAL. IF DURING DRESSING, BLENDING, OR POLISHING THE MATERIAL BECOMES DISCOLORED BECAUSE OF HEAT, DARKER THAN A LIGHT COLOR, YOU MUST REJECT THE COMPONENT.

(1) Remove all of the material that remains from repairs that were done before.

S 018-107-R00

(2) Cut back the damaged Teflon sleeve (Fig. 815).
   (a) Remove material to leave an area of 11.8 X23.6 in. (300 mm X 600 mm) Kevlar.
   (b) After you have removed the material in the area that is affected by heat, make sure that the corners of the repair area have a minimum radius of 1.5 in. (38 mm).

S 128-108-R00

(3) Clean the repair area.

(a) Use OMat 150 Acetone, or OMat 1/40 Isopropyl Alcohol, or OMat 1/257 degreaser.

WARNING: DO NOT GET THE DEGREASING AGENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATH THE FUMES FROM THE DEGREASING AGENT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREASING AGENT. KEEP THE DEGREASING AGENT AWAY FROM SPARKS, FLAMES, AND HEAT. DEGREASING AGENTS ARE POISONOUS AND FLMMABLE SOLVENTS WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Degrease the exposed area of the Kevlar wrap. Apply the solvent to the area to be cleaned with an OMat 1/101 lin-free cloth. Discard the soiled cloth after use.

(c) Use a clean cloth and continue to degrease the area until the area is clean and free from grease.

1) Do not let a used cloth touch a solvent in the bulk container.

(d) Dry the degreased area with a clean, dry, lint-free cloth.

S 958-109-R00

(4) Mask the area around the repair, tubes, and harnesses as necessary.

(a) Use OMat 2/96 masking tape.

S 348-110-R00

(5) Apply polysulfide to the exposed Kevlar (Fig. 815).

(a) Use OMat 8/215 (PR1440B1/2 100 ml) X2 or OMat 8/136 (PR1422B2 100 ml) X2. Obey the manufacturer's instructions to mix the polysulfide.

1) Apply the mixed polysulfide to the exposed area of the kevlar. The poly sulfide should have a smooth contour in line with the original profile of the Kevlar.

2) Apply the polysulphide up to the edges of the Teflon sleeve. Do not apply the polysulphide on the top of the Teflon.

(b) Lift the cut edges of the Teflon sleeve. Apply the polysulphide underneath the Teflon sleeve.

1) Make sure there is an overlap of 15 to 20 mm. around the repair area.

2) The thickness of the applied polysulphide should be no thicker than 0.079 in. (2 mm).

3) Make sure there is no exposed Kevlar in the repaired area.

(c) Apply the polysulphide under the accessory strap.

1) If the accessory strap is Pre SB72-D018, remove accessories as necessary and loosen the accessory strap to get access.

2) If the accessory strap is post SB72-D018, do not loosen the accessory strap.

3) Apply polysulphide under the strap and around the spacers

NOTE: Apply a maximum of 250 ml of the polysulphide.

(d) Let the polysulphide cure.

CAUTION: IF YOU USE HEAT TO REDUCE THE CURE TIME OF THE POLYSULPHIDE, DO NOT APPLY HEAT TO THE TEFLON SLEEVE AND KEVLAR WRAP WHICH IS NOT DAMAGED OR TO THE ADJACENT COMPONENTS, HARNESSES AND TUBES. THE HEAT CAN CAUSE DAMAGE TO THESE PARTS.

1) Let the polysulphide cure for 30 hours at 25 deg. C or 3 hours at 50 to 65 deg. C. Use J-type or K type thermocouples held close to the surface of the polysulphide to make sure that the surface temperature is controlled at all times. Use a suitable heat lamp.

S 958-111-R00

(6) Remove the masking.
(a) Remove the applied masking tape. Take care not to cause damage to the polysulphide layer.

S 958-112-R00

(7) Apply aluminum adhesive tape to the polysulphide applied area. Use OMat 298, Aluminum adhesive tape that is at least 2 in. (50 mm) wide. (Fig. 815).
(a) Apply the aluminum tape to the cured polysulphide only.
(b) Apply the aluminum tape in long lines and make an overlap of each line by 5 mm. until the polysulfide area is completely covered.
(c) Make sure that the aluminum tape is applied undereath the Teflon sleeve wth a 20 to 25 mm overlap.
(d) Apply the aluminum tape over the top of the tape that was applied before, in axial lines.

(e) Make an overlap of each line of 5 mm. and continue until all of the tape that was applied before is completely covered.
(f) After the aluminum tape is applied, do not peel it off.
(g) Make sure that all areas of polysulphide are covered.

S 218-113-R00

(8) Make sure there is no grease or polysulphide on the Teflon sleeve.

WARNING: DO NOT GET THE DEGREASING AGENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE DEGREASING AGENT. PUT PROTECTIVE SPLASH GOGGLES AND GLOVES ON WHEN YOU USE THE DEGREASING AGENT. KEEP THE DEGREASING AGENT AWAY FROM SPARKS, FLAMES, AND HEAT. DEGREASING AGENTS ARE POISONOUS AND FLAMMABLE SOLVENTS WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Clean the repair area.
  1) Use OMat 150 Acetone, OMat 1/40 Isopropyl Alcohol, or OMat 1/257 Degreaser.
  2) Apply the solvent to the area to be cleaned with an OMat 2/101 lint-free cloth. Discard the soiled cloth after use.
  3) Use a clean cloth and continue to degrease the area until the area is clean and free from grease.
  4) Do not let a used cloth touch the solvent in the bulk container.
(b) Dry the degreased area with a clean, dry, lint-free cloth.

S 348-115-R00

(9) Apply aluminum adhesive tape to the Teflon sleeve. Use OMat 298, Aluminum adhesive tape. (Fig. 815).
(a) Apply the aluminum tape around the full circumference of the Teflon sleeve.
  1) On the top of the Teflon sleeve apply a width of 1 in. (25 mm).
  2) On the top of the aluminum patched polysulphide apply a width of 1 in (25 mm).

3) On the left and rear sides of the patch, apply three pieces of tape exactly the same in length, to give an overlap of 1 in. (25 mm) on each surface. This is to increase the area of bond for the Teflon sleeve.

NOTE: You can use alternative widths of tape up to 6 in. (150 mm) wide.

S 868-116-R00

(10) Install the accessories that were removed for the repair.

S 428-117-R00

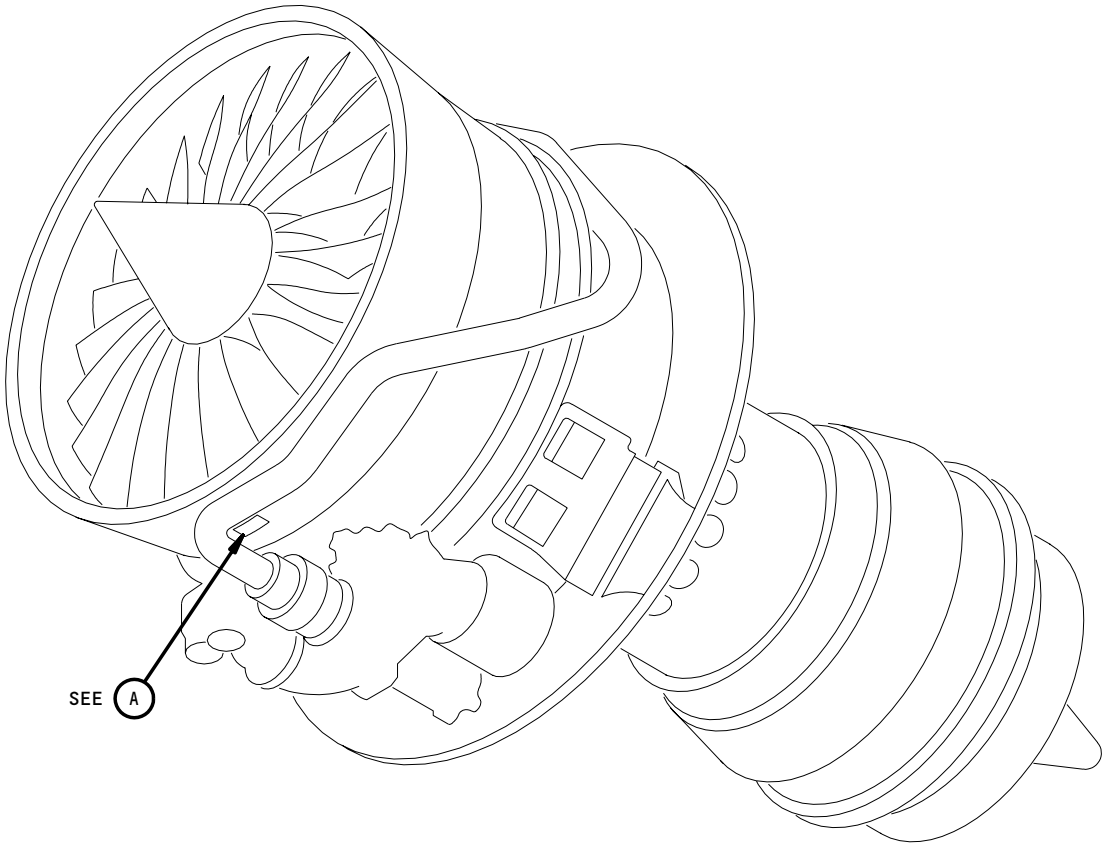
(11) Tighten the accessory strap.

S 938-118-R00

(12) Identify the repair.

(a) Use a vibro-engraver to write the repair identification number adjacent to the part number on the LP Compressor case or make an entry in the engine log book that FRS 7230 has been done.

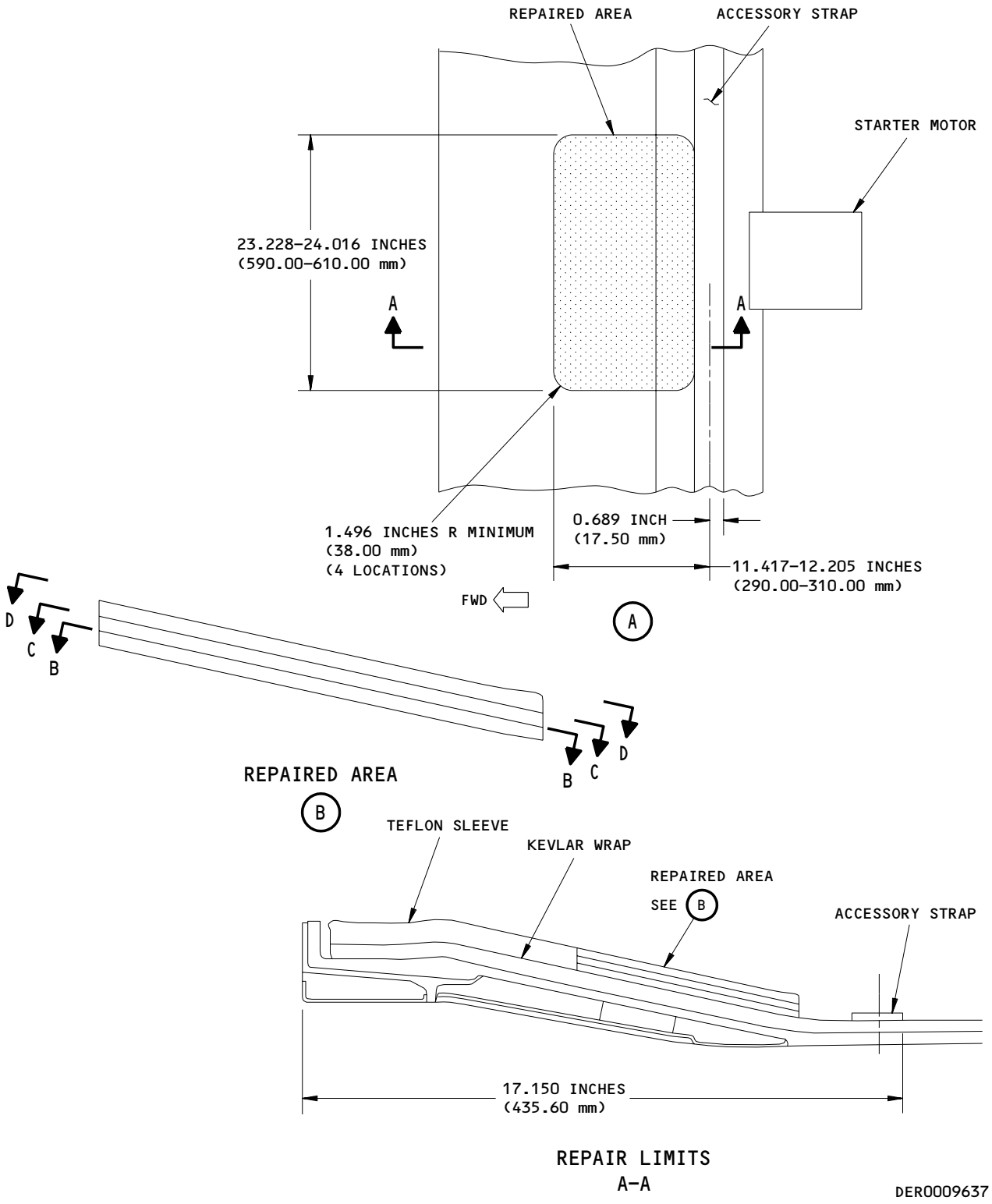
(b) Make a note in the engine log book that at every opportunity where there is access to the repaired area, do an inspection of the patched area and apply the aluminum tape again.



BASIC VIEW OF 535E4 ENGINE
(TO SHOW THE AREA TO BE REPAIRED)

DER0009636

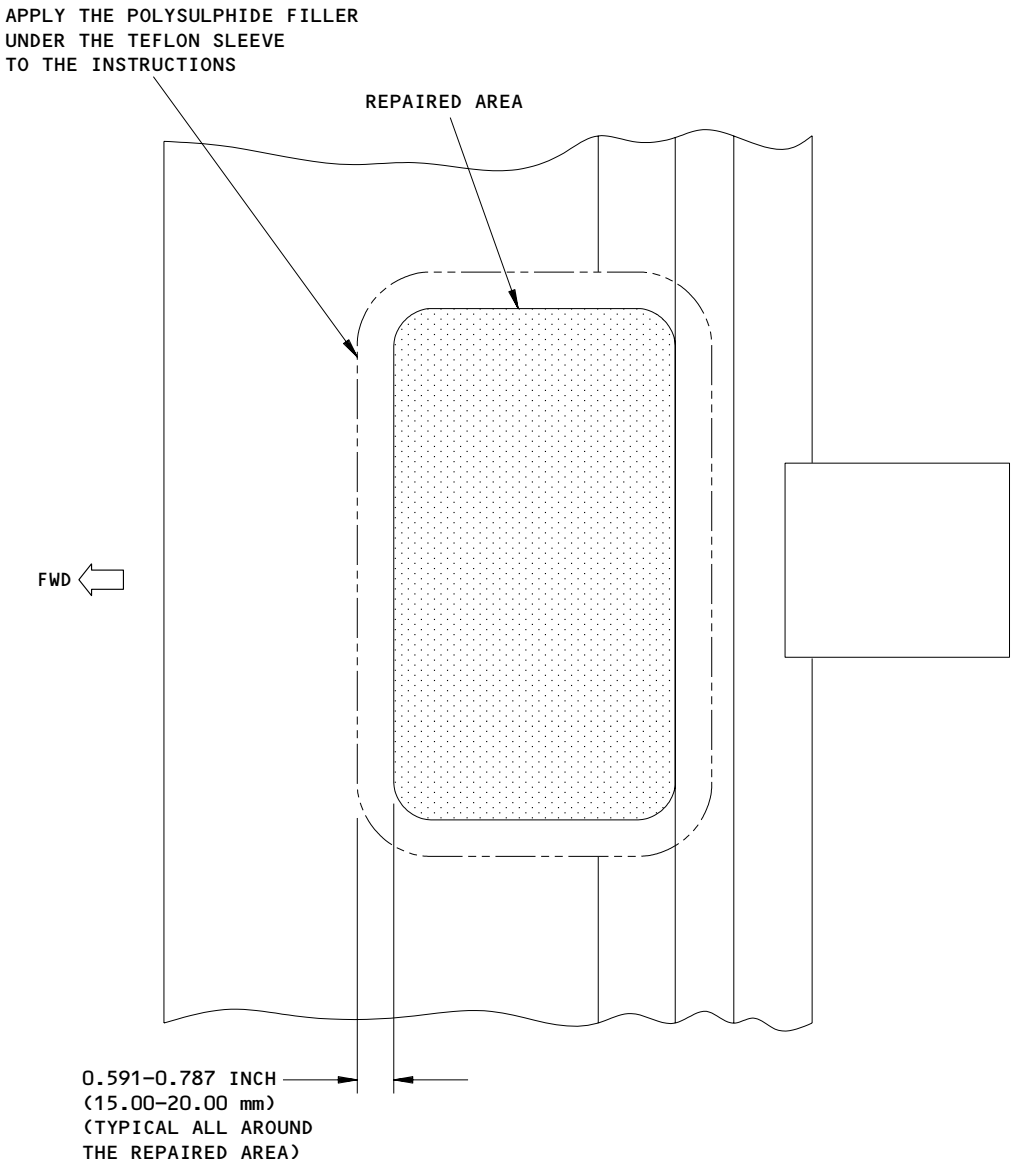
Repair Area
Figure 815 (Sheet 1)



REPAIR LIMITS
A–A

DER0009637

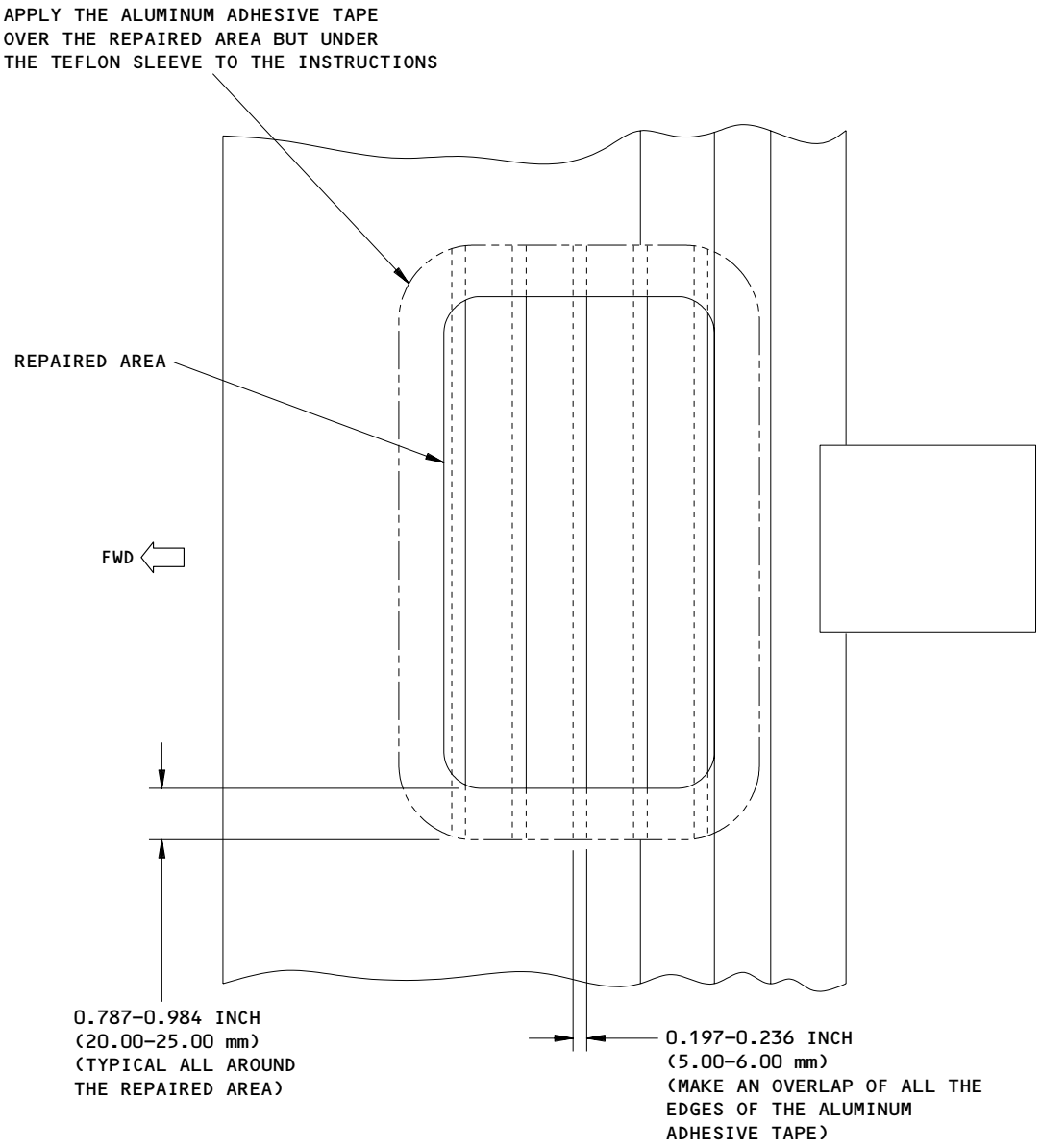
Repair Area
Figure 815 (Sheet 2)



POLYSULPHIDE FILLER
B–B

DER0009638

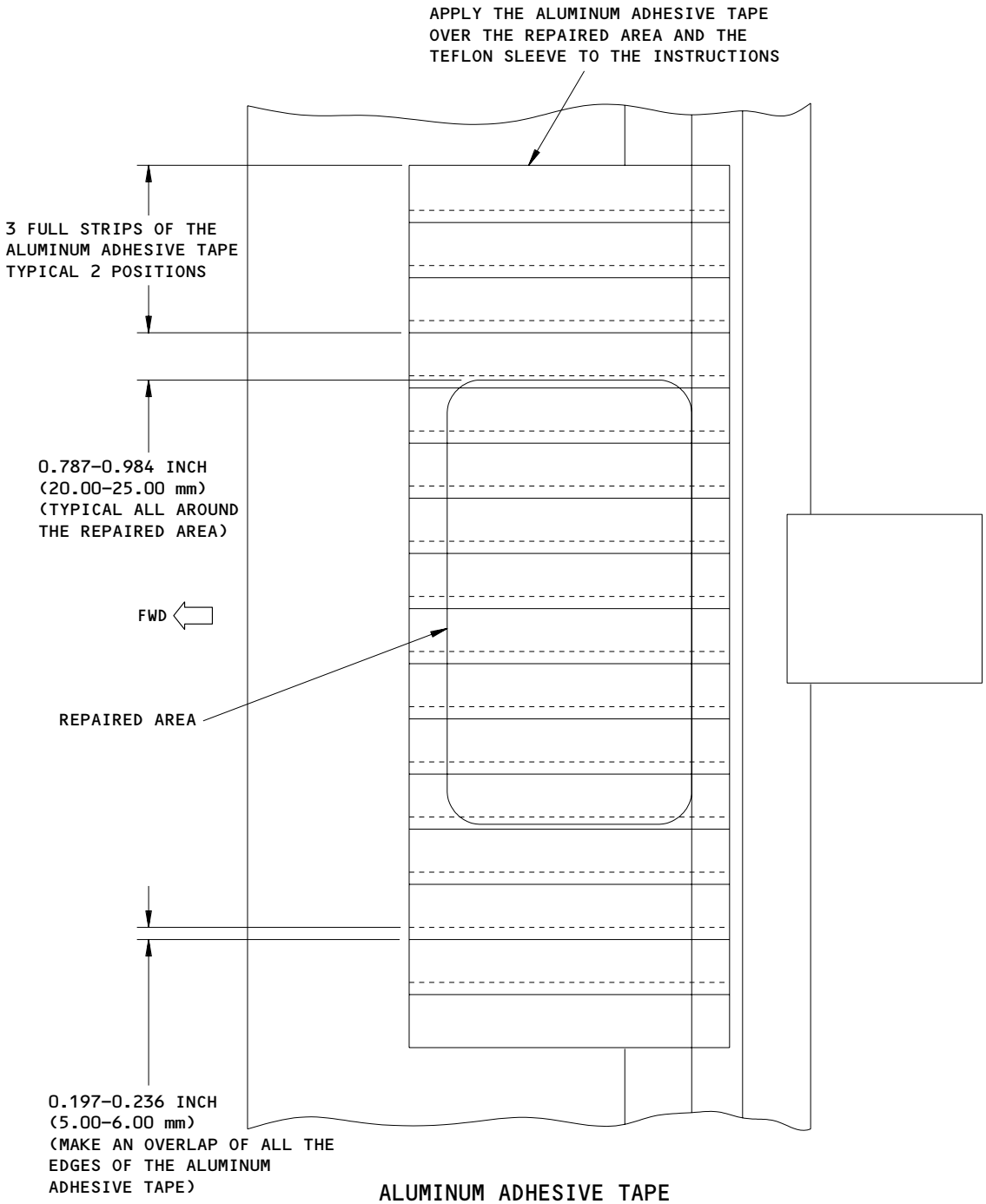
Repair Area
Figure 815 (Sheet 3)



ALUMINUM ADHESIVE TAPE
(1ST LAYER)
C–C

DER0009639

Repair Area
Figure 815 (Sheet 4)



ALUMINUM ADHESIVE TAPE
(2ND LAYER)
D–D

DER0009640

Repair Area
Figure 815 (Sheet 5)

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

TASK 72-34-10-728-120-R00

21. Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing) (Fig. 816)

A. General

(1) This procedure (FRS. 5200) replaces the rotor path lining. The repair uses a cold cure adhesive and hand dressing.

(2) During this repair, you must keep the area clean. Dirt or grease on the surfaces to be bonded will cause poor adhesion and unsatisfactory bonds. You must out on clean cotton or polyethylene gloves when you handle the parts that will be bonded.

(3) You can do this repair for L. P. Compressor cases with these part numbers:

UL30964	UL38178
UL31314	UL38186
UL37243	UL38193
UL37317	UL38195
UL38887	
FW11645	FW11655
FW11646	FW11656
FW11647	FW11657
FW11648	FW11658
FW11653	FW17008
FW11654	

B. Equipment

(1) Standard Equipment:

(a) 500 gram capacity scales accurate to 1 gram
(b) Abrasive blasting facility
(c) Degreasing facility
(d) Small trowel
(e) Spatula
(f) Vacuum cleaner
(g) Vibration peen equipment

(2) Special tools:

(a) MH15789 Temperature control unit
(b) MH15879 Harness
(c) MH16185 Clamp plate
(d) MH16188 Clamp
(e) MH16596 Pressure pad

C. Consumable Materials

(1) Solvent (One of these):

(a) OMat 150 Acetone

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

(b) OMat 1/40 Isopropyl Alcohol
(c) OMat 1/257 Cleaning solvent

(2) OMat 1249 Polyethylene sheet
(3) OMat 146 Abrasive medium
(4) OMat 230 Masking (zinc oxide) adhesive tape
(5) OMat 283 Abrasive tape
(6) OMat 5/66 Abrasive paper
(7) OMat 5/97 Garnet paper
(8) OMat 5/98 Garnet paper
(9) OMat 8/253A Two-Part epoxy cured polythioether compound
(10) OMat 8/257 Adhesion promoter
(11) OMat 8/52 Adhesive
(12) OMat 874 Filler
(13) Lint-free cloth (commercially available)

D. Access

(1) Location Zones
(a) 410 Left Power Plant
(b) 420 Right Power plant

E. Procedure

S 028-122-R00

(1) Do the steps that follow to replace the Rotor Path lining (Fig. 816)

CAUTION: YOU MUST USE A NON-METALLIC CHISEL, BLADE, OR SCRAPER IN A CONTINUOUS DIRECTION TO REMOVE THE PANEL. YOU MUST POINT THE CHISEL, OR BLADE, PARALLEL WITH THE SURFACE OF THE LP COMPRESSOR CASE. THE LP COMPRESSOR CASE IS THIN IN SOME AREAS. IF YOU TOUCH IT WITH A TOOL, YOU CAN CAUSE DAMAGE TO THE LP COMPRESSOR CASE AND MAKE IT UNSERVICEABLE.

CAUTION: DO NOT USE A ROTATING SLITTING WHEEL TO REMOVE PANELS FROM THE LP COMPRESSOR CASE. THESE TOOLS CAN CAUSE DAMAGE TO THE LP COMPRESSOR CASE AND MAKE IT UNSERVICEABLE.

(a) Use OMat 1249 polyethylene sheet and OMat 230 masking tape to cover the IP compressor intake.
(b) Use OMat 1249 polyethylene sheet and OMat 230 masking tape to remove the defective panels from the repair area.
(c) Use a vacuum cleaner to remove all unwanted material and adhesive from the LP compressor case.

NOTE: When you remove the damaged panels and remove the adhesive, you must not to remove the parent material from the compressor case. Removal of the parent material can make the compressor case unserviceable.

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

(d) Hand abrade the repair area
  1) Use OMat 5/66 abrasive paper or OMat 5/97 garnet paper and 5/98 garnet paper to abraded the damage area.

(e) Examine the repair area for signs of corrosion.
  1) If you find signs of corrosion, do FRS. 6826 before you continue with FRS. 5200.

(f) Examine the adjacent panels that are not damaged.
  1) Examine the adjacent panels to make sure that the panels have not become dislodged during removal of the defective panels.
  2) Do a check of the attrition lining panels to determine if any are loose from the LP Compressor Front Fan Case.
    a) Use a suitable implement to lightly hit (tap) the attrition ling panel.
    b) Tap in a straight line in an axial direction accross the panel. The taps should be no more than 1 inch (25.4 mm) apart.
    c) Do the process over the circumferential length of the panel. Tap in axial lines no more than 1 inch (25.4 mm) apart. A hollow sound can show that there is an area where an attrition lining panel has become loose from the LP Compressor Case.
  3) If the detected area, with loose panels, is at the corner of a panel or on the joint line of adjacent attrition lining panels, replace the affected panels in accordance with this repair
  4) If the area with loose panels is in an area away from the corner or joint line between adjacent attrition lining panels or is less than 10% of the total panel area, and less than 4 square inches (101.6 square mm), it is not necessary to replace the panel(s).
  5) If the detected area with loose panels is more than 4 square inches (101.6 square mm), remove and replace the panelS in accordance with the instructions in this repair.

(g) Prepare the surfaces to be bonded.

NOTE: Cleanliness of the surfaces to be bonded is very important. There must be no contamination and all of the old adhesive must be removed before the new adhesive layer is applied.

(h) Abrasive clean the repair area.

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

WARNING: YOU MUST PUT ON PROTECTIVE GLOVES WHEN YOU USE THE DEGREASING FLUIDS. DO NOT SMOKE WHEN YOU USE THE DEGREASING FLUIDS BECAUSE THE DEGREASIG FLUIDS DECOMPOSE TO MAKE A VAPOR THAT IS VERY TOXIC. USE THE DEGREASING FLUIDS ONLY IN AREAS THAT HAVE A GOOD FLOW OF AIR. KEEP AWAY FROM SOURCES OF IGNITION. THE DEGREASING FLUIDS ARE FLAMMABLWE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE INJURY TO PERSONS.

1) Use OMat 146 abrasive medium to clean the repair area.
2) Remove all grit and dust from the repair area.

(i) Do a surface break test of the prepared area.
1) Apply a thin film of distilled water to the repair location with a soft brush.
2) Immediately monitor the surface of the water to see if the film breaks.
3) If a separation occurs within 30 seconds you must clean the area again until the check is satisfactory.

(j) Degrease the prepared area to remove the break test fluid.
1) Apply OMat 150 Acetone, OMat 1/40 isopropyl alcohol, or OMat 1/257 cleaning fluid with a clean lint-free cloth to remove the break test fluid.
2) Let the surface dry in air.

(k) Use OMat 150 acetone, OMat 1/40 isopropyl alcohol, or 1/257 cleaning solvent to degrease the repair parts.
1) Dip the bonding face of the replacement panel or channel in the degreasing fluid and agitate to remove contamination.
2) Remove the repair part from the degreasing fluid and let the repair part dry in air.

(l) Prepare the filler material.
1) Mix the OMat 874 filler.

NOTE: Use a 500-gram capacity scale that is accurate to ±1 gram.

a) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together, until a constant blue color is without streaks.

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

2) Apply the OMat 874 filler to nomex honeycomb voids in the edges of the panels adjacent to the repair area.
   a) Use workshop tools and a spatula or a small trowel. Slightly overfill the attrition lining if you will machine the panel. Finish level with the nomex honeycomb if you will not machine the panel.

      NOTE: Do not overfill the aluminum honeycomb.

      NOTE: You must do the steps to prepare the adhesive, to apply the adhesive, and to install the replacement panels immediately after the filler is applied.

(m) Prepare and apply the adhesive OMat 8/253A.

NOTE: This adhesive is an alternative to OMat 8/52. Use this adhesive if this repair can cure at ambient temperature.

1) Use adhesion promoter 8/257 and a soft bristle brush to apply the adhesion promoter.
   a) Let the adhesion promoter dry in the air for 30 minutes.
2) Prepare and apply the polythioether compound OMat 8/253A.
   a) Mix the two-part epoxy cured polythioether compound in accordance with the manufactuer's instructions.
   b) Use a spatula or a comb and apply a layer of the polythioether compound 0.08 inch (2.0 mm) to 0.12 inch (3.0 mm) thick to the surface of the fan case.
   c) Use a brush or a roller and apply a layer of the polythioether compound 0.04 inch (1.0 mm) to 0.08 inch (2.0 mm) thick to the surface of the replacement panels.

      NOTE: When you apply the adhesive to the fan case, make sure that there is no contamination or smears on the adhesive with the blue filler that was applied earlier. If contamination occurs, remove the contaminated material and then continue with the application of the adhesive. Apply the adhesive again in that location.

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

(n) Prepare and apply the adhesive 8/52.
1) Mix the adhesive compound OMat 8/52.
a) Weigh out 100 parts of grey paste (Part A) and 33 parts of amber liquid (Part B) and mix thoroughly.

NOTE: The working life is approximately one hour at 22°C (72°F).

b) Use a spatula or a comb and apply a layer of the adhesive compound 0.04 inch (2.0 mm) thick to the surface of the replacement panels.

NOTE: When you apply the adhesive to the fan case, make sure that there is no contamination or smears on the adhesive with the blue filler that was applied earlier. If contamination occurs, removes the contaminated material and then continue with the application of the adhesive. Apply the adhesive again in that location.

(o) Bond the replacement panels.
1) Bond the replacement panels in position.
2) If you will use heat to cure the adhesive, put a thermocouple in the adhesive at the panel joint to monitor the cure temperature.
3) Use OMat 283 adhesive tape and temporarily attach the panes with adhesive tape.
4) Use OMat 874 filler to prepare the filler material.
5) Apply the filler material to gaps around the replacement panels.
6) Hold the replacement panels in position with mechanical clamps.
a) If you will cure the filler and adhesive at ambient temperature, use clamp plate MH16185, clamp MH16188, and pressure pad MH16596.
b) If you will use heat to reduce the cure time, use the MH15789 temperature control.
7) Cure the adhesive and the filler (OMat 8/52).
a) Cure at a maximum temperature of 60°C (140°F) for 3 hours.

NOTE: Use a thermometer to monitor the temperature.

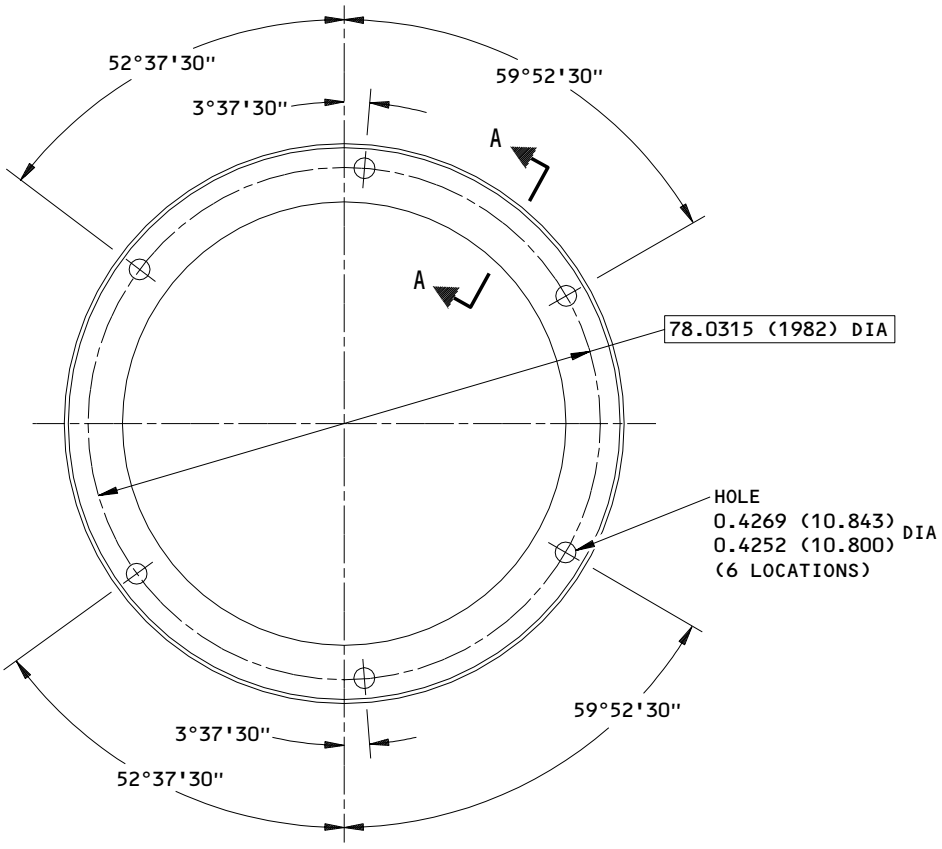
8) Cure the adhesive and the filler (OMat 8/253A).
9) Cure at ambient temperature in accordance with the manufacturer's instructions.
10) Remove the clamping tools.
(p) Fill the attrition lining honeycomb.
1) Use OMat 874 to prepare the filler material.

Rotor Path Lining Replacement (With the Use of Cold Cure Adhesive and Hand Dressing)

2) Mix, by weight, 100 parts of the blue base and 94 parts of the white accelerator together, until a constant blue color without streaks.
3) Apply the filler to the honeycomb voids.

NOTE: Overfill the voids a small amount.

(q) Do an inspection of the repair.
1) Make sure that the attrition lining panels are tighten on the LP Compressor Front Fan Case.
a) Use a suitable implement to lightly hit (tap) the attrition lining panel.
b) Tap in a straight line in an axial direction accross the panel. The taps must be no more than 1 inch (25.4 mm) apart.
c) Do the process over the circumferential length of the panel. Tap in straight lines that are no more than 1 inch (25.4 mm) apart. A hollow sound can show that there is an area where the attrition lining panel become loose from the LP Compressor Case.
2) If the detected area of loose panels is at the corner of a panel or on the joint line of adjacent attrition lining panels, replace the affected panels in accordance with this repair.
3) If the detected area of loose panels is in an area away from the corner or a joint line between adjacent attrition lining panels or is less than 10% of the total panel area, and less than 4 square inches (101.6 square mm), it is not necessary to replace the panel(s).
4) If the detected area of loose panels is more than 4 square inches (101.6 square mm), remove and replace the panel in accordance with the instructions in this repair.
(r) Use hand dressing to make the rotor path profile.
1) Abrade the attrition lining to the necessary profile.
a) Use OMat 5/66 abrasive paper or OMat 5/97 garnet paper.
b) Make sure that the aerodynamic smoothness is restored.
(s) Use a vacuum cleaner to remove all the unwanted materials from the repair area.
(t) Do a visual and dimensional inspection of the repaired area.
(u) Identify the repair.
1) Vibration peen FRS.5200 adjacent to the repaired area.

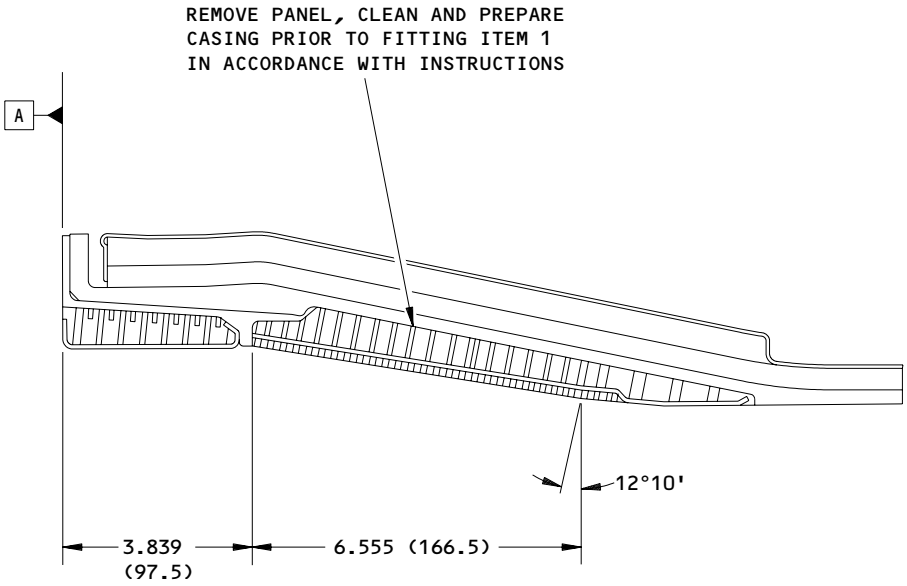


VIEW ON THE FRONT FLANGE OF LP COMPRESSOR FRONT CASE

NOTE: ALL BONDS ARE GROUP 2.
GEOMETRIC SYMBOLS CONFORM TO ISO R1101-1969.
DIMENSIONS ARE IN INCHES (MILLIMETERS).

66301

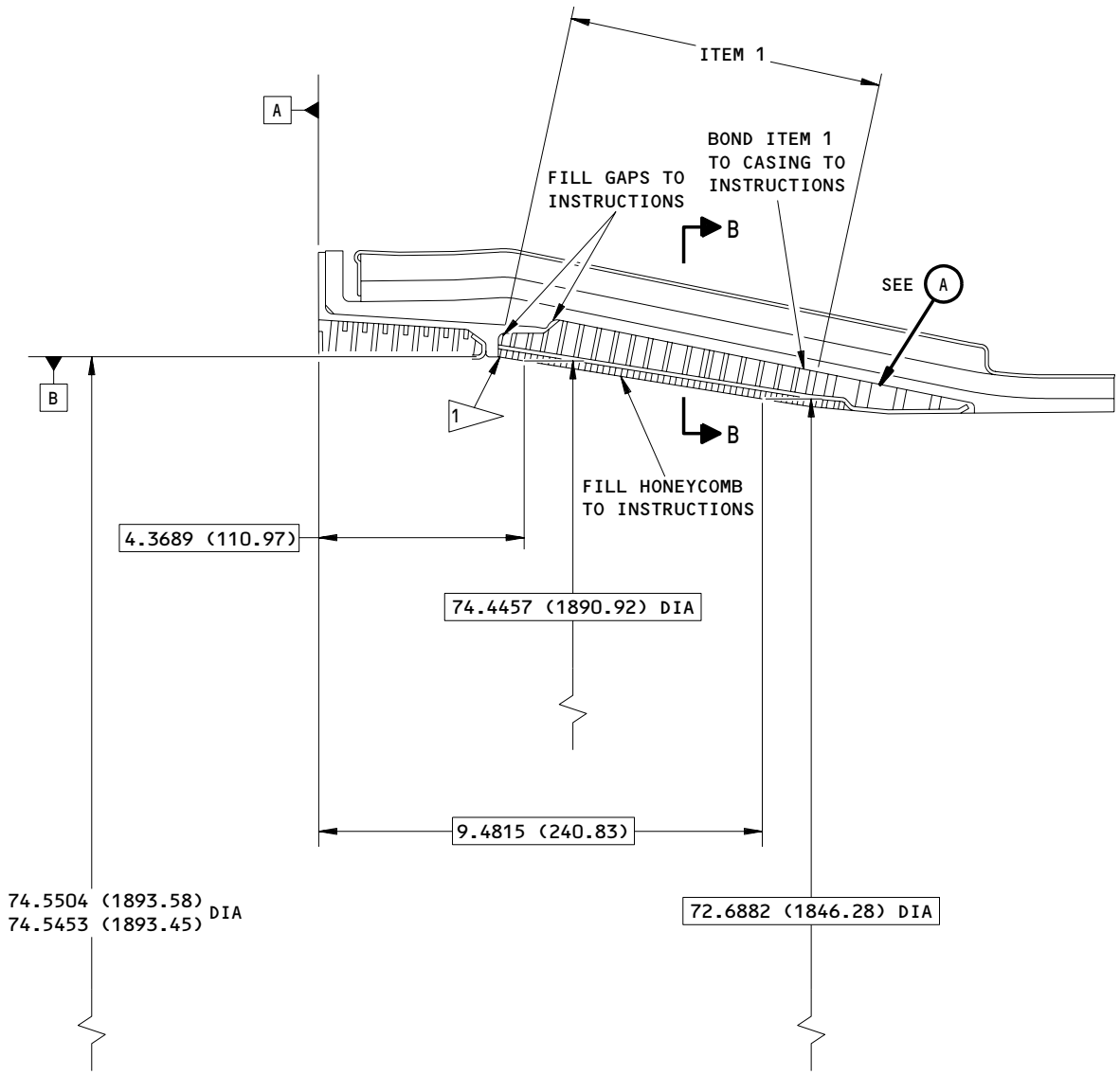
Repair Details and Dimensions
Figure 816 (Sheet 1)



(SHOWING REMOVAL OF DAMAGED ACOUSTIC PANEL)
A-A

65886A

Repair Details and Dimensions
Figure 816 (Sheet 2)

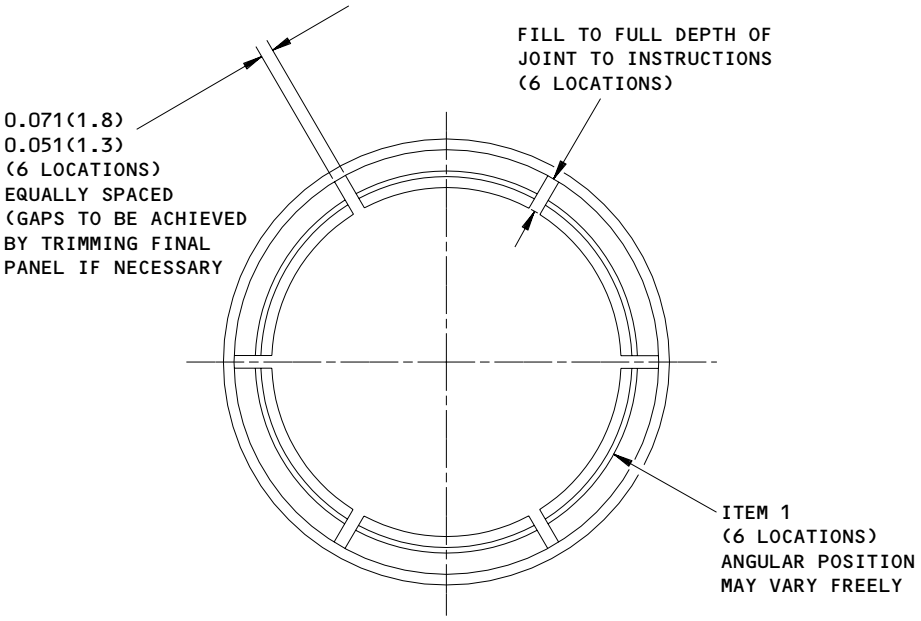


A-A

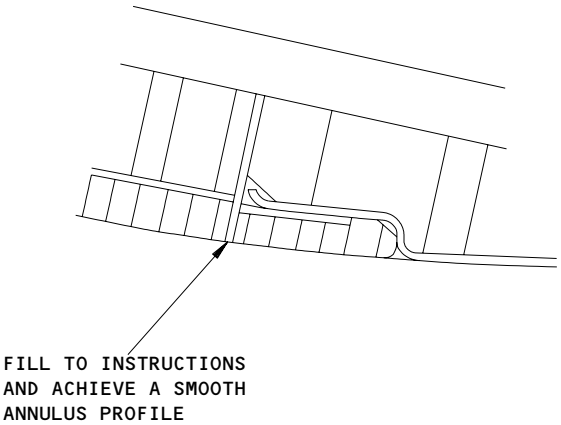
1 A SMOOTH ANNULUS PROFILE TO BE ACHIEVED AT THIS POSITION IN ACCORDANCE WITH INSTRUCTIONS.

66302A

Repair Details and Dimensions
Figure 816 (Sheet 3)



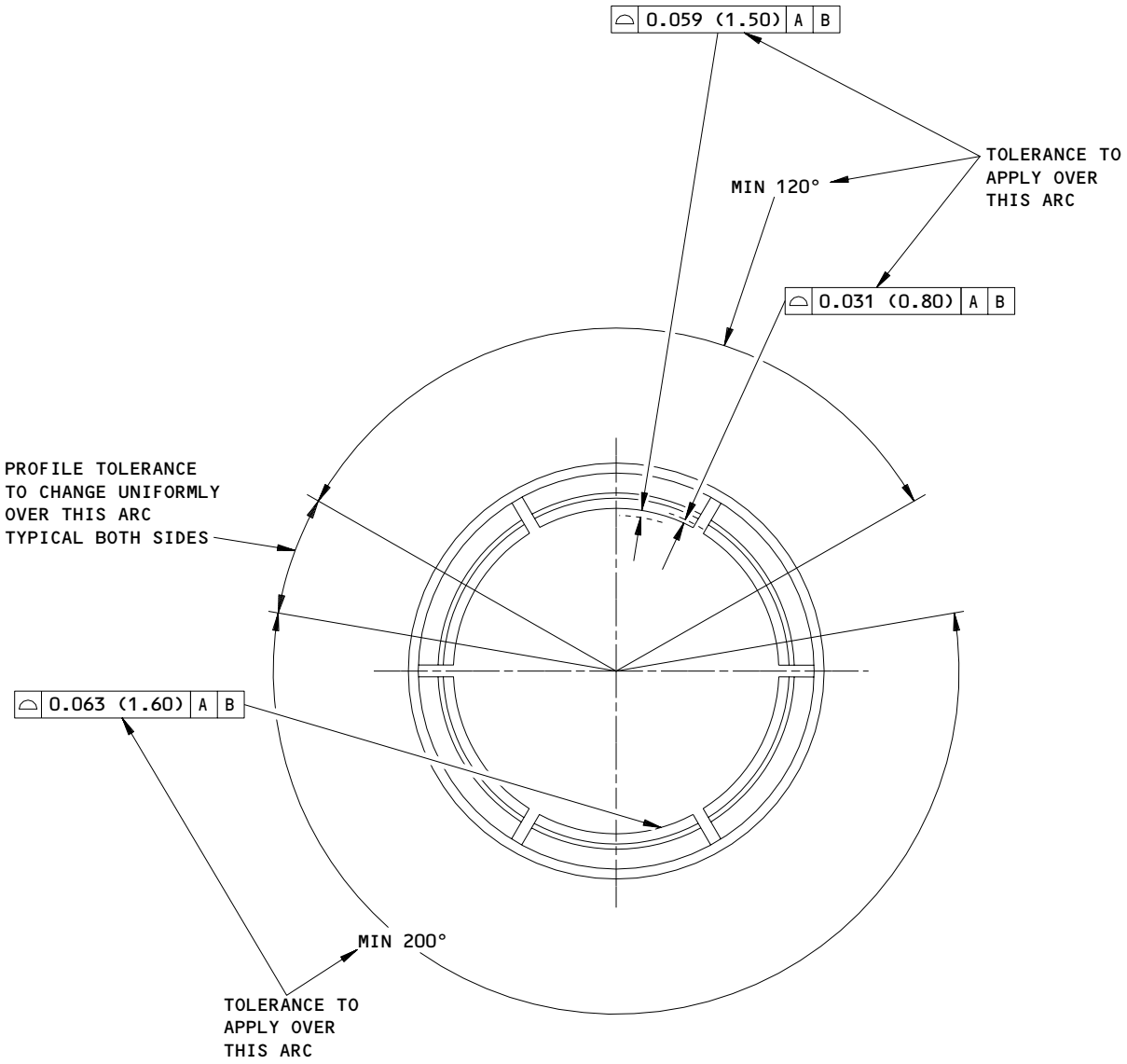
(DIMENSION DETAILS)
B-B



(A)

66303A

Repair Details and Dimensions
Figure 816 (Sheet 4)



(REPAIR DETAILS)
B-B

95135

Repair Details and Dimensions
Figure 816 (Sheet 5)

THRUST REVERSER LOCATING RING - INSPECTION/CHECK

1. General
   A. This procedure contains the inspection of the seal end blocks installed on the radial drive fairing seal.

TASK 72-34-11-216-001-R00

2. Inspection of the Seal End Blocks on the Radial Drive Fairing Seal
   A. References
      (1) AMM 72-34-11/801, Thrust Reverser Locating Ring
      (2) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones
          415/425 Thrust Reverser (Left)
          416/426 Thrust Reverser (Right)

   C. Do an Inspection of the Seal End Blocks

S 016-002-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open the thrust reverser (AMM 78-31-00/201).

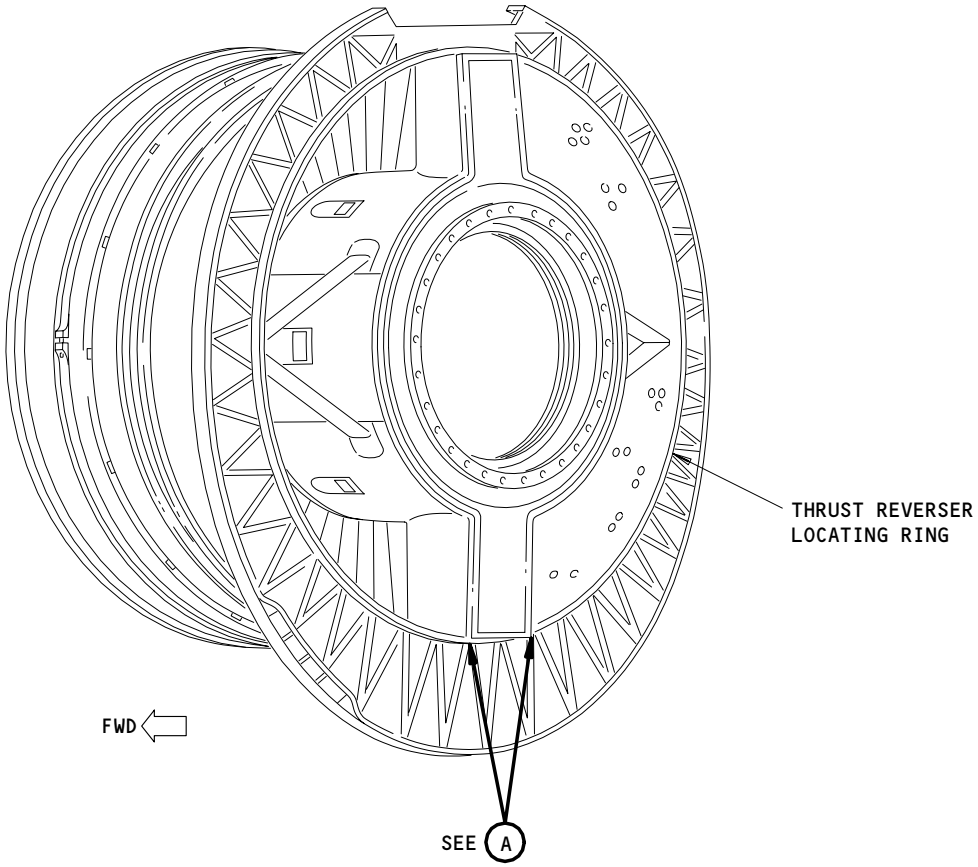
S 216-003-R00

(2) Examine the seal end blocks (Fig. 601).
   (a) Do the repair procedure FRS.5318 if the end block is gone or the end block is damaged very much (AMM 72-34-11/801).

S 416-004-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Close the thrust reverser (AMM 78-31-00/201).



CROSS-SECTION OF RADIAL
DRIVE BLOCK SEAL INSTALLATION

A7712

Radial Drive Fairing Seal End Blocks - Inspection/Check
Figure 601

THRUST REVERSER LOCATING RING - APPROVED REPAIRS

1. General
   A. These repairs are contained in this procedure:

Paragraph Number	Repair Number	Title
2	FRS.5318	Replace the Seal End Blocks on the Radial Drive Fairing Seal

TASK 72-34-11-968-001-R00

2. Replace the Seal End Block on the Radial Drive Fairing Seal
   A. General
      (1) This procedure (FRS.5318) replaces the seal end blocks installed on the radial drive fairing seal (or radial drive seal).
      (2) It is very important that you keep the replacement parts and the bonding surfaces clean.
      (3) This procedure FRS.5318 applies to locating ring assemblies with these part numbers:

RB211-535C	RB211-535E4
LK82751 (without SB 72-7298)	UL15277
UL15290 (with SB 72-7298)	

   B. Equipment
      (1) Brush, Soft Hair
      (2) Scraper, Corrugated
   C. Consumable Materials
      (1) Compound, Silicone, Cold-Curing (Silcoset 152)
          OMat No. 872
      (2) Primer, Silcoset
          OMat No. 876
      (3) Acetone
          OMat No. 150
          or

(4) Isopropyl Alcohol
OMat No. 1/40
or
(5) Cleaning Solvent
OMat No. 1/257
(6) Garnet Paper, Grade 80
OMat No. 5/97
(7) Gloves, White Cotton Fiber
(8) Distilled Water
(9) Cloth, Lint-Free

D. Parts
(1) Block, Radial Drive Seal, WRS1507 (RR 1502413)
or ARM866 (RR 1502414)

E. Replace the Seal End Block (Fig. 801)

S 028-008-R00

CAUTION: KEEP THE REPAIR AREA CLEAN DURING THIS PROCEDURE. USE CLEAN GLOVES AND ONLY TOUCH THE PARTS IF IT IS NECESSARY. DO NOT TOUCH THE PARTS ON THE SURFACES TO BE BONDED. DIRT OR GREASE ON THE SURFACES TO BE BONDED CAN CAUSE AN UNSATISFACTORY BOND.

(1) Remove the seal end block to be replaced.

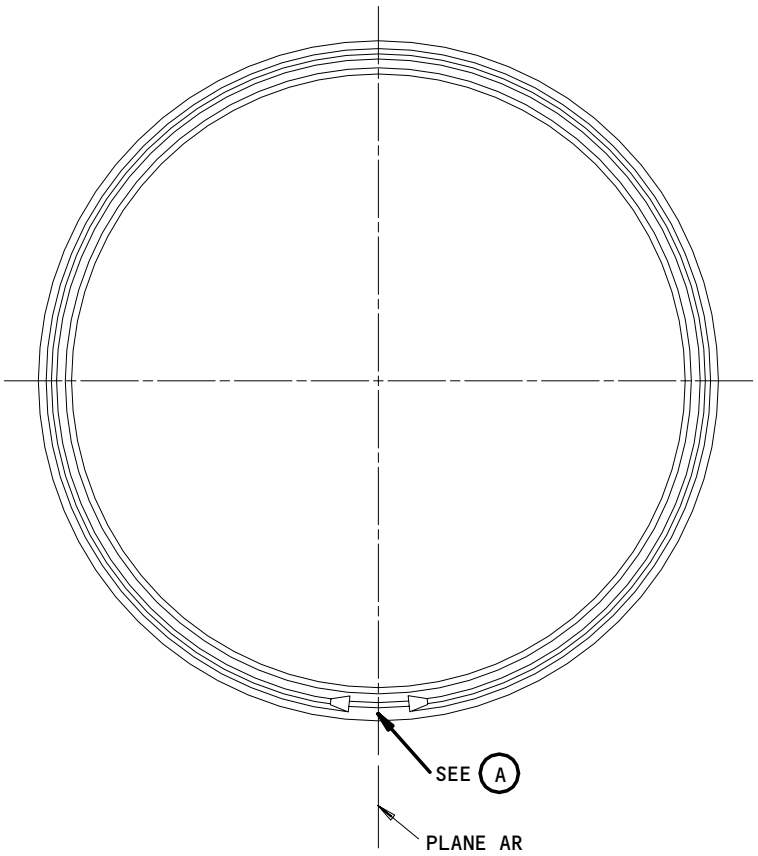
S 168-003-R00
(2) Remove all of the bonding agent that remains from the seal assembly.

S 848-004-R00
(3) Do these steps to prepare the surfaces to be bonded:

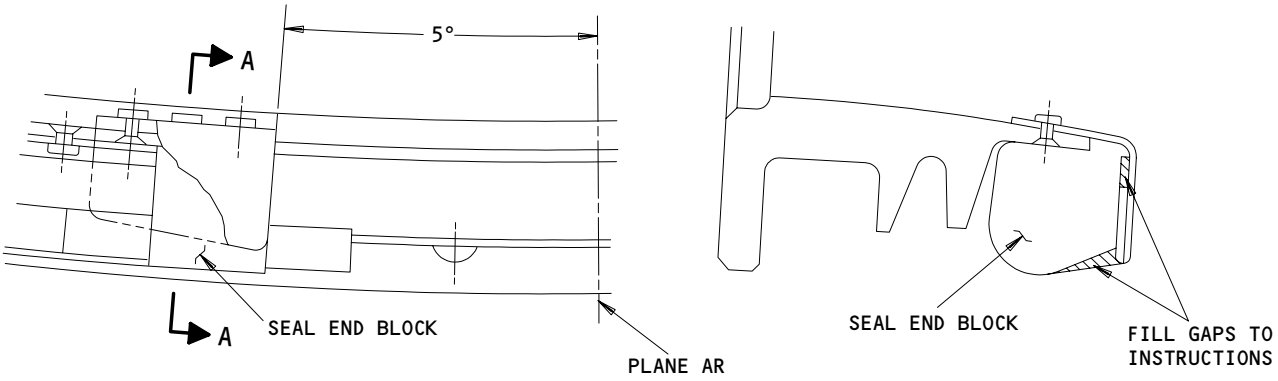
WARNING: DO NOT GET MEK IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MEK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MEK. KEEP THE MEK AWAY FROM SPARKS, FLAME, AND HEAT. MEK IS A POISONOUS AND FLAMMABLE SOLVENT AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: USE A NEW, LINT-FREE CLOTH FOR EACH DIFFERENT AREA TO BE CLEANED. DO NOT APPLY THE MEK DIRECTLY FROM THE BULK CONTAINER TO THE CLOTH, CONTAMINATION OF THE BULK LIQUID CAN OCCUR.

(a) Use a clean, lint free cloth which is moist with Acetone OMat No. 150, or Isopropyl Alcohol OMat No. 1/40, or Cleaning Solvent No. 1/257 to clean the surfaces to be bonded.
(b) Use the garnet paper with your hand to rub the surfaces to be bonded.
(c) Clean the surfaces again with a new, lint-free cloth moist with MEK.



FORWARD VIEW OF
THRUST REVERSER LOCATING RING



EXAMPLE AT EITHER SIDE OF PLANE AR

A

A–A

82517
82521

Radial Dirve Fairing Seal End Block Repair
Figure 801

(d) Do these steps to make sure the surfaces to be bonded are clean:
1) Use a soft hair brush to quickly apply an equal layer of distilled water on the area of a surface to be bonded.
2) Immediately look for a break in the continuity of the layer of water.
3) If a break in the continuity occurs before 30 seconds, do the procedure again which prepares the surfaces to be bonded.
4) Remove the distilled water from the surface with the acetone.
5) Let the surface dry fully.
6) Do this procedure again until all of the surfaces to be bonded are clean.

S 428-005-R00

(4) Do these steps to install the seal end block in the correct position:

WARNING: DO NOT GET PRIMER IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM PRIMER. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE PRIMER. KEEP THE PRIMER AWAY FROM SPARKS, FLAME, AND HEAT. USE THE PRIMER ONLY IN AREAS WITH A GOOD AIR FLOW. PRIMER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Apply a thin layer of silcoset primer to the surfaces to be bonded on the locating ring and the end block bracket.

WARNING: DO NOT GET SEALANT IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SEALANT. USE THE SEALANT ONLY IN AREAS WITH A GOOD AIR FLOW. SEALANT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Apply the silicone compound to the seal end blocks, the end section of the seal assembly, and the surfaces with a layer of primer.
Use a scraper or other applicable tool to get the necessary thickness of silicone on the surfaces.
(c) Put the seal end blocks in the correct position and apply sufficient force to to get a good seal.
(d) Use silicone compound to fill the space between the seal end block and the bracket.
(e) Remove unwanted silicone from around the edges of the seal end blocks.
(f) Let the silicone compound cure for 24 hours at room temperature.

S 218-007-R00

(5) Make sure the seal end block is in the correct position and is correctly installed.

S 938-006-R00

(6) Write the repair number (FRS.5318) adjacent to the part number with a permanent marker of a different color than the part.

LP COMPRESSOR INLET ROTATING FAIRING - REMOVAL/INSTALLATION

1. General
   A. This procedure contains the data to remove and install the LP compressor inlet rotating fairing, which will be referred to as the rotor spinner.
   B. Use the procedures in AMM 70-51-00/201 to tighten the fasteners.
   C. Tighten the fasteners to the torque values in AMM 70-51-00/201 unless a torque value is given in this procedure.
   D. In this procedure it is recommended that the position of the components be identified to help align them during assembly. This will keep to a minimum changes in LP vibration. If it is necessary to install replacement parts, it is permitted to interchange used for new. The effect on LP vibration will be less than 0.1 inches/sec. There is no requirement to do the powerplant vibration survey.

TASK 72-35-01-004-001-R00

2. Remove the LP Compressor Inlet Rotating Fairing (Rotor Spinner)
   A. Equipment
      (1) 289200 Protective Work Mats, Rolls-Royce
      (2) LJ34372 Cover, LP Fan Exhaust
      (3) LJ29934 Cover, Exhaust Collector
      (4) HU29255 - Impact Extractor Body
      (5) HU35451 - Extractor
   B. Consumable Materials
      (1) Marker (Felt or Fiber Tip)
          OMat No. 262
   C. Access
      (1) Location Zone
          412/422 Nose Cowl

   D. Prepare for Removal

      S 864-002-R00
      (1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D19, ENGINES START CONT LEFT

      S 864-003-R00
      (2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
          (a) P11-2 Overhead Circuit Breaker Panel
              1) 11D20, ENGINES START CONT RIGHT

      S 494-004-R00
      (3) Install the covers for the LP fan exhaust and for the exhaust collector.

          NOTE: The covers will not let the wind cause the LP compressor to turn while you remove the rotor spinner.

S 944-005-R00

(4) Put protective mats in the inlet cowl.
  (a) Make sure you can easily see the red warning flags on the covers.

E. Remove the Rotor Spinner (Fig. 401)

S 024-006-R00

CAUTION: ENGINES PRE-RR-SB 72-9177;
THE ROTOR SPINNER MUST BE PUT BACK IN THE SAME ANGULAR POSITION. IF NOT ALIGNED, THE LP COMPRESSOR ASSEMBLY WILL NOT BE BALANCED.

(1) ENGINES PRE-RR-SB 72-9177;
Do these steps that follow:
  (a) Make identification marks on the LP compressor, the nose cone fairing and the rotor spinner to help align the components.
  (b) Do the procedure that follows to remove the rotor spinner (Fig. 401).
    1) Remove the bolts (5) that attach the nose cone fairing (6).
      a) Use the impact extractor (HU29255) with the extractor (HU35451) to remove the fairing (6).

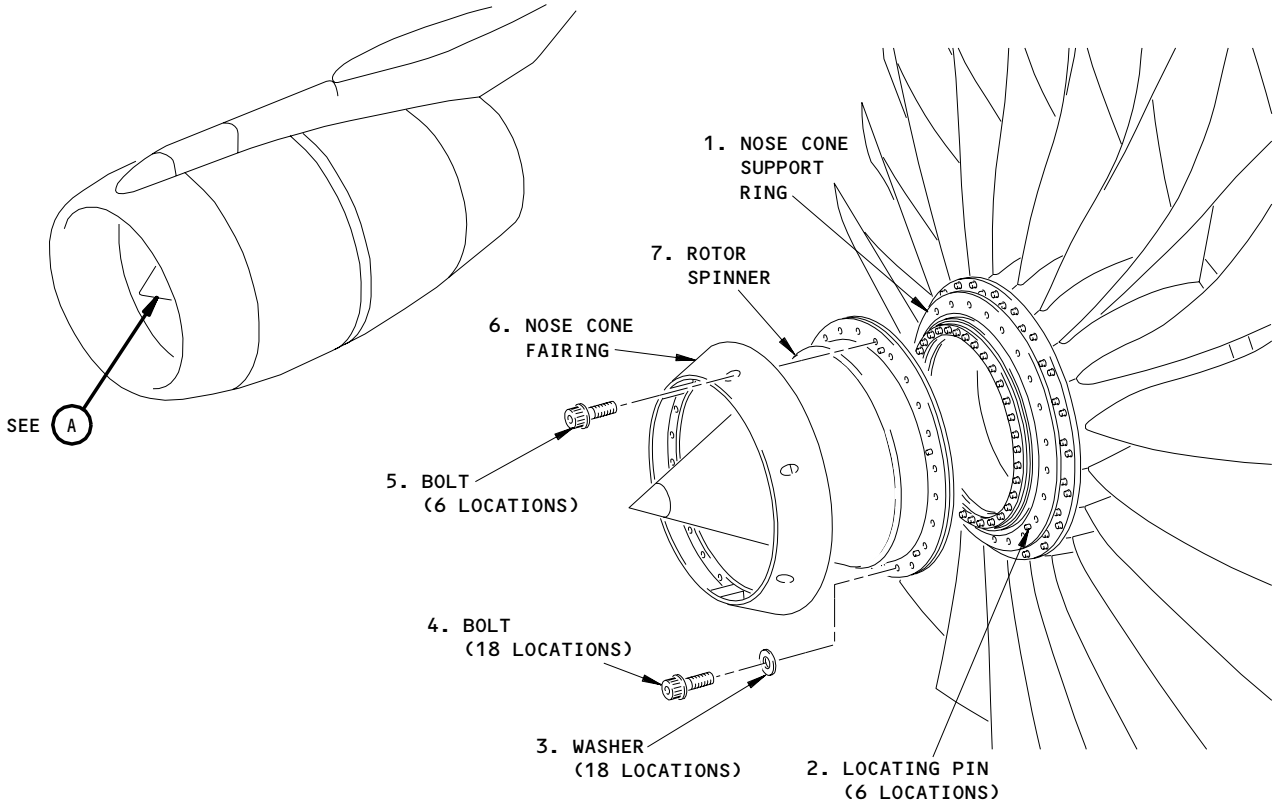
WARNING: BE CAREFUL WHEN YOU LIFT THE ROTOR SPINNER. THE APPROXIMATE WEIGHT OF THE SPINNER IS 17 POUNDS (7.7 KG) AND COULD CAUSE INJURY TO PERSONS AND/OR DAMAGE TO THE INLET COWL.

    2) Hold the rotor spinner (7) while you remove the bolts (4) and washers (3), then remove the rotor spinner (7).

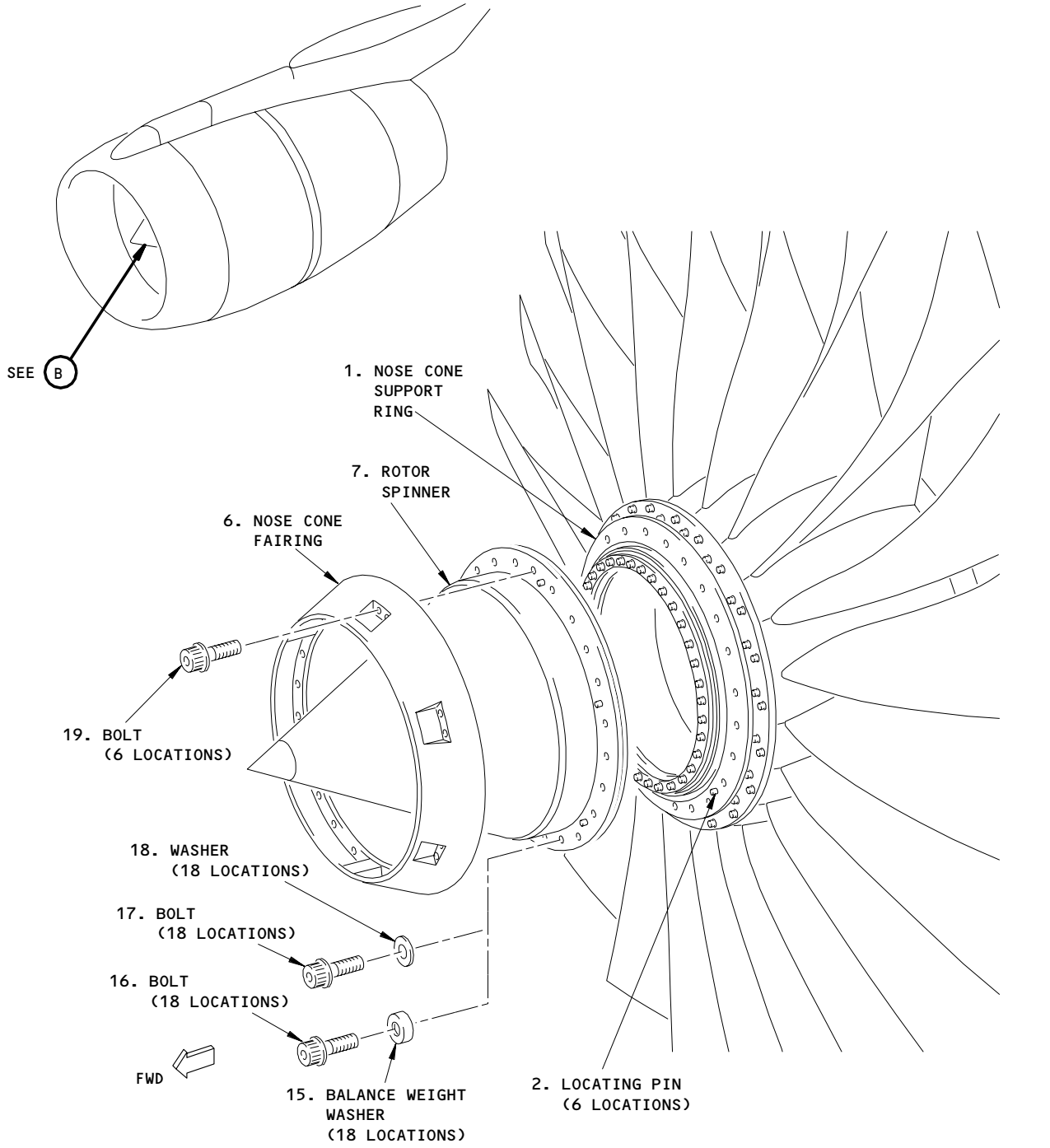
S 024-007-R00

CAUTION: ENGINES POST-RR-SB 72-9177;
IT IS ESSENTIAL THAT THE INLET ROTATING FAIRING FOR THE LP COMPRESSOR AND FAIRING EXTENSION ARE INSTALLED TO THE SAME ANGULAR POSITION IN ORDER TO MAINTAIN THE BALANCE INTEGRITY OF THE LP COMPRESSOR ROTATING ASSEMBLY.

(2) Make identfication marks on the items that follow to help the components align.
  (a) LP compressor



LP Compressor Inlet Rotating Fairing Installation
Figure 401 (Sheet 1)



(ENGINES POST-RR-SB 72-9723)

B

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LP Compressor Inlet Rotating Fairing Installation
Figure 401 (Sheet 2)

(b) Rotor spinner extension
(c) Nose cone fairing
(d) Rotor spinner.

S 934-019-R00

(3) ENGINES POST-RR-SB 72-9177;
Do the steps that follow:
(a) You must also make identification marks on the rotor spinner extension.
(b) Do the procedure that follows to remove the rotor spinner and spinner extension (Fig. 401).
1) Remove the bolts (12) and washers (11) that attach the nose cone fairing (6).
a) Use the impact extractor (HU29255) with the extractor (HU35451) then remove the fairing (6).

CAUTION: BE CAREFUL WHEN YOU LIFT THE ROTOR SPINNER. THE APPROXIMATE WEIGHT OF THE SPINNER IS 6.3 POUNDS (5.9 KG) AND COULD CAUSE DAMAGE TO THE INLET COWL.

2) Hold the rotor spinner (7) while you remove the bolts (13) and washers (14) then remove the rotor spinner (7).

WARNING: BE CAREFUL WHEN YOU LIFT THE ROTOR SPINNER EXTENSION. THE APPROXIMATE WEIGHT OF THE SPINNER EXTENSION IS 13 POUNDS (5.9 KG) AND COULD CAUSE INJURY TO PERSONS AND/OR DAMAGE TO THE INLET COWL.

3) Hold the rotor spinner extension (8) while you remove the bolts (10) and the washers (9) then remove the rotor spinner extension (8).

S 024-008-R00

CAUTION: ENGINES POST-RR-SB 72-9723;
THE ROTOR SPINNER MUST BE PUT BACK IN THE SAME ANGULAR POSITION. IF NOT ALIGNED, THE LP COMPRESSOR ASSEMBLY WILL NOT BE BALANCED.

(4) ENGINES POST-RR-SB 72-9723;
Do these steps that follow:
(a) You must make identification marks on the LP compressor, nose cone fairing and the rotor spinner to help align the components.

(b) Do the procedure that follows to remove the rotor spinner (Fig. 401).
1) Remove the bolts (19) that attach the nose cone fairing (6).
a) Use the impact extractor (HU29255) with the extractor (HU35451) then remove the fairing.
b) Make a temporary mark at all of the positions where the trim balancing bolt assemblies (16) are located.

NOTE: This is because you must install all of the balancing bolt assemblies (16) at the same marked positions during the assembly.

You can identify the balancing bolt assemblies (16) at each position where you see a balance weight (large washer).

WARNING: BE CAREFUL WHEN YOU LIFT THE SPINNER. THE APPROXIMATE WEIGHT OF THE SPINNER IS 17 POUNDS (7.7 KG) AND COULD CAUSE INJURY TO PERSONS AND/OR DAMAGE TO THE INLET COWL.

2) Hold the rotor spinner (7) while you remove all of the balancing bolt assemblies (16) and the bolts (17) and washers (18); then remove the spinner (7).

TASK 72-35-01-404-010-R00

3. Install the LP Compressor Inlet Rotating Fairing (Rotor Spinner)

A. Equipment
(1) 289200 Protective Work Mats, Rolls-Royce

B. Consumable Materials
(1) Anti-Seize Compound OMat No. 432.
(2) Silicone Grease OMat No. 418.

C. Access
(1) Location Zone
412/422 Nose Cowl

D. Install the Rotor Spinner (Fig. 401)

S 424-011-R00
(1) ENGINES PRE-RR-SB 72-9177;
Do the procedure that follows to install the rotor spinner (Fig. 401).
(a) Align the correlation marks on the nose cone support ring (1) and the rotor spinner (7).

(b) Install the rotor spinner (7) on the nose cone support ring (1).

NOTE: Six of the bolt positions in the rotor spinner are to attach the nose cone fairing.

(c) Install the bolts (4) and the washers (3).
1) Tighten the bolts to the standard load (AMM 70-51-00/201).
(d) Visually inspect the nose cone fairing for cracks before installation (AMM 72-35-01/601).
(e) Align the correlation marks on the rotor spinner (7) and the nose cone fairing (6).
(f) Install the nose cone fairing (6) on to the rotor spinner (7) and make sure the fairing engages on the locating pins (2).
(g) Install the bolts (5).
1) Tighten the bolts to the standard load (AMM 70-51-00/201).

S 424-012-R00

(2) ENGINES POST-RR-SB 72-9177;
Do the procedure that follows to install the rotor spinner (Fig. 401).
(a) ENGINES POST-RR-SB 72-D132;
Lubricate the seal using OMat No. 432 anti-seize compound or OMat No. 418 silicone grease.
(b) Align the correlation marks on the nose cone support ring and rotor spinner extension (8).
(c) Install the rotor spinner extension (8) on to the nose cone support ring (1).
(d) Install the bolts (10) and the washers (9).
1) Tighten the bolts to the standard load (AMM 70-51-00/201).
(e) Align the correlation marks on the rotor spinner extension (8) and the rotor spinner (7).
(f) Install the rotor spinner (7) on to the rotor spinner extension (8).

NOTE: Six of the bolt positions in the rotor spinner are used to attach the nose cone fairing.

(g) Install the bolts (13) and the washers (14).
1) Tighten the bolts to the standard load (AMM 70-51-00/201).

(h) Visually inspect the nose cone fairing for cracks before installation (AMM 72-35-01/601).
(i) Align the correlation marks on the rotor spinner (7) and the nose cone fairing (6).
(j) Install the nose cone fairing (6) on to the rotor spinner (7).

CAUTION: MAKE SURE THAT YOU INSTALL THE WASHERS UNDER THE NOSE CONE FAIRING BOLTS. IF YOU DO NOT, VIBRATION OF THE SPINNER CAN OCCUR AND CAUSE DAMAGE.

(k) Install the bolts (12) and the washers (11).
1) Tighten the bolts to the standard load (AMM 70-51-00/201).

S 424-013-R00
(3) ENGINES POST-RR-SB 72-9723;
Do the procedure that follows to install the rotor spinner (Fig. 401).

S 424-014-R00
(4) ENGINES POST-RR-SB 72-D132;
Lubricate the seal using OMat No. 432 anti-seize compound or OMat No. 418 silicone grease.
(a) Align the correlation marks on the nose cone support ring (1) and the rotor spinner (7).
(b) Install the rotor spinner (7) on to the nose cone support ring (1).

NOTE: Six of the bolt positions in the rotor spinner are used to attach the nose cone fairing.

(c) Install the trim balancing bolt assemblies (16).
1) Use the temporary marks that you made during the removal to install the bolt assemblies in the correct positions.
(d) Install the bolts (17) and the washers (18).
1) Tighten the balancing bolts (16) and the bolts (17) to the standard load (AMM 70-51-00/201).
(e) Visually inspect the nose cone fairing for cracks before installation (AMM 72-35-01/601).
(f) Align the correlation marks on the nose cone fairing (6) and the rotor spinner (7).
(g) Install the nose cone fairing (6) into its position and make sure that you engage the six locating pins (2).
(h) Install the bolts (19).
1) Tighten the bolts to the standard load (AMM 70-51-00/201).

E. Put the Airplane Back to its Usual Condition

S 944-015-R00
(1) Remove the protective mats from the inlet cowl.

S 094-016-R00
(2) Remove the covers from the LP fan exhaust and the exhaust collector.

S 864-017-R00

(3) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D19, ENGINES START CONT LEFT

S 864-018-R00

(4) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:

(a) P11-2 Overhead Circuit Breaker Panel

1) 11D20, ENGINES START CONT RIGHT

LP COMPRESSOR INLET ROTATING FAIRING - INSPECTION/CHECK

1. General
   A. This procedure contains the inspection of the LP compressor inlet rotating fairing which will be referred to as the rotor spinner.

TASK 72-35-01-206-001-R00

2. Inspection of the LP Compressor Inlet Rotating Fairing (Rotor Spinner)
   A. Access
      (1) Location Zone
          412/422 Nose Cowl

   B. Procedure

S 216-002-R00

(1) Examine the rubber nose cap.
   (a) Make sure the fit is not loose.
   (b) Rubber that is gone is not permitted.
   (c) Filler that is gone is permitted if the bond between the rubber nose cap and the rotor spinner is tight.

S 216-003-R00

(2) Examine the outer surface of the rotor spinner.
   (a) If the polyurethane varnish layer is missing - Accept the rotor spinner.
   (b) Examine the aluminum colored paint layer.
      1) If less than 25 per cent of the aluminum colored paint layer is missing - Accept the rotor spinner.
      2) If more than 25 per cent of the aluminum colored paint layer is missing - Accept the rotor spinner for a maximum of 100 flights.
   (c) Grooves and scores in the base material.
      1) If the damage is confined to the first two laminates - Accept the rotor spinner.
      2) If the damage is more than the first two laminates - reject the rotor spinner.
   (d) If delamination of the base material occurs - replace the rotor spinner.
   (e) Cracks - replace the rotor spinner.

S 216-004-R00

(3) Examine the inner surface and the flange of the rotor spinner (if the rotor spinner has been removed).
   (a) No cracks are permitted.
   (b) If the rotor spinner has delamination, you must replace it before 25 flights or 125 flight hours which ever comes first.

S 216-006-R00

(4) Examine the Omega Seal.

(a) If the damage to the Omega Seal is up to a total of one sixth of the circumference of the spinner, do the step that follows:

1) Remove the damaged seal material and equivalent section of the seal 180 degree opposite. It is not acceptable to remove a full sector of the seal material. The Omega Seal must be repaired to FRS7052 within 500 flights of finding the damage and the Spinner Fairing must be rejected for inspection for cracking (go to the step below to examine the nose cone fairing).

(b) If the damage to the Omega Seal totals more than one sixth of the circumference of the spinner at the seal location, reject the Rotor Spinner for repair to FRS7052.

S 216-005-R00

(5) Examine the nose cone fairing.

(a) ENGINES PRE-RR-SB 72-9177;
Cracks

NOTE: Make sure you carefully examine the bolt holes which are used to attach the fairing.

1) Axial cracks up to 0.20 inch (5.0 mm) in length which go forward from one or more of the six bolt access holes with no cracking rearwards of the hole are permitted. The fairing must be removed and repaired in less than 100 flight cycles.

2) Axial cracks up to 0.20 inch (5.0 mm) which go rearward from one or more of the six bolt access holes, with no cracking forwards of the hole are permitted. The fairing must be removed and repaired in less than 10 flight cycles.

(b) ENGINES PRE-RR-SB 72-9177;
Sealing-blocks around the inside of the bolt holes that are not attached.

1) Repair sealing-blocks that are not attached to FRS5400.

a) You can accept a maximun of 2 sealing-blocks that are not attached, unless they are adjacent, for up to 100 flight hours.

(c) ENGINES POST-RR-SB 72-9177;
Cracks

NOTE: Make sure you carefully examine the material in and around the bolt holes, front edge and front corners of the recess pockets.

1) If cracks of any length are found the fairing must be rejected.

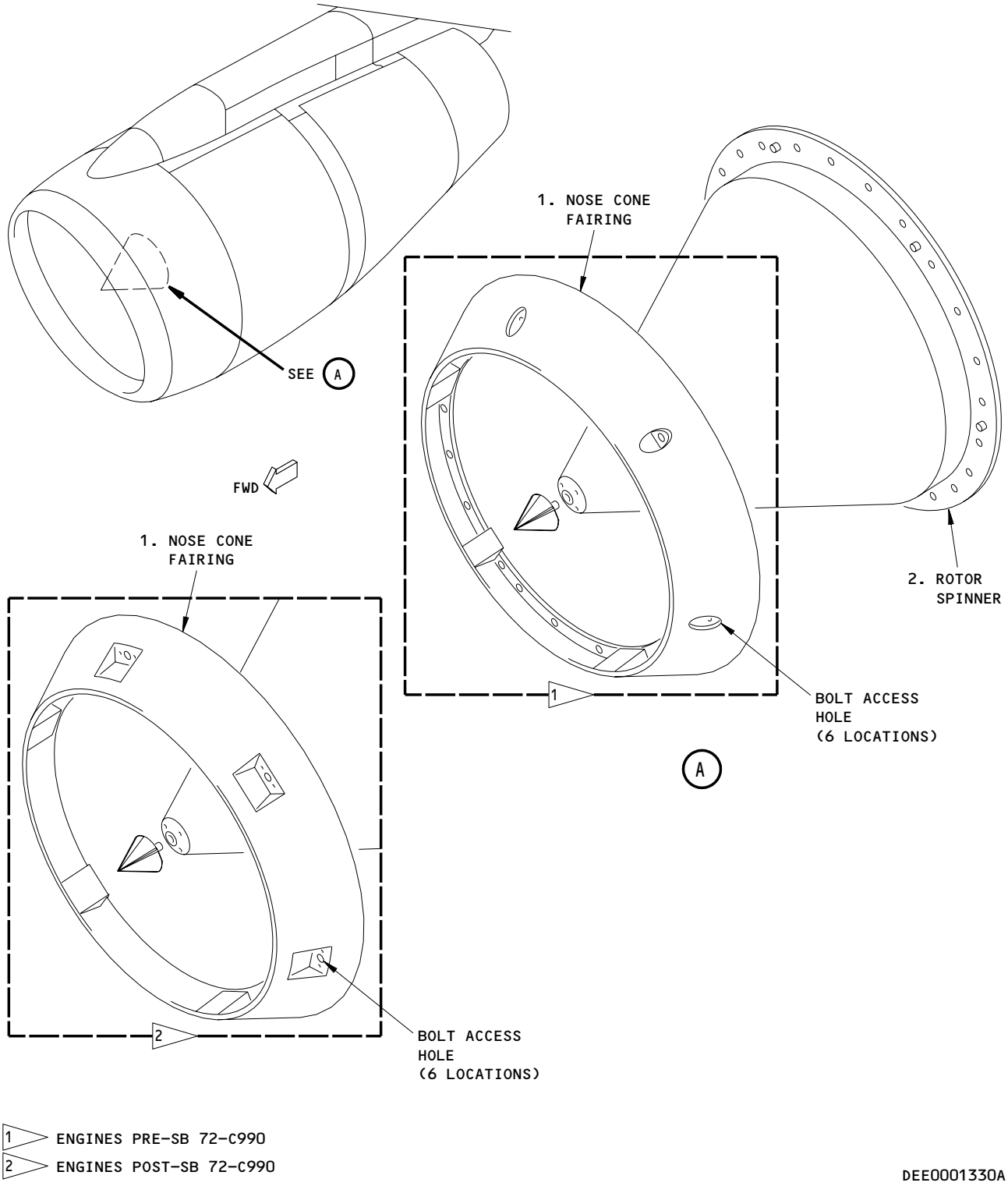
(d) ENGINES POST-RR-SB 72-9723;
Cracks

NOTE: Make sure you carefully examine the material in and around the bolt holes, front edge and front corners of the recess pockets.

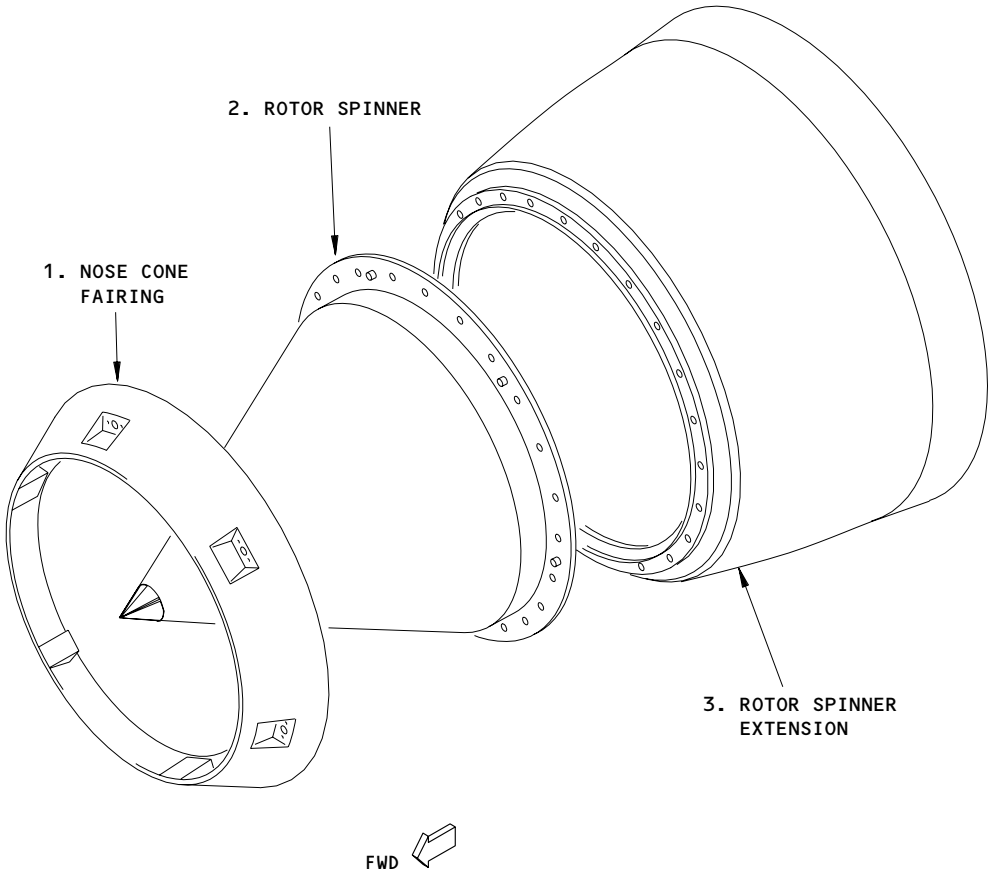
1) Cracks around one bolt hole or dowel hole, or which extends between the two, are permitted if cracks do not go outwards of the recess. Reject in less than five (5) flight cycles.

(e) Circular dents are permitted if you find these conditions:
1) They are less than 0.05 inch (1.27 mm) in depth.
2) There is no related material that is gone.
3) There are no related scores.

(f) If any bulges are present the fairing must be rejected.



LP Compressor Inlet Rotating Fairing
Figure 601 (Sheet 1)



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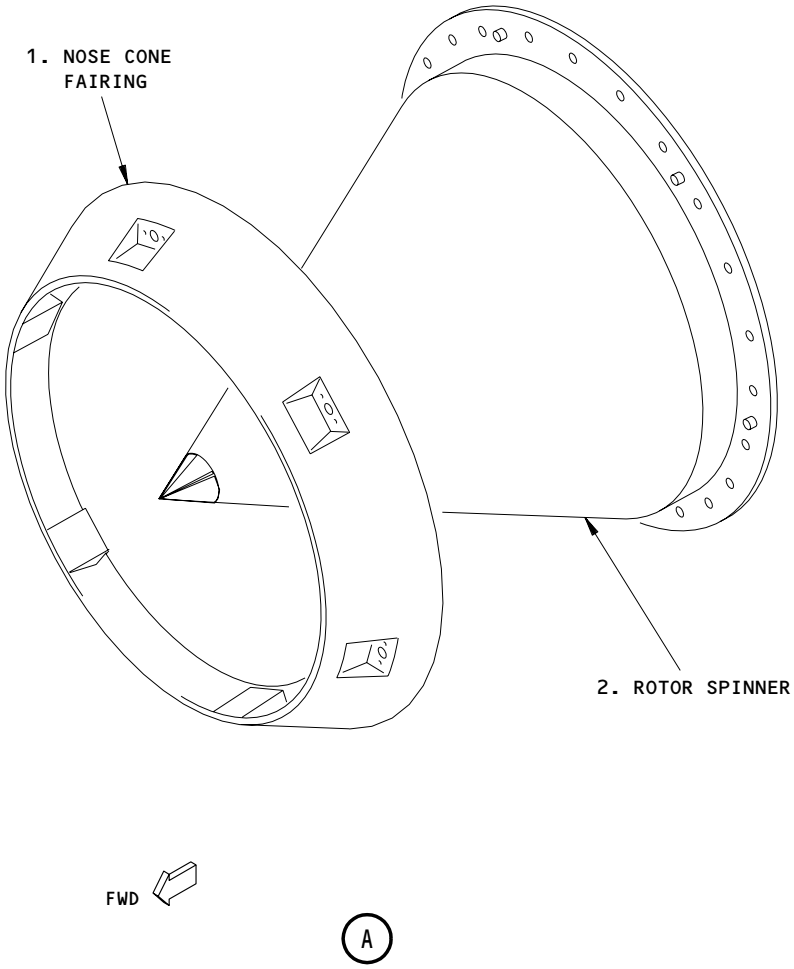
LP Compressor Inlet Rotating Fairing
Figure 601 (Sheet 2)



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LP Compressor Inlet Rotating Fairing
Figure 601 (Sheet 3)

LP COMPRESSOR INLET ROTATING FAIRING - APPROVED/REPAIRS

1. General
   A. This task includes the Repair Schemes (FRS) that follow:
      (1) FRS7052 - Replace the seal on the LP compressor front spinner assembly

TASK 72-35-01-728-019-R00

2. Low Pressure (LP) Compressor Front Spinner Assembly - Remove and Replace the Seal
   A. General
      (1) The repair in this procedure is FRS7052.
      (2) This procedure gives instructions to replace the seal on the LP compressor front spinner assembly.
      (3) This repair can be used on front spinner assemblies with the part numbers that follow:
         (a) FW14983 Assembly A
         (b) FW14986 Assembly A
         (c) FW12883 Assembly B
         (d) FW12885 Assembly B
   B. Consumable Materials
      (1) Marking ink - OMat 264
      (2) Two-pack epoxy finish, black and catalyst - OMat 788
      (3) Sealing compound - OMat 8/168
      (4) Primer - OMat 8/236
      (5) Acetone - OMat 150
      (6) Lint-free cloth - OMat 101
      (7) Abrasive Paper, 60-180 grit, Aluminum oxide or Silicon, Carbide or Garnet
   C. References
      (1) AMM 72-35-01/401, Nose Cone Fairing
   D. Parts

Part No.	Identification
FW14985	Seal (Assembly A)
FW12884	Seal (Assembly B)

E. Procedure (Fig. 801)

S 028-020-R00

(1) Remove the nose cone fairing (AMM 72-35-01/401).

S 028-021-R00

(2) Remove the existing seal.
  (a) Remove the seal from the LP compressor spinner. Use hand tool.

S 128-022-R00

(3) Prepare the seal location surface.
  (a) Make the seal location surface rough. Use 60-180 grit abrasive paper.

    NOTE: Use a circular overlap movement and move your hand accross the surface, to make a criss cross pattern.

  (b) Remove the grease from the seal location surface
    1) Apply OMat 150 acetone to the area to be cleaned with on OMat 2/101 lint-free cloth. Discard the soiled cloth after use.
    2) Use a clean cloth and continue to degrease the area until the area is clean and free from grease.
    3) Do not let a used cloth touch the solvent in the bulk container.
    4) Dry the degreased area with a clean, dry lint-free cloth.
  (c) Do a water break check.
    1) Use a hair brush, that is soft and clean, to apply a thin layer of distilled water over the bond area.
    2) Look at the layer of distilled water immediately (in less than 30 seconds).
    3) If breaks occur in the water layer in less than 30 seconds, you must clean the surfaces again. The layer must be continuous.
    4) Use a clean, lint-free cloth that is soaked in clean acetone (OMat 150) to remove the distilled water.

S 378-023-R00
(4) Apply primer to the seal location surface.
  (a) Apply a thin coat of OMat 8/236 primer to the prepared surface.
  (b) Let the primer air dry for 1 hour.

S 128-024-R00
(5) Prepare the seal.
  (a) Make the mating surface of the seal rough. Use 60-180 grit abrasive paper.
  (b) Clean the mating surface of the seal.
    1) Wipe the seal with an OMat 2/101 lint-free cloth. Discard the cloth after use.
    2) Do not let a used cloth touch the solvent in the bulk container.
    3) Dry the degreased area with a clean, dry lint-free cloth.

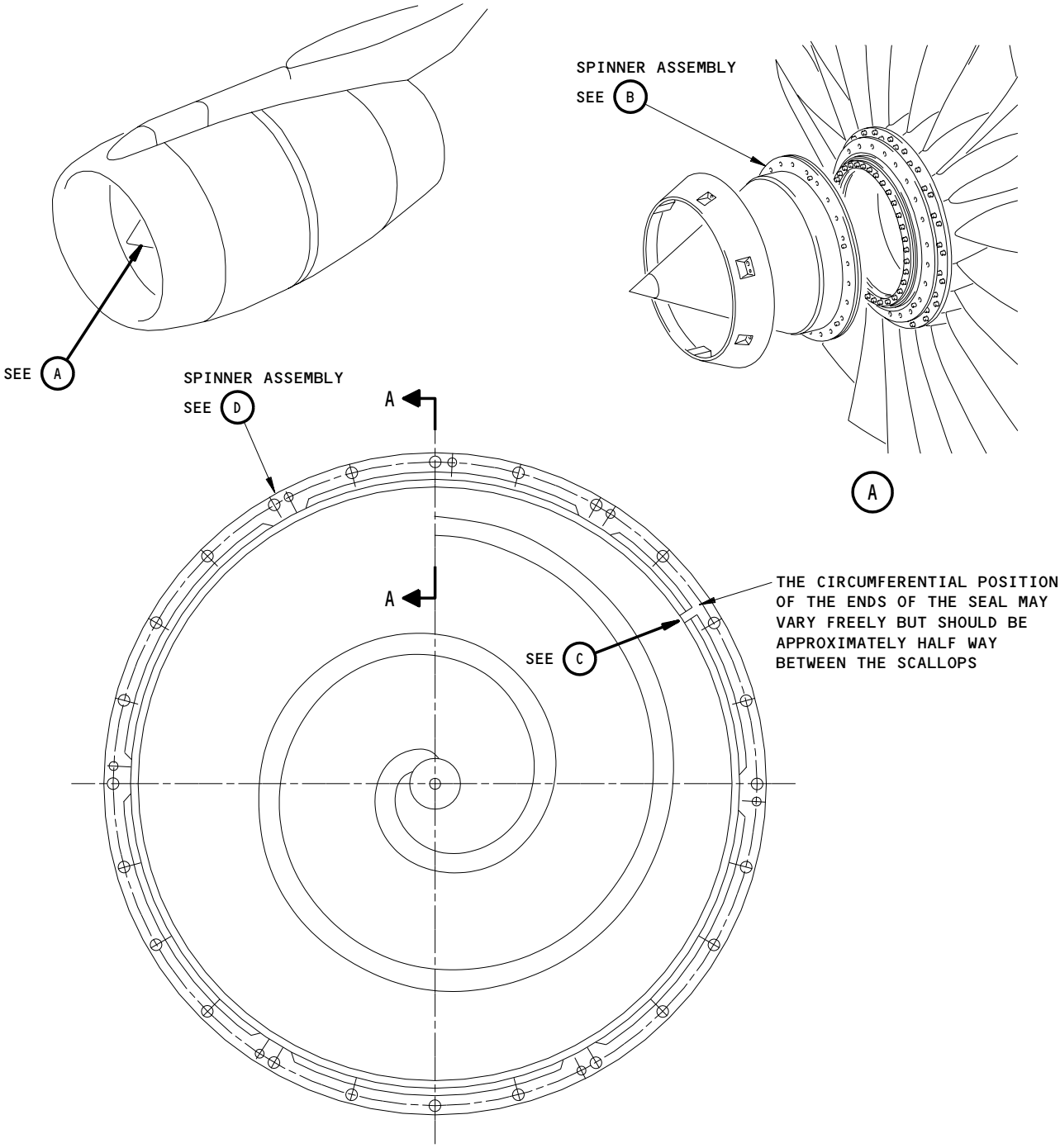
S 348-025-R00
(6) Bond the seal to the spinner.
  (a) Apply OMat 8/168 sealant to the mating surfaces of the seal and the spinner. Use a spatula or a palette and spread the sealant with a comb.
  (b) Put the seal in position on the spinner.
    1) Apply pressure to the seal to remove unwanted air to make sure that there is a bead of sealant around the edges of the seal.
    2) Let the sealant cure for 48 hours.

      NOTE: You can use the components after 2 hours.

S 378-026-R00
(7) Touch paint the repair area. Use OMat 788 two-pack epoxy finish.
  (a) Brush apply one coat of OMat 788 two pack epoxy finish.
  (b) let the paint dry in air for 1 hour.

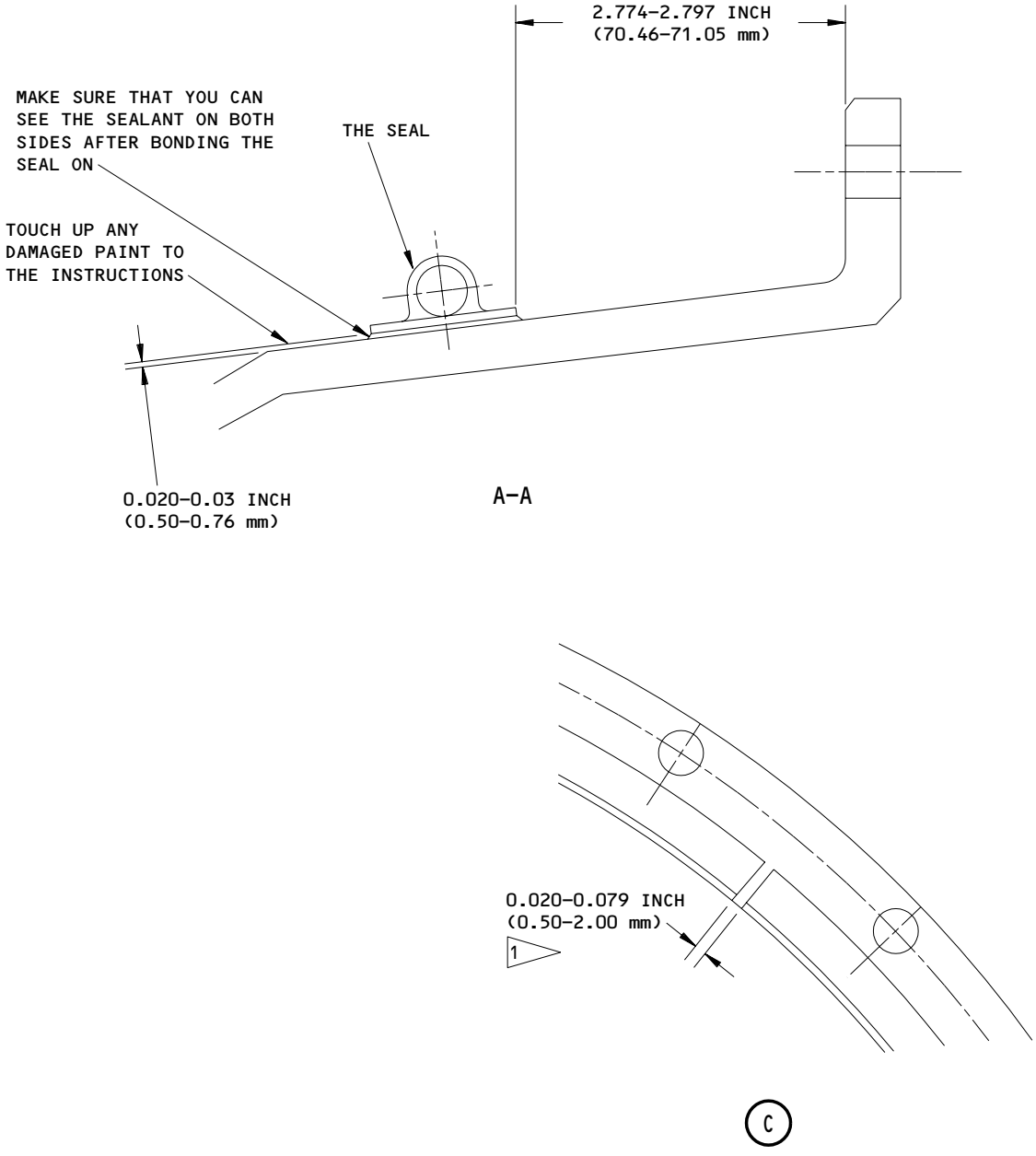
S 218-027-R00
(8) Examine the repair.
  (a) Make sure that the seal is in the correct position.

S 938-028-R00
(9) Identify the part.
  (a) Mark FRS7052 adjacent to the part number. Use OMat 264 marking ink.
  (b) Mark a dot approximately 5mm diameter adjacent to the part number.



(ASSEMBLY A)

Repair Details and Dimensions
Figure 801 (Sheet 1)

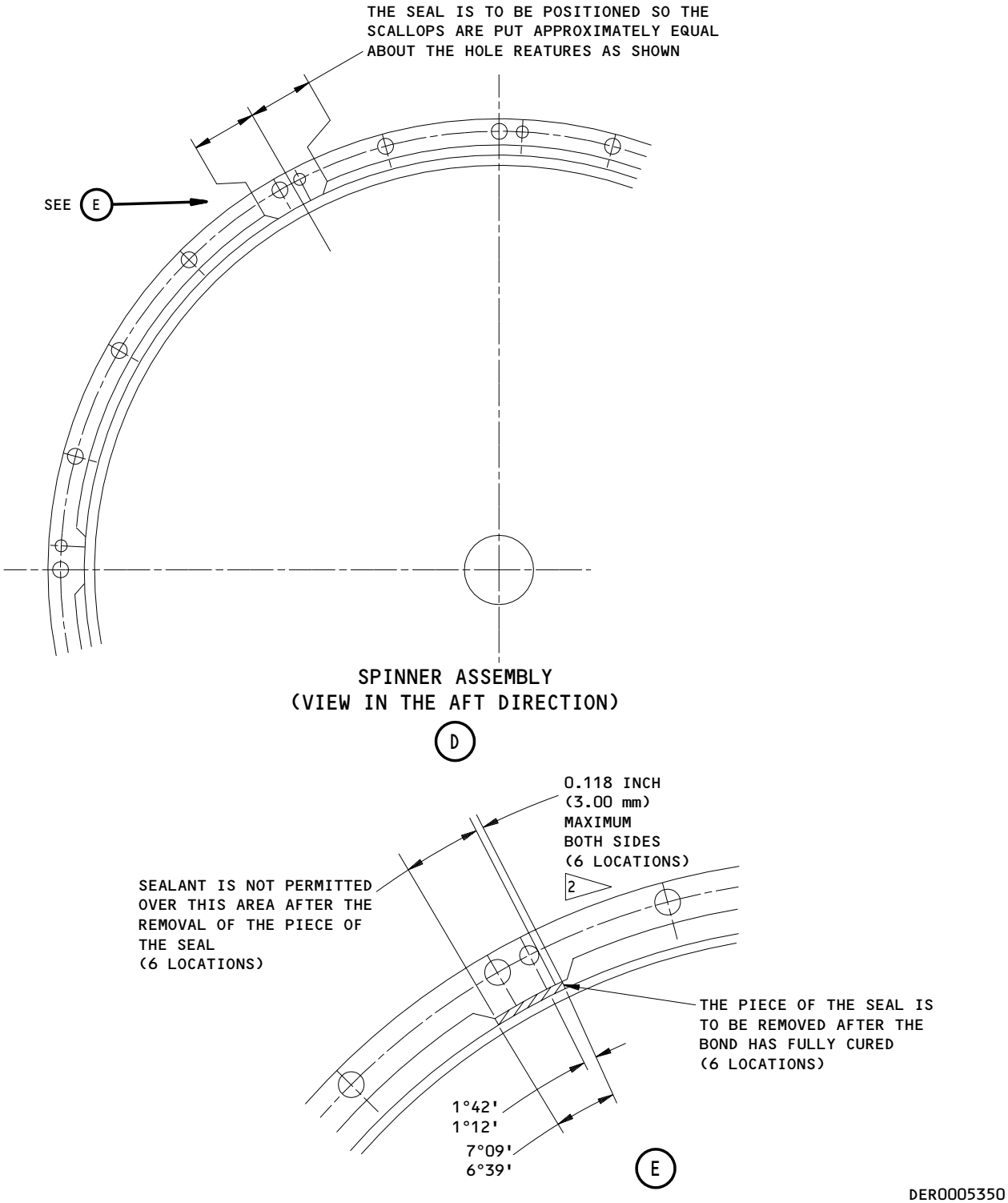


1 THE ENDS OF THE SEAL ARE TO BE TRIMMED TO GIVE THIS DIMENSION

DERO005348

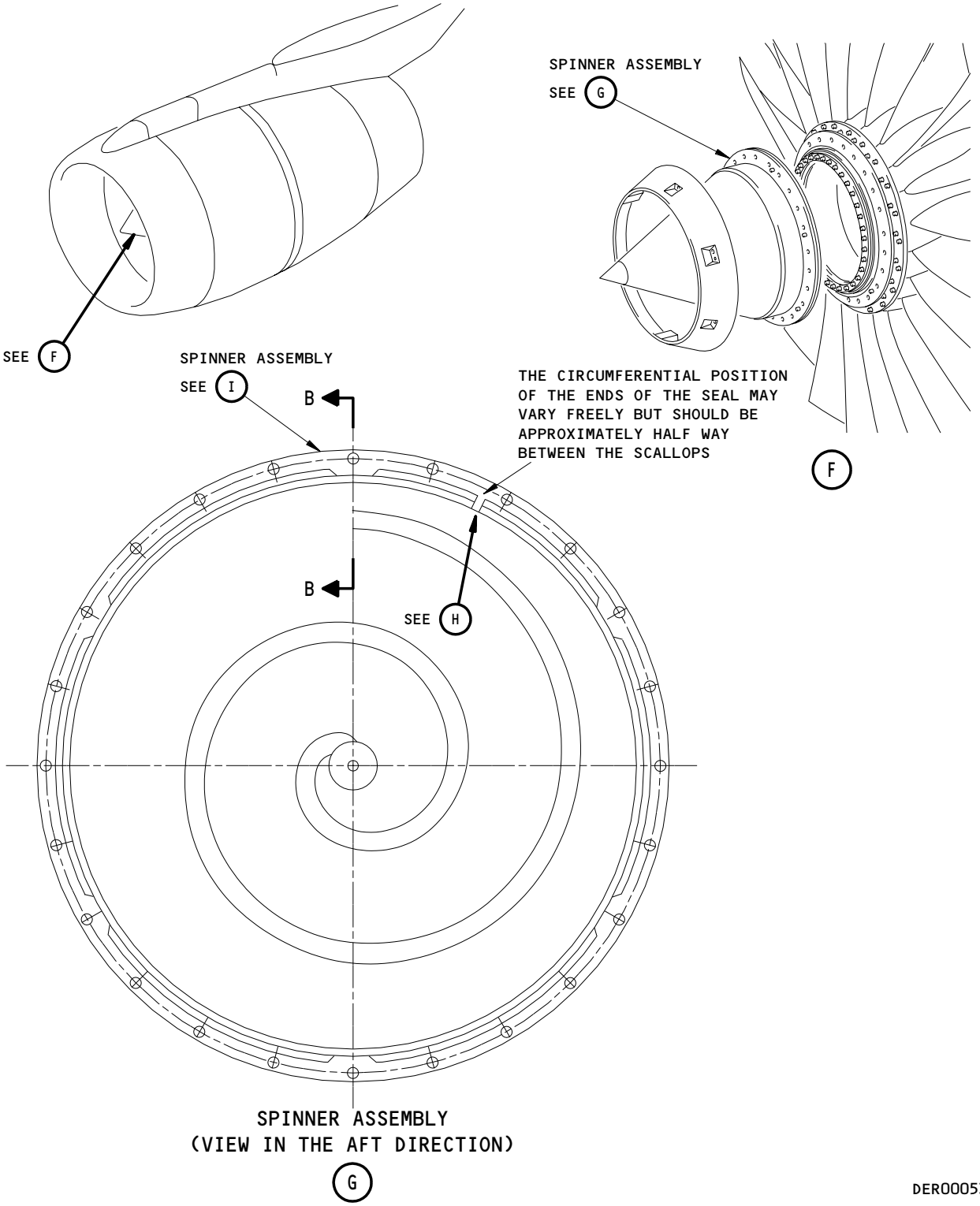
(ASSEMBLY A)

Repair Details and Dimensions
Figure 801 (Sheet 2)



2 SEALANT IS PERMITTED IN THIS AREA (ASSEMBLY A)

Repair Details and Dimensions
Figure 801 (Sheet 3)

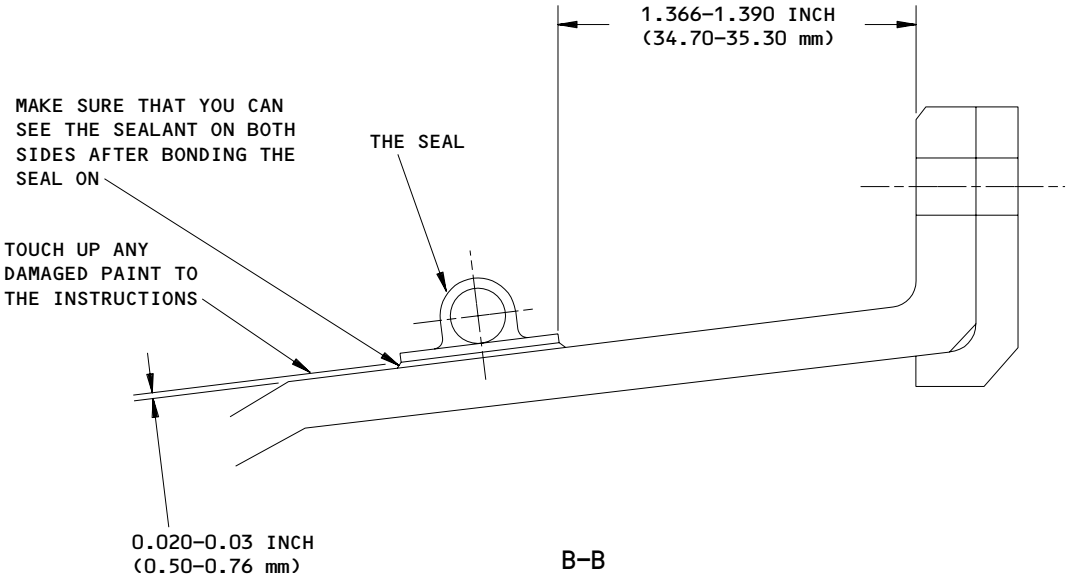


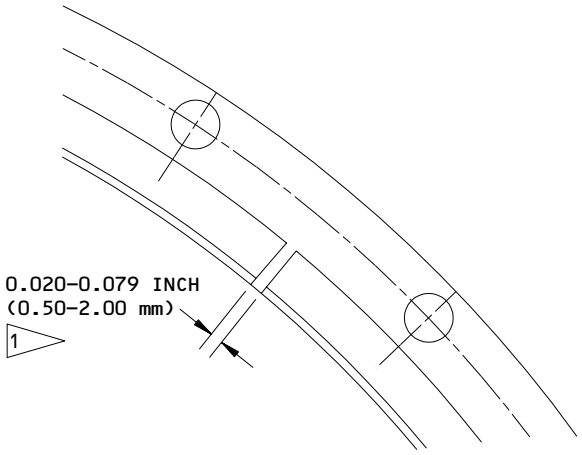
DER0005347

(ASSEMBLY B)

Repair Details and Dimensions
Figure 801 (Sheet 4)

U61174



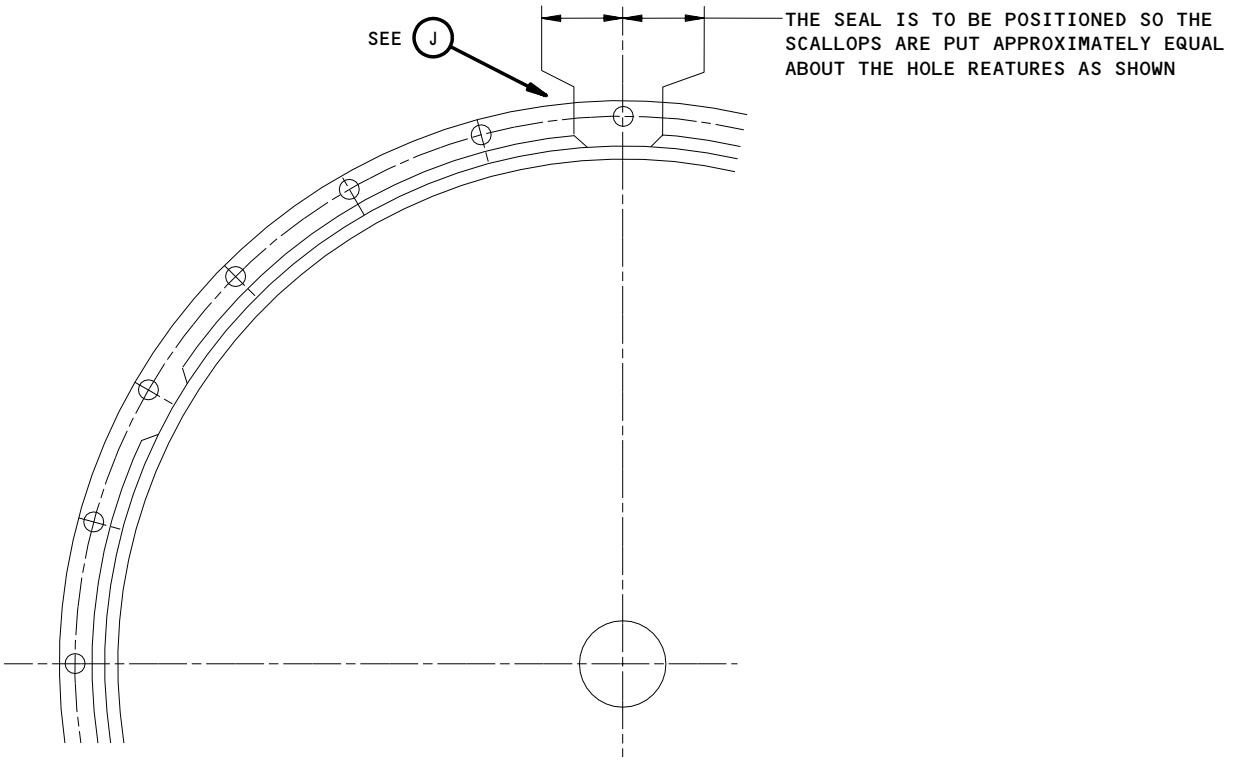


1 THE ENDS OF THE SEAL ARE TO BE TRIMMED TO GIVE THIS DIMENSION

DER0005349

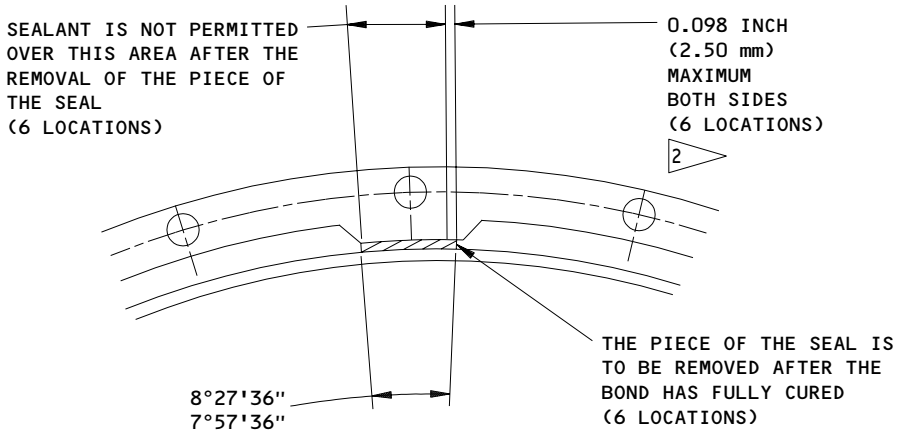
(ASSEMBLY B)

Repair Details and Dimensions
Figure 801 (Sheet 5)



SPINNER ASSEMBLY
(VIEW IN THE AFT DIRECTION)

I



J

DER0005351

2 SEALANT IS PERMITTED IN THIS AREA (ASSEMBLY B)

Repair Details and Dimensions
Figure 801 (Sheet 6)

IP COMPRESSOR SPLITTER FAIRING - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task is to remove the IP Compressor Splitter Fairing. The second is to install the IP Compressor Splitter Fairing.
   B. Use the procedures given in AMM 70-51-00/201 to tighten fasteners. Tighten the fasteners to the torque values given in AMM 70-51-00/201 unless a torque value is specified in this procedure.

TASK 72-35-02-724-001-R00

2. Remove the IP Compressor Splitter Fairing
   A. General
      (1) To help the removal of threaded parts, taper bolts and parts that have an interference fit, use an approved OMat 1001 penetrating oil. Apply plenty of oil and allow time for penetration before removal.
   B. Consumable Materials
      (1) OMat 1001 - Penetrating oil
   C. References
      (1) AMM 70-51-00/201, Torque Tighten Procedures
      (2) AMM 72-31-10/401, LP Compressor Rotor Blade and Disc
   D. Access
      (1) Location Zones
          410 Left Engine
          420 Right Engine

      (2) Access Panels
          412 Left Nose Cowl
          422 Right Nose Cowl

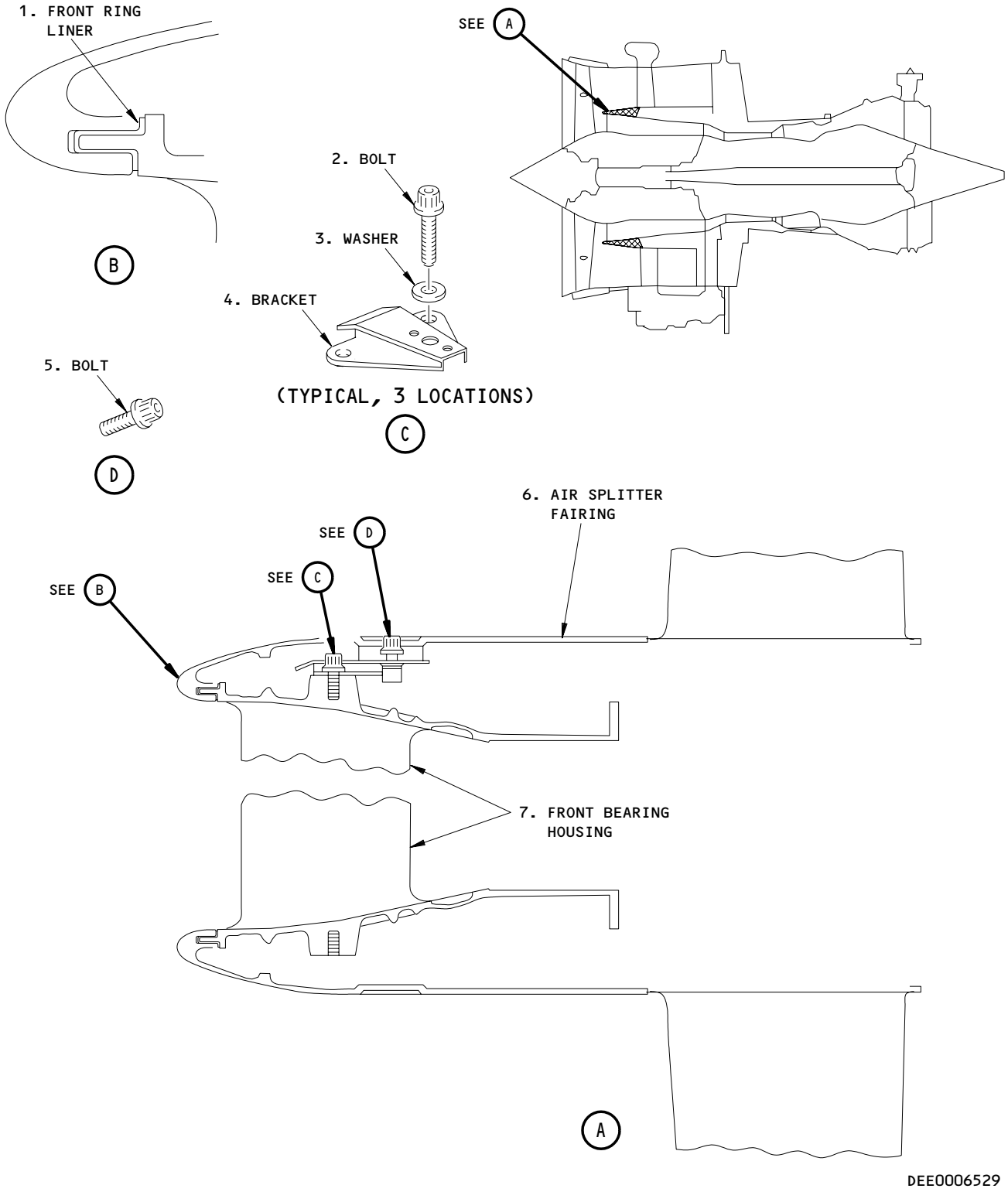
   E. Prepare to remove the IP Compressor Splitter Fairing

      S 014-003-R00
      (1) Remove the LP Compressor module (AMM 72-31-10/401).
   F. Procedure (Fig. 401)

      S 014-004-R00
      (1) Release and remove the three bolts (2) that secure the fairing to the front bearing housing, then remove the fairing.

      S 014-005-R00
      (2) Remove the three support brackets (4).

      S 014-006-R00
      (3) Remove the front liner ring.



IP Compressor Splitter Fairing – Removal/Installation
Figure 401

TASK 72-35-02-724-002-R00

3. Install the IP Compressor Splitter Fairing

A. General
(1) Lubricate all threads and abutment faces with OMat 1011 engine lubricating oil.

B. Consumable Materials
(1) Engine Oil, OMat No. 1011
(2) Jointing Compound, OMat No. 4/46
(3) Acetone, OMat No. 150
OR
Sealant Remover, Applied 8039, OMat No. 1/290
OR
Sealant Remover, Pyrene 15-01, OMat No. 1/290a

C. Equipment
(1) Assembly strap - HU28155/1, Quantity 5

D. References
(1) AMM 70-51-00/201, Torque Tighten Procedures
(2) AMM 72-31-10/401, LT Compressor Rotor Blade and Disc

E. Access
(1) Location Zones
410 Left Engine
420 Right Engine

(2) Access Panels
412 Left Nose Cowl
422 Right Nose Cowl

F. Procedure (Fig. 401)

S 414-007-R00
(1) Install the air splitter fairing support brackets (4) to the front bearing housing.

S 414-008-R00
(2) Tighten the bolts to the standard loading.

S 114-020-R00

CAUTION: YOU MUST TAKE CARE WHEN YOU APPLY THE SOLVENT AS THE SURFACE PROTECTION WILL BE AFFECTED. ALL AFFECTED AREAS MUST BE PROTECTED (AMM 70-42-12/201). IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE CAN OCCUR.

(3) Clean the joint faces of the front ring liner and the splitter fairing front recess with a clean cloth moistened with OMat No. 150 Acetone or OMat 1/290 Sealant Remover or OMat 1/290a Sealant Remover to remove all traces of existing joint compound.

S 394-010-R00

(4) Apply OMat 4/46 jointing compound to joint faces of front ring liner and splitter fairing front recess.
(a) Allow to dry for ten minutes.

S 424-011-R00

(5) Install the front ring liner to the air splitter fairing recess.
(a) Make sure the faces are in contact.

S 424-012-R00

(6) Install the splitter fairing to the front bearing housing.
(a) Make sure the timing marks on the fairing and the torsion box at top dead center are in position.

S 484-013-R00

(7) Put the five Assembly Straps (HU28155) equally spaced around the fairing and adjust the tension.
(a) Make sure the faces of the fairing, front ring liner, and bearing housing touch fully at position A.

S 424-014-R00

(8) Attach the fairing to the support brackets with 3 bolts (2).

S 424-015-R00

(9) Tighten the bolts to the standard loading.

S 214-016-R00

(10) Check the air splitter fairing, front ring liner, and the front bearing housing faces touch at position A.

NOTE: If the fairing and support bracket holes are not aligned correctly and if they prevent installation of the bolts, then the position of the support brackets can be adjusted within the tolerances of the bracket's bolt holes.

S 084-017-R00

(11) Remove the assembly straps.

S 154-018-R00

(12) Clean all unwanted jointing compound from the joint areas.

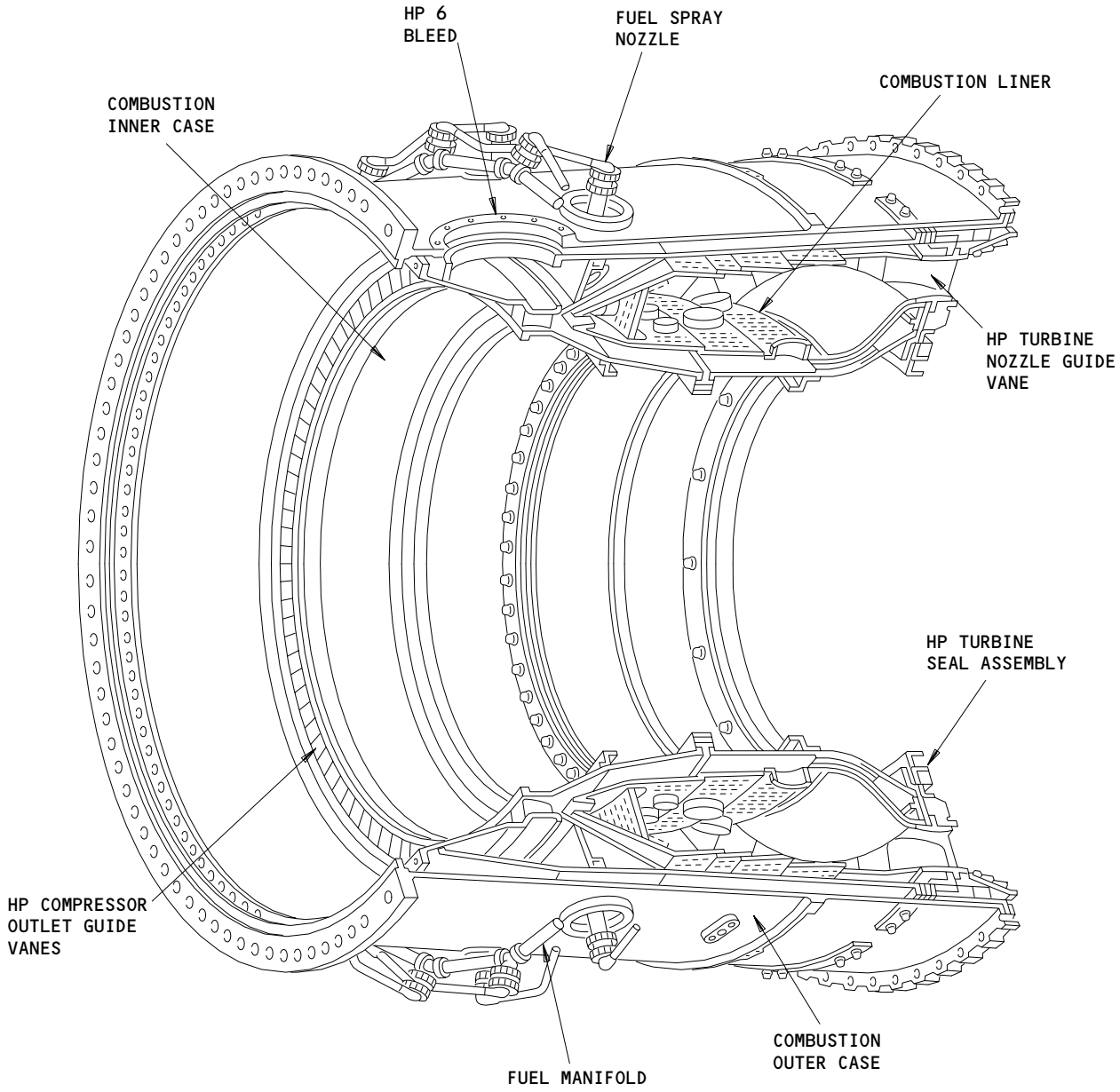
G. Install the LP Compressor module

S 424-019-R00

(1) Install the LP Compressor (AMM 72-31-10/401).

COMBUSTION SECTION - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. In the combustion section, atomized fuel added to the air delivered from the compressor section is burnt before being passed to the turbine section to produce mechanical power.
   B. The combustion system is comprised of the combustion chamber and an inner and outer combustion case mounted between the low pressure (LP) compressor inner case and intermediate pressure (IP) turbine case.
2. Component Details
   A. Combustion Chamber
      (1) The combustion chamber consists of a front, an inner and an outer annular liner enclosed and supported within the inner combustion case. Holes within the front liner forward panel allow for the location of eighteen fuel spray nozzles (AMM 73-11-00).
   B. Inner Combustion Case
      (1) The inner combustion case is located at the rear on lugs from the outer combustion case, and attached at the front to an annular cone mounted from the high pressure (HP) compressor case. Integral with the inner combustion case are the HP compressor outlet guide vanes (OGV).
      (2) RB211-535E4-B ENGINES POST-RR-SB 72-C230 (PHASE V COMBUSTOR); The H.P. Compressor outlet guide vanes (O.G.V.) are mounted in the outlet guide vane casing which, at the rear, is attached to the combustion rear inner casing.
      (3) Flanges to the rear of the inner combustion case make provision for mounting the HP turbine nozzle guide vanes (NGV) and turbine seal assembly.
      (4) Mounted radially rearward of the NGV are shroud segments, which form a seal with the HP turbine blade tip sealing bands to control gas leakage.
      (5) Provision to the inner combustion case is made for the attachment of the fuel spray nozzles.
   C. Outer Combustion Case
      (1) Provision to the outer combustion case is made for mounting the HP 6 bleed air off-take and for mounting of the engine HP 3 bleed valves, fuel spray nozzles and the fuel manifold. (AMM 75-32-00).
      (2) Ports within the inner and outer combustion case and the combustion front line provide access for borescope inspection of the combustion chamber.



Combustion Section
Figure 1

COMBUSTION SECTION - INSPECTION/CHECK

1. General
   A. This section contains the limits for cracks in the outer case of the combustion section.
   B. Use these limits when you think there is a crack in the outer case or if it is necessary.
   C. The inspection/check in 72-00-00/601 contains the usual inspection procedure and the limits for the combustion section on the RB211-535 engine.

TASK 72-40-00-206-001-R01

2. Limits for the Outer Case of the Combustion Section
   A. Procedure

S 226-002-R01

(1) Limits for Cracks in the Weld Between the Soleplates on the HP Air Offtake and the Adjacent Fuel Spray Nozzle (Fig. 601)
   (a) If cracks are less than 0.50 inch (12.70 mm), do the inspection again before 100 flight cycles.
   (b) If cracks are more than 0.50 inch (12.70 mm) but less than 1.50 inches (38.10 mm), do the inspection again before 50 flight cycles.
   (c) Replace the engine if cracks are more than 1.50 inches (38.10 mm).

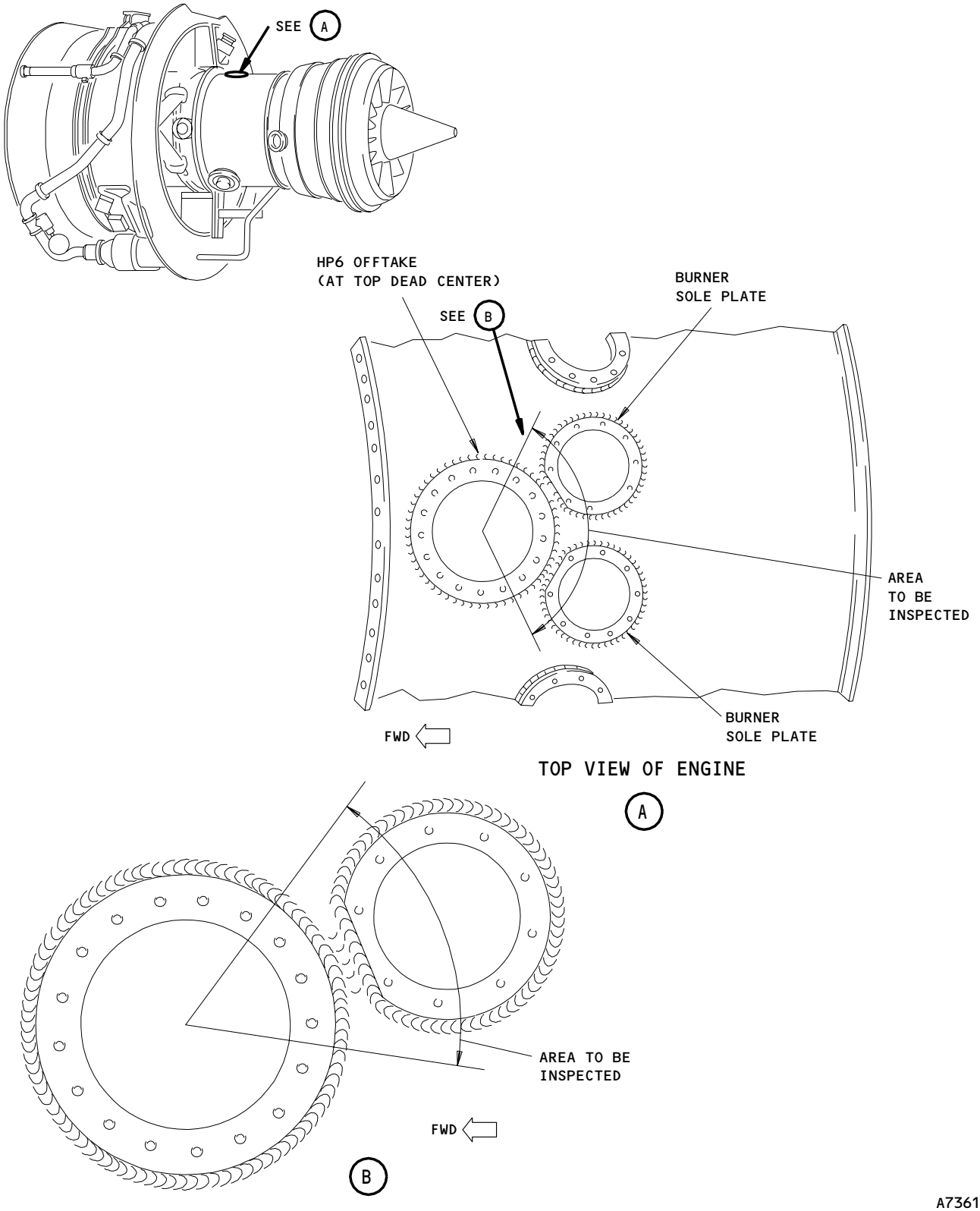
S 966-003-R01

(2) Cracks in the Fuel Manifold Support Bracket.
   (a) Cracks in the bracket are permitted.
   (b) Replace the cracked brackets when the HP (04) module repair or a fuel manifold removal is done.

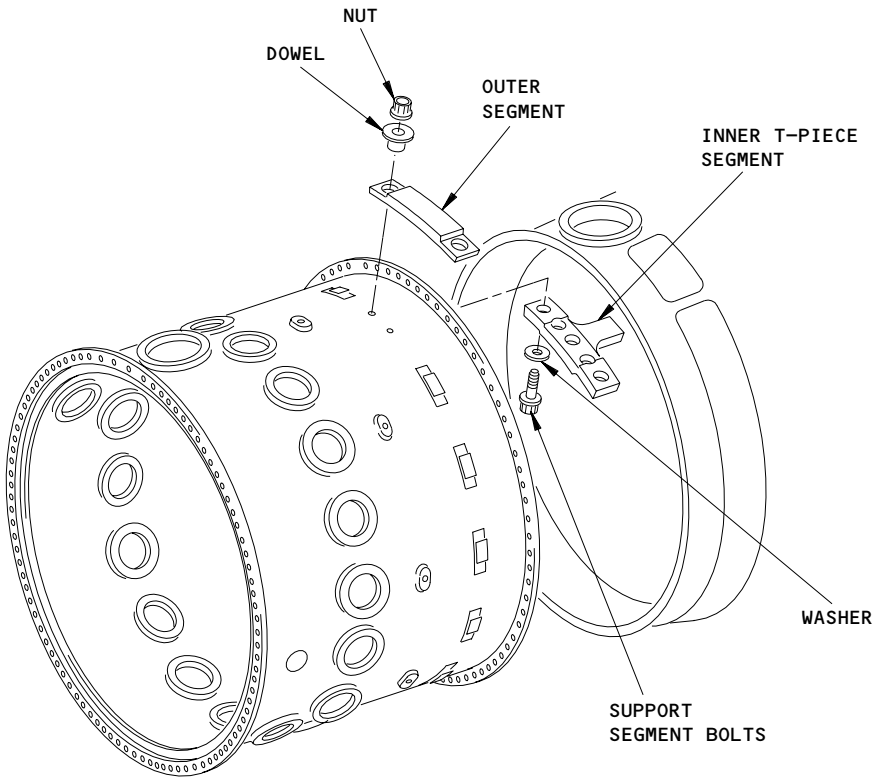
S 216-004-R01

(3) Examine the combustion outer case for missing bolts or segments (Fig. 602)

NOTE: All bolts that have been tack-welded must be removed and repaired to FRS7124.



Combustion Outer Case - Inspection/Check
Figure 601



DEE0006287

Combustion Outer Case Support Segment - Inspection/Check
Figure 602

(a) If no bolts are missing, accept.
(b) If bolts are missing, do the steps that follow:
    1) If bolts are missing but no inner segments are missing, repair to FRS7124.
    2) If bolts are missing and 1 inner segment is missing, repair to FRS7125.
    3) If bolts are missing and 2 inner segments that are not adjacent are missing, repair to FRS7124.
    4) If bolts are missing and 2 inner segments that are adjacent are missing, reject before 100 flight hours.
    5) If bolts are missing and more than 2 inner segments are missing, reject before 100 flight hours.
    6) Examine the C-Ducts for damage (AMM 78-31-20/201).
(c) Examine the inner surface of the combustion outer case and unwanted material:
    1) If the unwanted material from damaged bolts and missing segments has been removed, accept.
    2) If the unwanted material cannot be removed, and there is no fretting on the combustion outer case, accept if you repeat the inspection at intervals of 600 flight hours.
    3) If the unwanted material cannot be removed and there is fretting on the combustion outer case, reject before 100 flight hours.
    4) If a missing segment cannot be removed, reject before 100 flight hours.

COMBUSTION SECTION - INSPECTION/CHECK

1. General
   A. This section contains the limits and acceptance standards for cracks in the outer case of the combustion section.
   B. Use these limits when you think there is a crack in the outer case or if it is necessary.
   C. The inspection/check in 72-00-00/601 contains the usual inspection procedure and the limits for the combustion section on the RB211-535 engine.

TASK 72-40-00-206-003-R02

2. Limits for the Outer Case of the Combustion Section
   A. Procedure

S 226-002-R02

(1) Limits for cracking of the weld between the HP air offtake soleplate and the adjacent fuel spray nozzle soleplates refer to (Fig. 601).
   (a) If cracks are less than 0.50 inch (12.70 mm), do the inspection again in less than 100 flight cycles.
   (b) If cracks are more than 0.50 inch (12.70 mm) but less than 1.50 inches (38.10 mm), do the inspection again in less than 50 flight cycles.
   (c) Replace the engine if cracks are more than 1.50 inches (38.10 mm).

S 226-001-R02

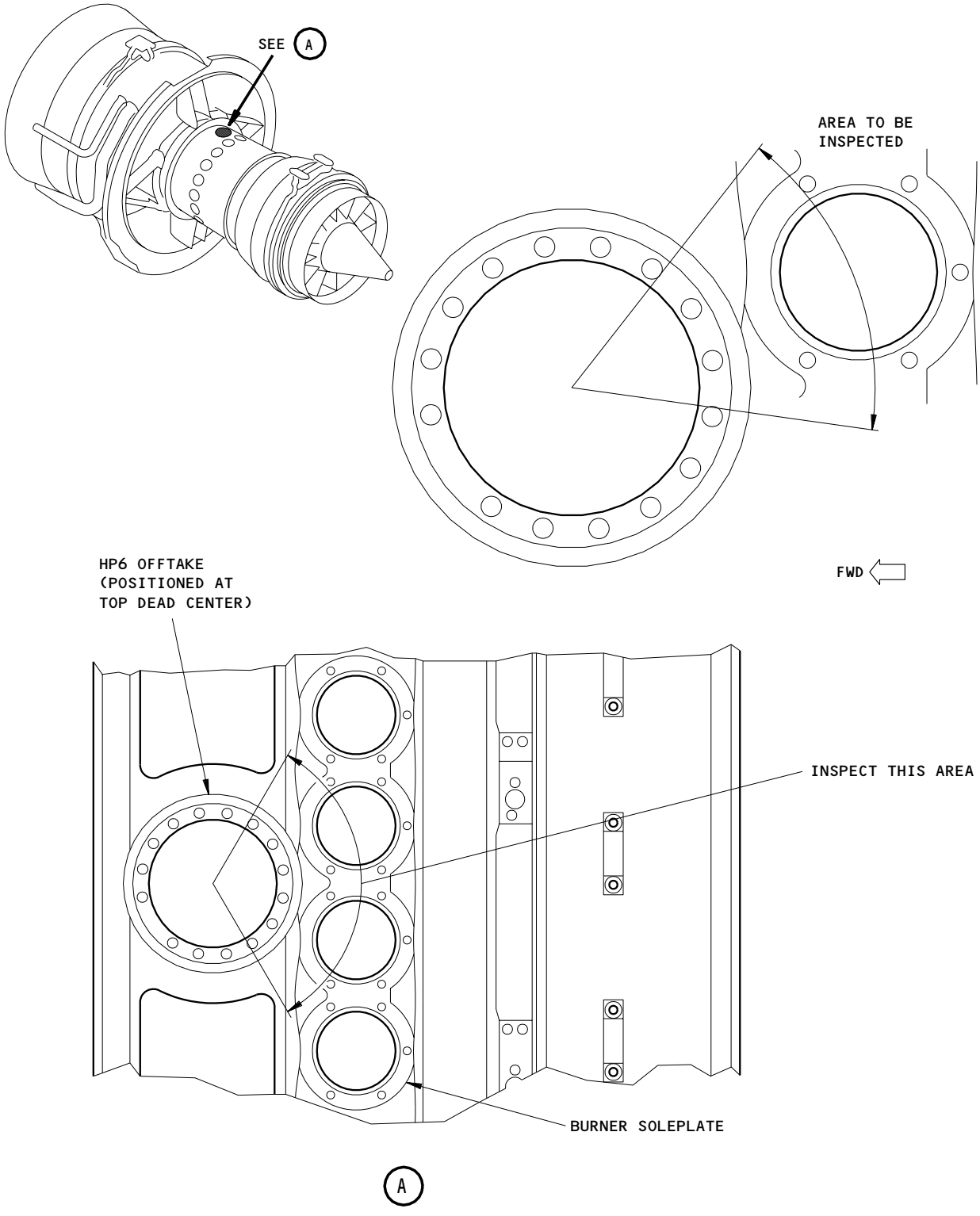
(2) Cracks in the Fuel Manifold Support Bracket (Fig. 602).
   (a) Cracks in the bracket are permitted.
   (b) Replace the cracked brackets during a HP (04) module repair or a fuel manifold removal.

S 216-004-R02

(3) Examine the combustion outer case for missing bolts or segments (Fig. 603)

NOTE: All bolts that have been tack-welded must be removed and repaired to FRS7124.

   (a) If no bolts are missing, accept.
   (b) If bolts are missing, do the steps that follow:
      1) If bolts are missing but no inner segment is missing, repair to FRS7124

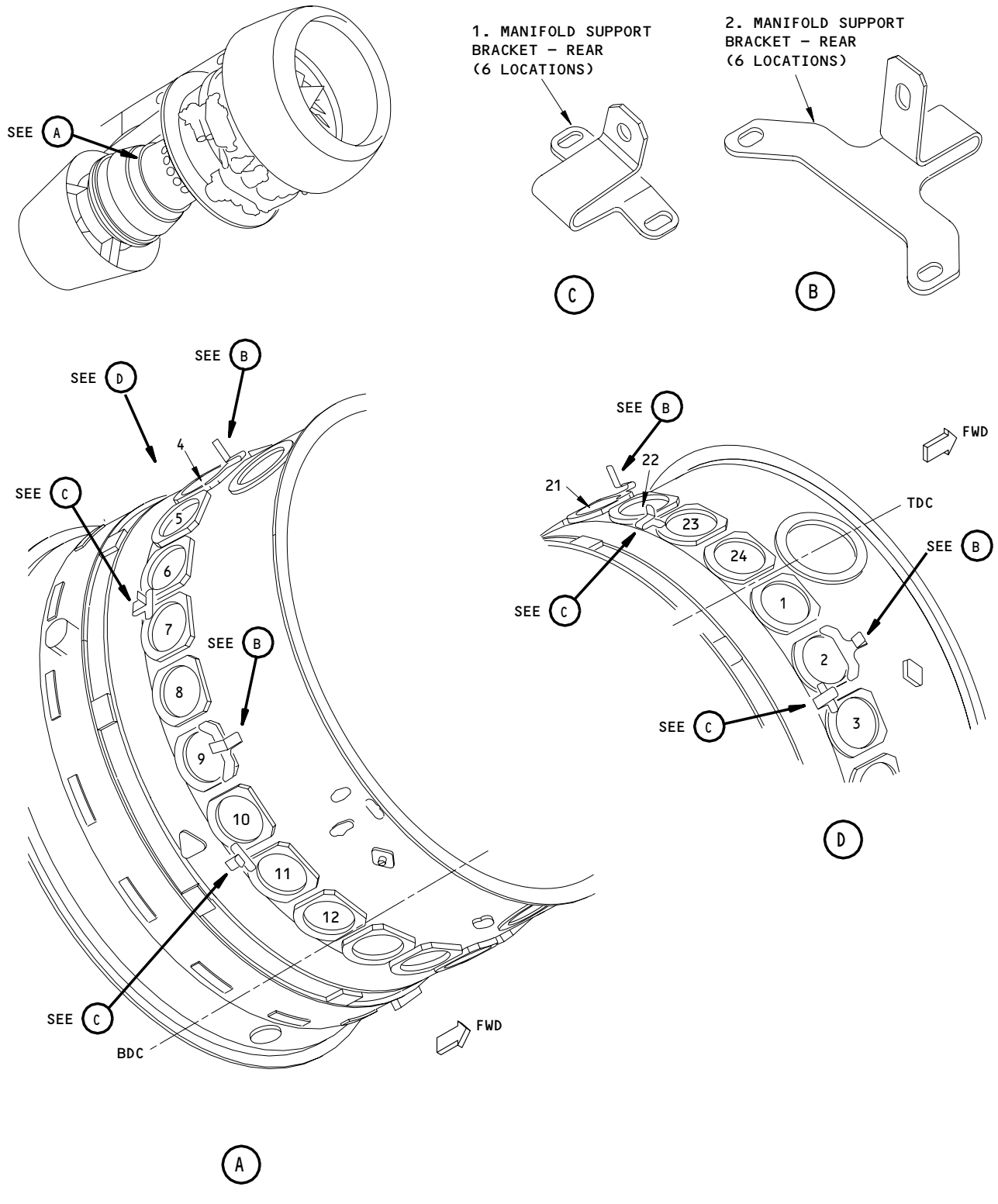


DEE00y2231

Combustion Outer Case - Inspection/Check
Figure 601

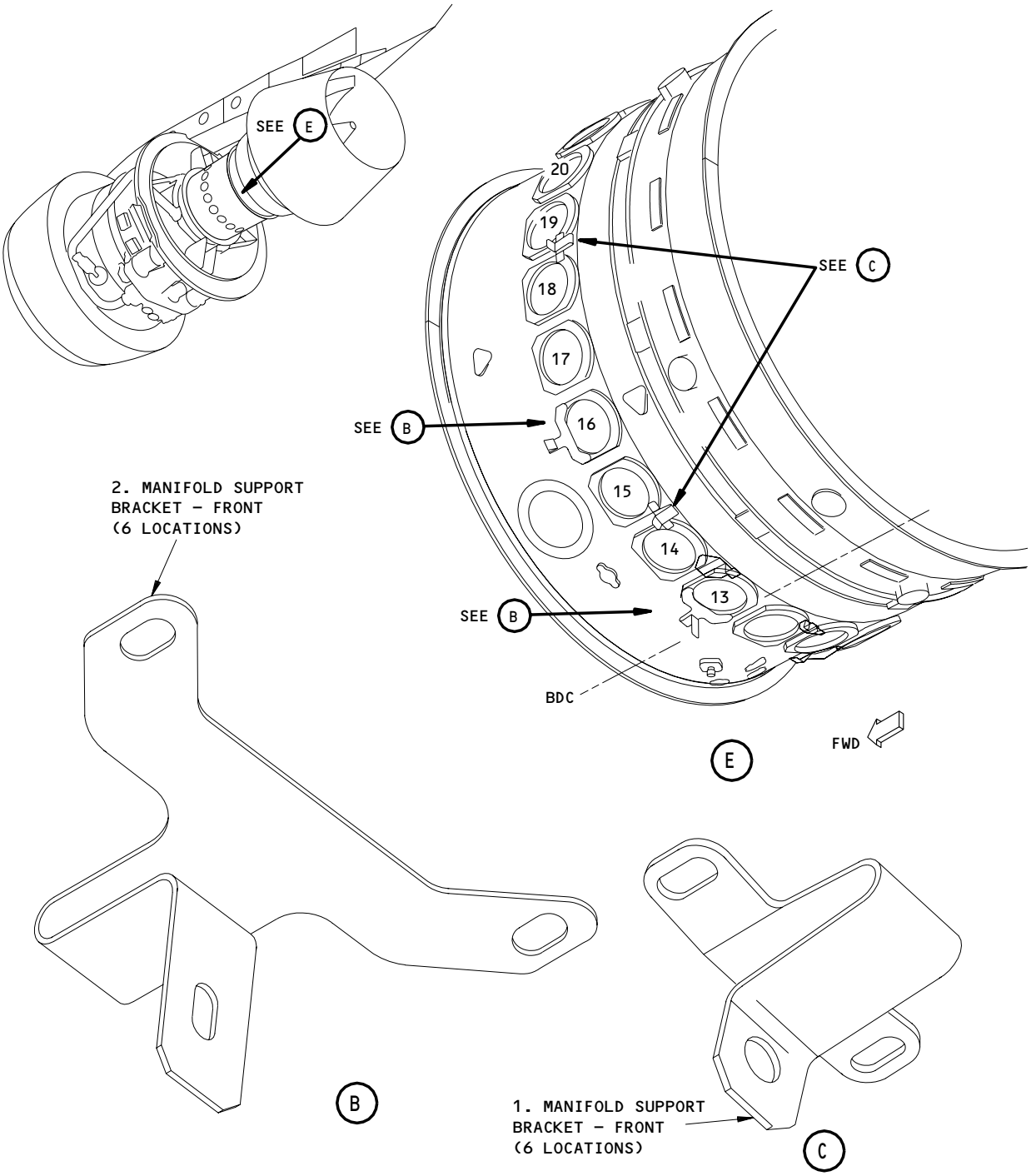
2) If bolts are missing and 1 inner segment is missing, repair to FRS7125.
3) If bolts are missing and 2 inner segments that are not adjacent are missing, repair to FRS7124.
4) If bolts are missing and 2 inner segments that are adjacent are missing, reject before 100 flight hours.
5) If bolts are missing and more than 2 inner segments are missing, reject before 100 flight hours.
6) Examine the C-Ducts for damage (AMM 78-31-20/201).

(c) Examine the inner surface of the combustion outer case for unwanted material:
1) If the unwanted material from damaged bolts and missing segments has been removed, accept.
2) If the unwanted material cannot be removed, and there is no fretting on the combustion outer case, accept if you repeat the inspection at intervals of 600 flight hours.
3) If the unwanted material cannot be removed and there is fretting on the combustion outer case, reject before 100 flight hours.
4) If a missing segment cannot be removed, reject before 100 flight hours



DEE00y2338

Fuel Manifold Support Bracket (Right Side) – Inspection/Check
Figure 602 (Sheet 1)



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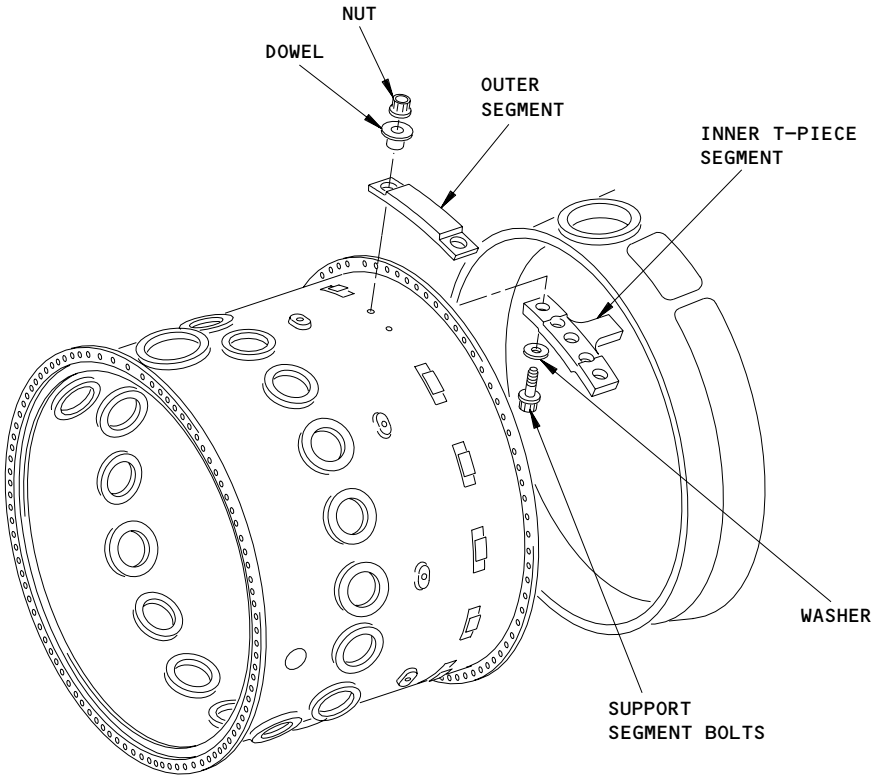
Fuel Manifold Support Bracket (Left Side) – Inspection/Check
Figure 602 (Sheet 2)



DEE0006287

Combustion Outer Case Support Segment - Inspection/Check
Figure 603

COMBUSTION OUTER CASING - APPROVED REPAIRS

1. General
   A. This task is to replace a failed anti-rotation segment location bolt with a blind bolt system.

TASK 72-41-00-308-039-R00

2. Replace Failed Anti-Rotation Segment Location Bolt with Blind Bolt System (Fig. 801)
   A. General
      (1) This repair, FRS7124, gives the procedure to replace failed anti-rotation segment location bolts with blind bolt system on the combustion outer casing.
      (2) This repair can be used for combustion cases with the part numbers that follows:

535E4-37	UL18736
	UL18740
	UL24119
	UL20134
	UL36194
	UL39320
	FW11983
535E4-B-37	UL18736
	UL18740
	UL30971
	UL24119
	UL20134
	UL36194
	UL39320
	FW11983

      (3) This procedure describes a temporary repair. All repair items introduced by this procedure must be replaced by standard items at the next overhaul.
      (4) All broken bolt heads, washers and other unwanted material must be removed from inside the borescope inspection ports.
   B. Equipment

      (1) Depth gauge, HU81840
      (2) Bolt Insertion Tool, MH75DM-12AA
   C. Parts
      (1) Outer Support Segment, LK71766
      (2) Blind Bolt, PLT5291-12-08
      (3) Spacer, Locally Manufactured
   D. References
      (1) AMM 72-00-00/601, Engine

(2) AMM 72-40-00/601, Combustion Section
(3) AMM 73-11-05/401, Fuel Spray Nozzles

E. Procedure

S 218-060-R00

(1) Component Inspection (AMM 72-40-00/601)
  (a) Do an inspection of the bolt locations and identify all bolts that are finger loose.
  (b) Identify all weld blockage repairs that were weld attached to the support segment.
  (c) Identify missing bolt locations.

S 018-058-R00

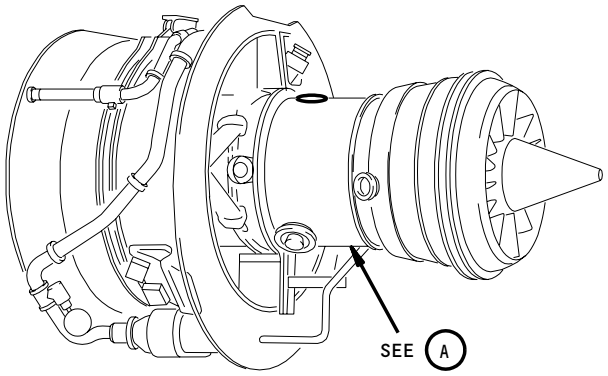
CAUTION: BE CAREFUL WHEN YOU REMOVE THE BOLTS. DO NOT CAUSE DAMAGE TO THE CASING OR PUSH IN TO CAUSE A DENT.

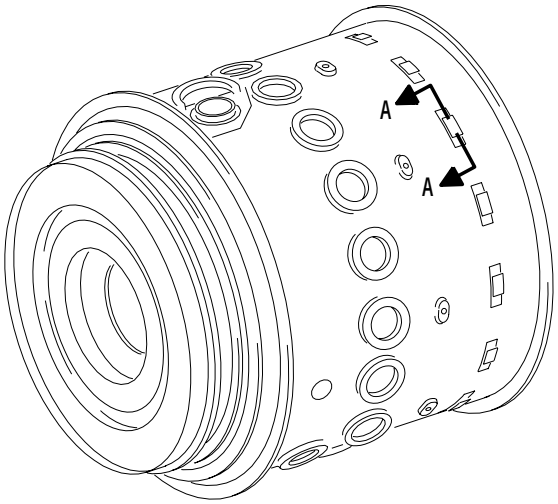
(2) Remove Identified Repairs (Fig. 801)
  (a) For loose bolts:
    1) Use mechanical force to break and remove bolt and nut. Do not grind off.
    2) Remove the headed dowel and make sure that the bolt head and washer have dropped into the engine and do not sit under the bolthole.
  (b) For previous weld repairs:
    1) Carefully dress to remove the repair weld, remove the bolt and headed dowel.
    2) Take care not to cause damage to the support segment or casing.
  (c) For missing bolts:
    1) Check the missing bolt position and remove all dowels that remain.
    2) Take care not to cause damage to the support segment or casing.

S 218-059-R00

(3) Do an Inspection of the missing bolt locations (Fig. 801).
  (a) Do a visual inspection of all missing bolt location holes for obvious damage.

    NOTE: This repair cannot be used where damage to the hole would prevent the blind bolt from being successfully installed.

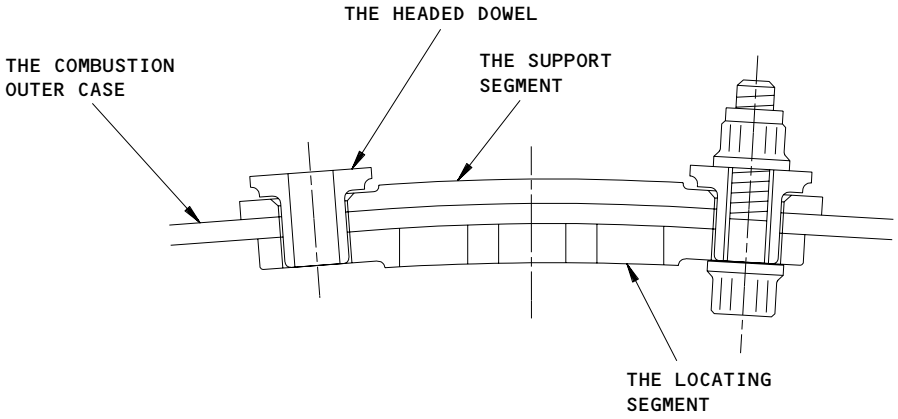




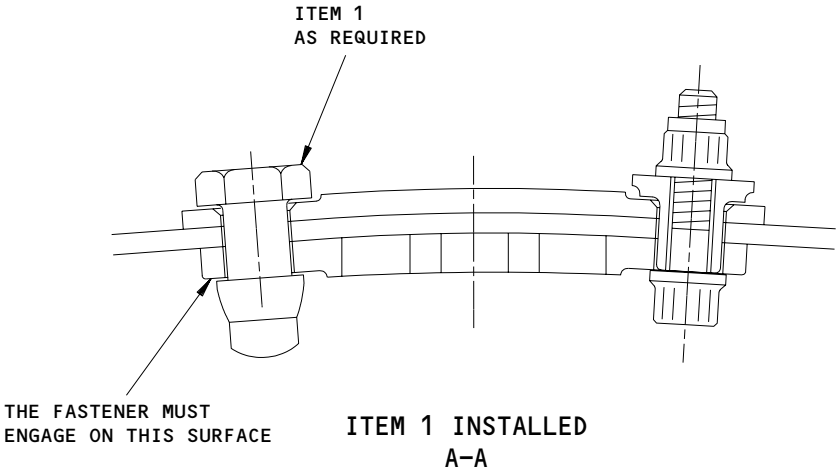
TO SHOW THE
04 MODULE ONLY
A

DER0007033

Repair Construction Details
Figure 801 (Sheet 1)



(MISSING BOLT)
A-A

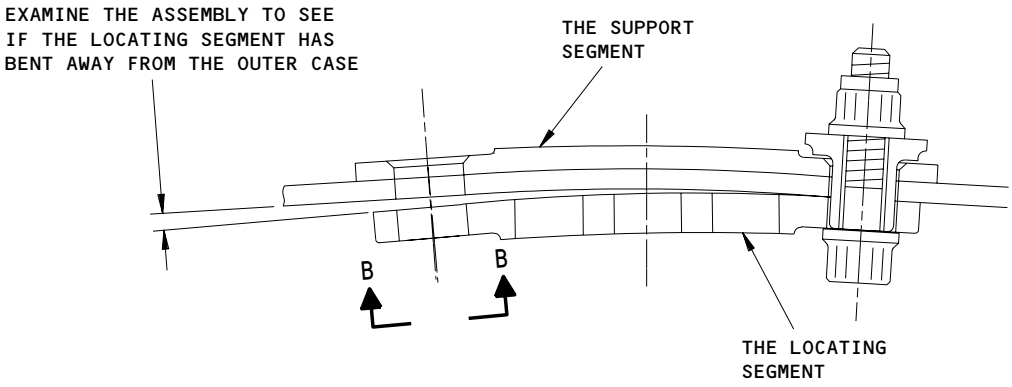


ITEM 1 INSTALLED
A-A

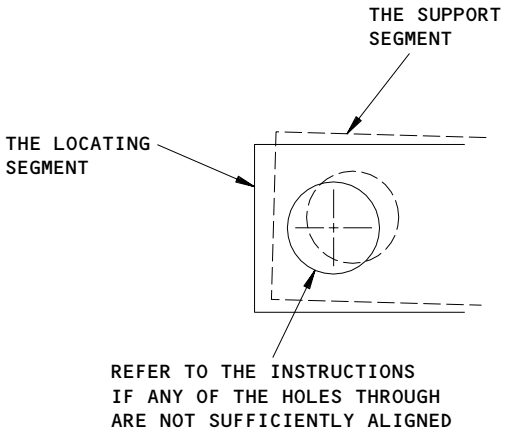
NOTE: AT EACH POSITION ONE BOLT IS MISSING FROM A SUPPORT SEGMENT. REMOVE THE HEADED DOWEL AND INSTALL ITEM 1 TO THE INSTRUCTIONS.

DER0007034

Repair Construction Details
Figure 801 (Sheet 2)



TO SHOW THE POSSIBLE
BENDING OF THE
LOCATING SEGMENT
A–A



TO SHOW POSSIBLE
MIS–ALIGNMENT
B–B

DER0007035

Repair Construction Details
Figure 801 (Sheet 3)

(b) Check that the outer support segment and the inner location segment are installed.
1) If the segments are missing, you must use a new outer support segment.
(c) Check that the location segment has not sprung away from casing.
1) This repair cannot be used where the location segment has sprung away from the casing.
(d) Make sure the holes in the support segment, locating segment and combustion outer case are in alignment.
(e) Use hand tools to align the holes if it is necessary.

S 208-061-R00

(4) Make a selection of the repair items (Fig. 802 and Fig. 803)
(a) Check the thickness of the segments and the combustion outer case and make a selection of the necessary spacer.
1) Use the HU81840 depth gauge 1 off, to check the combined thickness of the support segment, locating segment and combustion outer case.
a) If the depth gauge goes over the section (see diagram A), use the spacer (item 3).
b) If the depth gauge does not go over the section (see diagram B), use the spacer (item 2).
2) Use a locally manufactured spacer.
3) For a missing segment, use LK1766 Outer Support Segment 1 off, and the spacer (item 4).
4) Use a locally manufactured spacer.

S 428-062-R00

(5) Install a Blind Bolt (Fig. 801)
(a) Check the location and fit.
(b) Do a dry installation of the repair items. Use hand tools.
(c) Install the blind bolt.
1) Take care to keep the bolt straight and bottomed in the hole during the tightening sequence.
2) Install item 1 PLT5291-12-08 blind bolt 1 off and the necessary spacer.

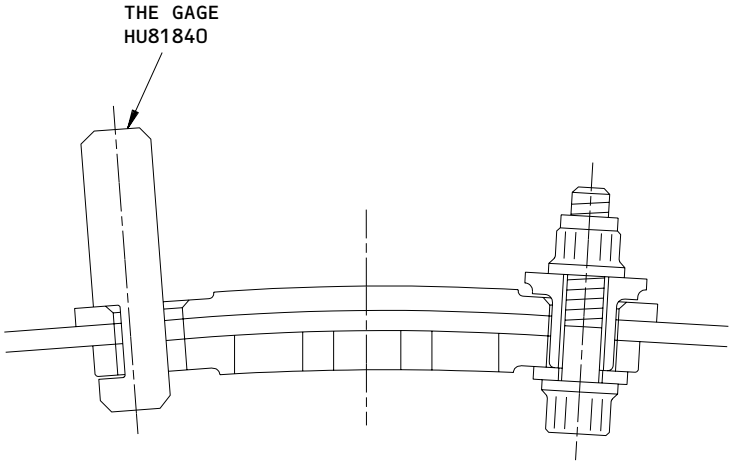


DIAGRAM A

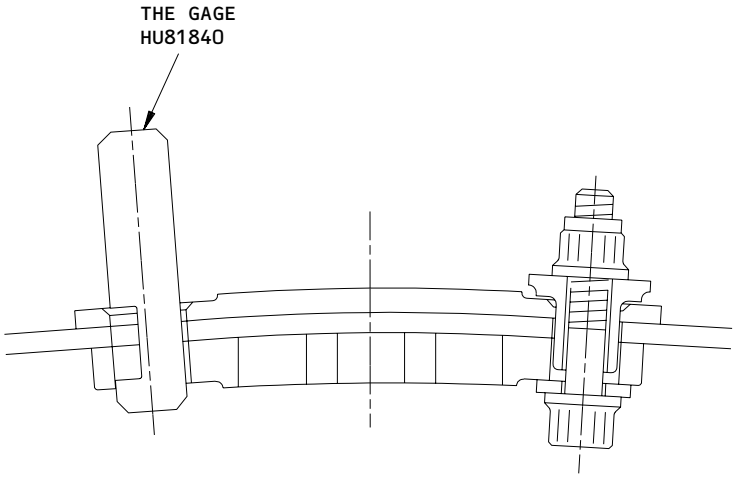
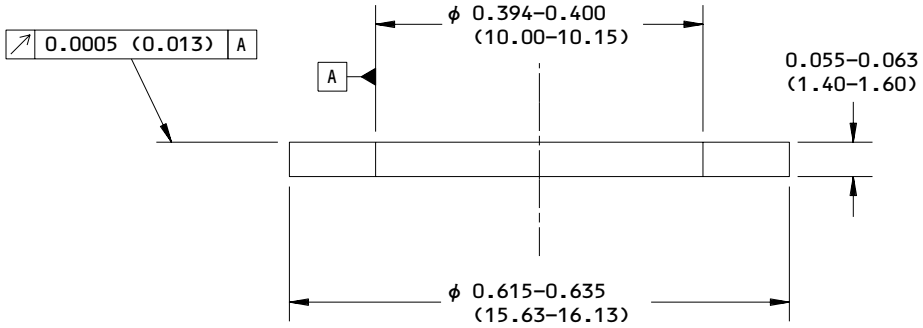


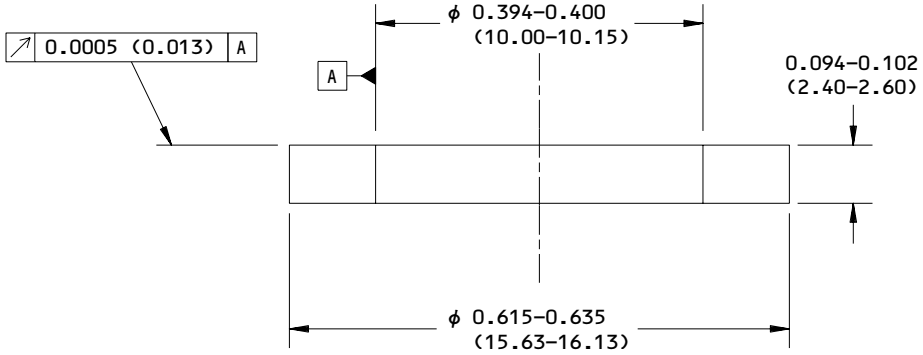
DIAGRAM B

DER0007184

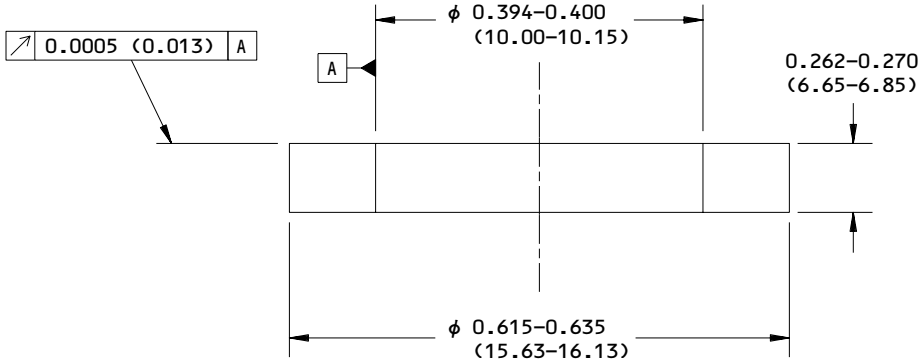
Repair Details
Figure 802



DETAIL OF THE LOCALLY MANUFACTURED SPACER ITEM 2



DETAIL OF THE LOCALLY MANUFACTURED SPACER ITEM 3



DETAIL OF THE LOCALLY MANUFACTURED SPACER ITEM 4

NOTE: MACHINE ALL OVER
CAN BE MADE FROM EAF, EBM, EDL (DTD189), EEA (BS.S130), EFN (BS.S527), ECN (AMS5646) OR EFB (AMS5512)
MAKE THE SPACER TO THE INSTRUCTIONS
SURFACE TEXTURE VALUE TO BE 63 MICROINCHES (1.6 MICROMETERS)
BREAK THE SHARP EDGES 0.004–0.020 (0.10–0.50)

DER0007146

Repair Details and Dimensions
Figure 803

3) Tighten using MH75DM-12AA bolt inspection tool 1 off, until draw bolt snaps off.

NOTE: It is possible that the blind bolt does not reach the bottom of the hole when it is first installed. This is acceptable if the gap between the support segment and the spacer is less than 3mm when fully inserted. You can use an alternative locally supplied bolt insertion tool if it is suitable for the task of installing this type of 3/8inch blind bolt.

S 218-063-R00

(6) Repair Inspection
   (a) Do a visual inspection of the part.
   (b) Check that the inserted bolt is square in the hole and is finger tight.

S 028-064-R00

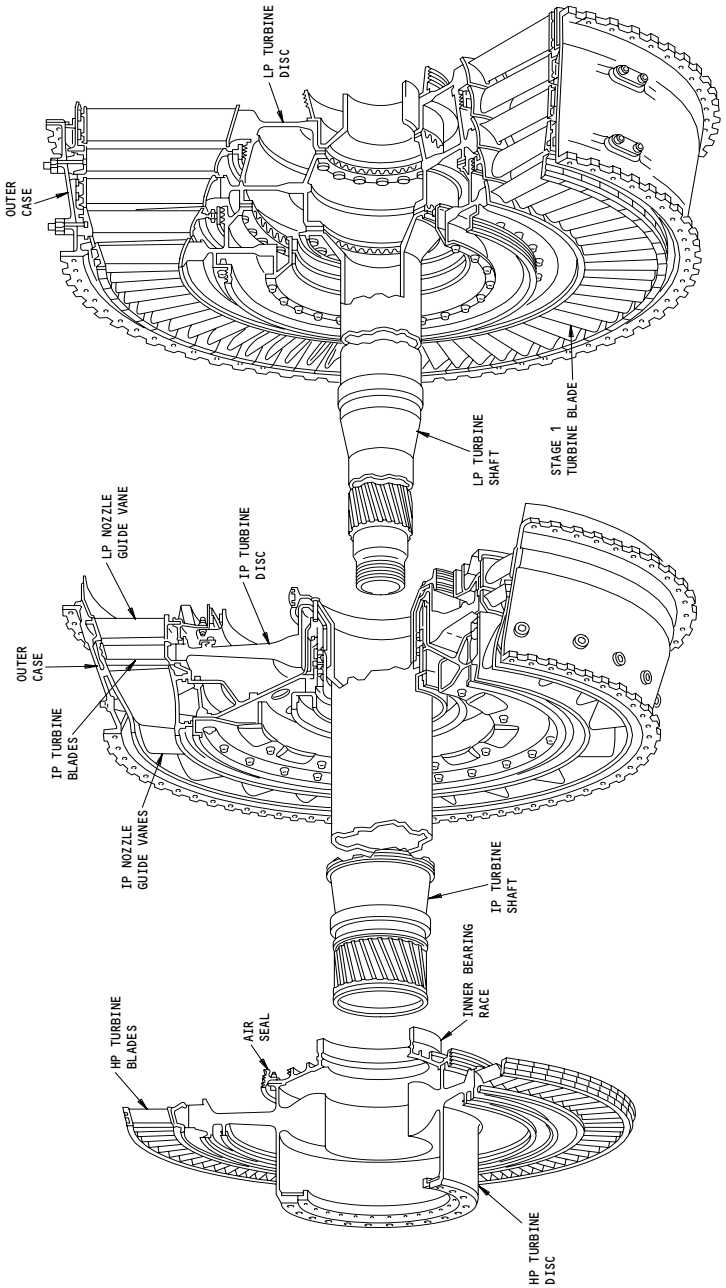
(7) Remove the unwanted material
   (a) Remove the borescope access plugs (AMM 72-00-00/601).
   (b) Remove the broken bolt heads, washers and other unwanted material from the inside of the casing through the borescope inspection ports.
   (c) Install the borescope access plugs (AMM 72-00-00/601).

S 028-065-R00

(8) Remove the Location Segment
   (a) If it is necessary, do the steps that follow to remove the location segment:
      1) Remove the bottom fuel spray nozzle (AMM 73-11-05/401).
      2) Remove the location segment from inside the combustion case through the fuel spray nozzle opening.
      3) Install the bottom fuel spray nozzle (AMM 73-11-05/401).
   (b) Make an entry in the engine logbook that references FRS7124 and the repair positions.

TURBINE SECTION - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. Energy in the stream of gas received from the combustion section is converted into mechanical work by the turbine section and used to drive the compressors.
   B. The turbine section consists of the following sections:
      (1) High pressure (HP) turbine.
      (2) Intermediate pressure (IP) turbine.
      (3) Low pressure (LP) turbine.
      (4) Low pressure (LP) turbine exhaust case.
2. Component Details
   A. HP Turbine
      (1) The HP turbine is comprised of an integral disc and shaft assembly and blades. The turbine shaft is attached directly to the HP compressor. The shaft is supported at the rear on a roller bearing mounted in the IP turbine case.
      (2) Integral lands on the disc combine with the turbine seals, positioned within the combustion section (AMM 72-40-00), to provide controlled airflow (AMM 72-02-00) through holes within the disc and blade root to cool the turbine blades.
      (3) The turbine blades are located to the disc by firtree roots that provide radial retention while axial retention is accomplished through circumferential lockplates.
      (4) Each blade tip has an integral and interlocking shroud with peripheral sealing lands that, together with shroud segments mounted within the combustion section (AMM 72-40-00), controls gas leakage.
   B. IP Turbine
      (1) The IP turbine comprises the HP/IP turbine bearing support, a single stage turbine disc, shaft and blades. The assembly is mounted between the combustion case and LP turbine case.
      (2) The IP turbine shaft is located by a ball bearing mounted within the intermediate case and is supported on a roller bearing in the HP/IP turbine bearing support housing. The drive to the IP compressor is through a helical spline to the front of the turbine shaft.
      (3) The HP/IP turbine bearing support comprises a central hub, housing the HP and IP turbine roller bearings, attached to the case through fabricated struts.
      (4) The turbine blades are located to the disc by firtree roots that provide radial retention while axial retention is accomplished through circumferential lockplates.
      (5) Each blade tip has an integral shroud with peripheral sealing lands that, together with shroud segments mounted within the case, controls gas leakage.



Turbine Section
Figure 1

(6) Provision to the outer case is made for mounting overheat detectors (AMM 77-21-00) and thermocouples sensing exhaust gas temperature (EGT) (AMM 77-21-00).

C. LP Turbine

(1) The LP turbine consists of three turbine discs, blades, shaft and outer case containing nozzle guide vanes. The outer case is attached between the IP turbine case and LP turbine exhaust case.

(2) The LP turbine shaft is located by a ball bearing mounted within the intermediate case, and supported on a roller bearing in the LP turbine exhaust case. The drive to the LP compressor is through a helical spline to the front of the turbine shaft.

(3) The blades are located to the discs by firtree roots that provide radial retention while axial retention is accomplished through circumferential lockplates.

(4) Each blade tip has an integral shroud with peripheral sealing lands that, together with shroud segments mounted within the IP and LP turbine cases, control gas leakage.

(5) LP nozzle guide vanes, mounted circumferentially within the turbine case, guide the exhaust gas through the turbine. Abradable shroud rings attached to the inner land of the vanes provide a seal to the turbine discs.

D. LP Turbine Exhaust Case (Fig. 2)

(1) The LP turbine exhaust case is a fabricated cylindrical structure to which a central hub housing the turbine roller bearing is attached, through hollow struts. The case is attached between the LP turbine case and the exhaust collector (AMM 78-00-00).

(2) Fairings attached to the hub surround each strut and together with an exhaust cone attached to the rear flange of the hub, provide for an even exhaust of turbine gas.

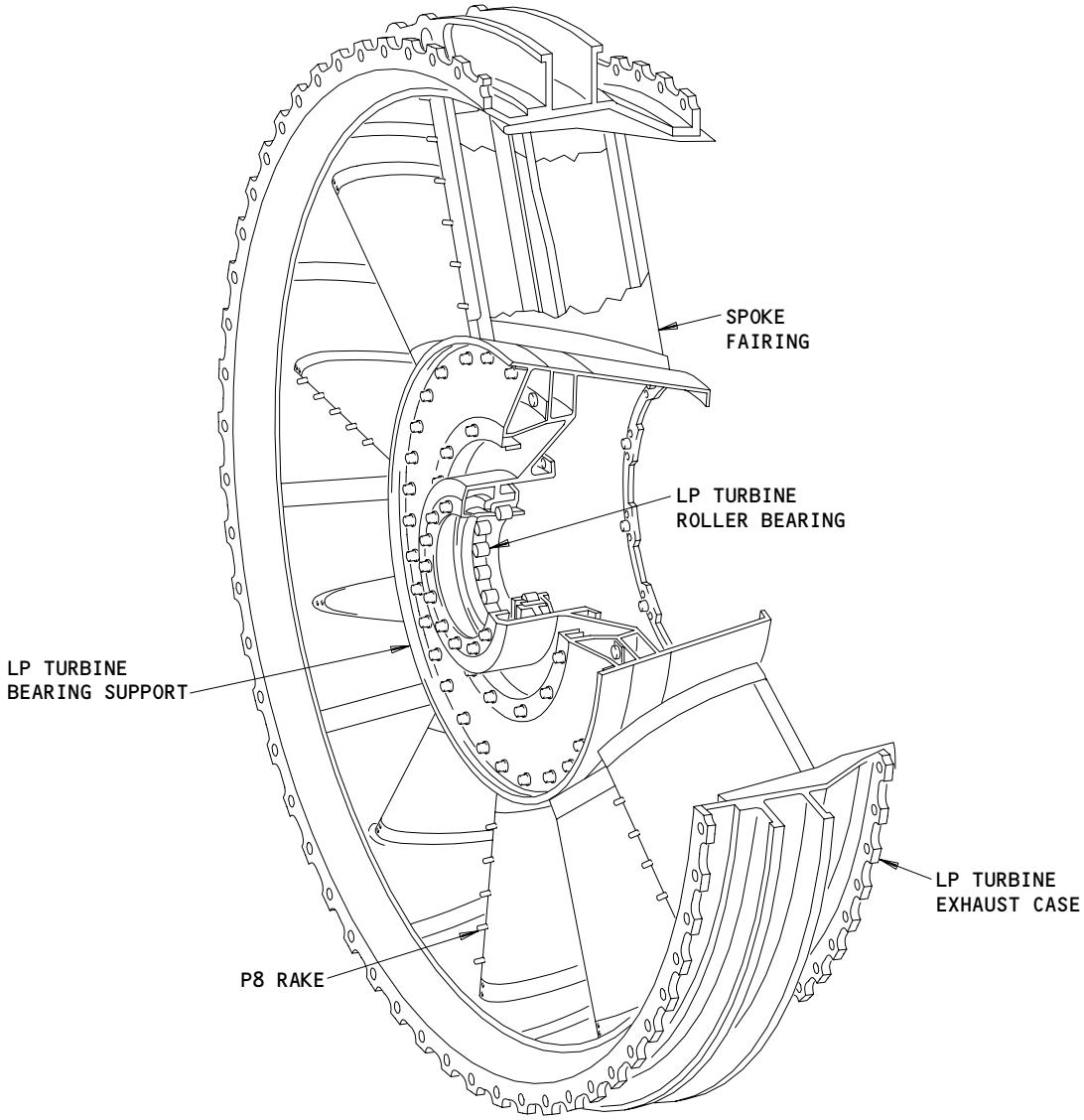
(3) Rakes (P8) mounted within the leading edge of some fairings, sense gas generator exhaust pressure (AMM 77-11-00).

(4) Oil tubes situated within some fairings, provide lubrication to and from the LP turbine bearing.

(5) A double ribbed stiffening ring on the case provides attachment for the engine rear mount (AMM 71-21-00).

(6) A turbine overspeed emergency shutdown mechanism (AMM 76-22-00) is mounted within the hub of the exhaust case and has an actuating cable exiting through one of the struts.

(7) IP 6 air tubes (AMM 72-02-00) are situated within some of the fairings and provide cooling air to the turbine exhaust case.



EXHAUST CASE

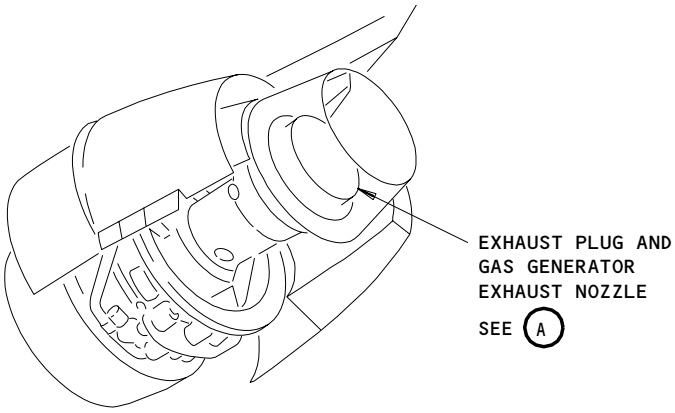
51535

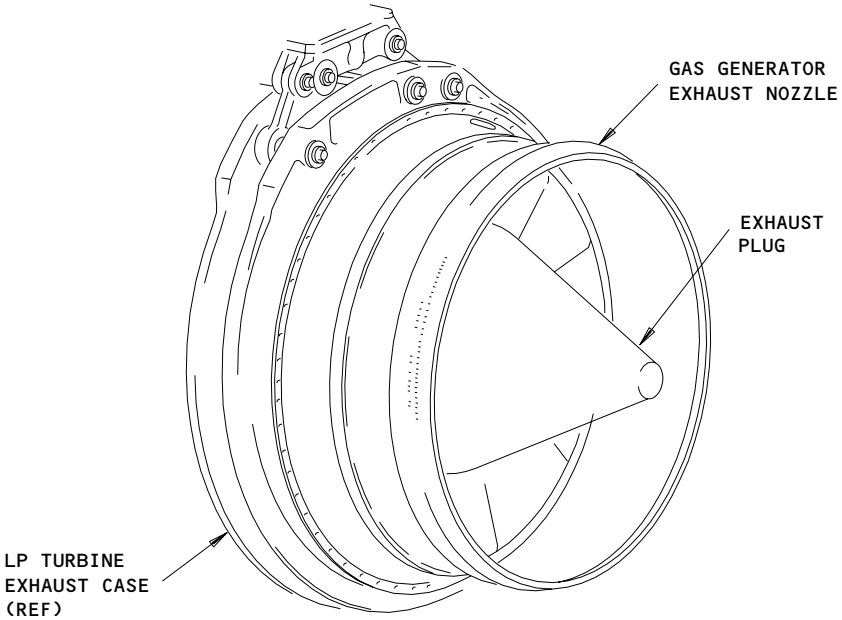
LP Turbine Exhaust Case
Figure 2

TURBINE SECTION

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
PLUG - EXHAUST	---	2	TURBINE EXHAUST	72-51-01
NOZZLE - GAS GENERATOR EXHAUST	---	2	TURBINE EXHAUST	72-51-02

Turbine Section - Component Index
Figure 101





EXHAUST PLUG AND GAS GENERATOR
EXHAUST NOZZLE
(A)

NOTE: COMMON NOZZLE EXHAUST
COLLECTOR REMOVED.

Turbine Section – Component Location
Figure 102

EXHAUST PLUG - REMOVAL/INSTALLATION

1. General
   A. Use the procedures given in AMM 70-51-00/201 to tighten the fasteners. Tighten the fasteners to the torque values given in AMM 70-51-00/201 unless a torque value is specified in this procedure.

TASK 72-51-01-004-010-R00

2. Remove the Exhaust Plug
   A. References
      (1) AMM 78-31-00/201, Thrust Reverser
   B. Access
      (1) Location Zone
          410/420 Power Plant

   C. Remove the Exhaust Plug (Fig. 401)

S 044-003-R00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 034-002-R00

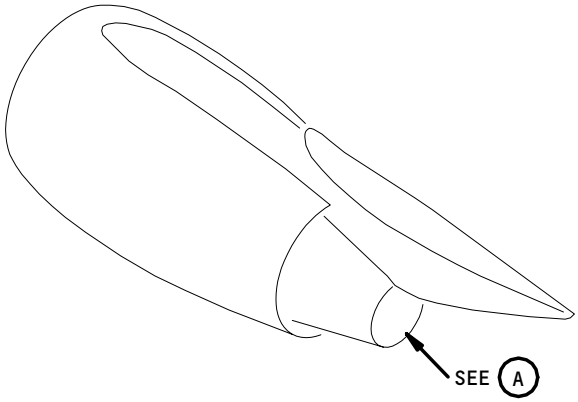
      (2) Hold the exhaust plug while you remove the bolts.

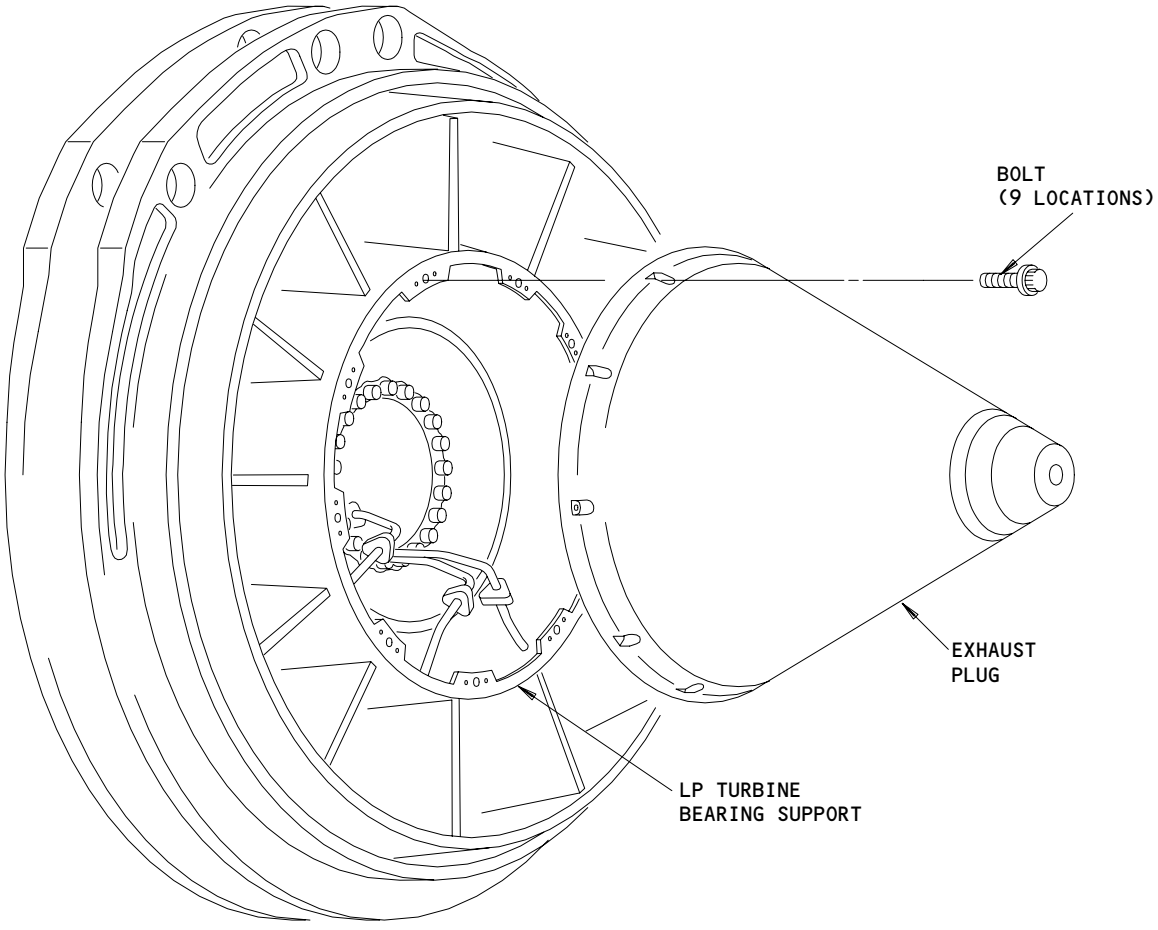
S 024-007-R00

      (3) Carefully remove the exhaust plug from the bearing support.

TASK 72-51-01-404-009-R00

3. Install the Exhaust Plug
   A. References
      (1) AMM 78-31-00/201, Thrust Reverser





NOTE: EXHAUST COLLECTER AFTERBODY REMOVED FOR CLARITY

A

50942

Exhaust Plug Installation
Figure 401

B. Access
   (1) Location Zone
       410/420 Power Plant

C. Install the Exhaust Plug (Fig. 401)

   S 434-004-R00
   (1) Make sure the three position dowels align with the exhaust plug.

   S 424-005-R00
   (2) Put the exhaust plug in the correct position on the LP bearing support.

   S 424-008-R00
   (3) Install and tighten the bolts which attach the exhaust plug.

   S 444-006-R00
   (4) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

GAS GENERATOR EXHAUST NOZZLE - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks:
      (1) The removal of the gas generator exhaust nozzle (referred to as the exhaust nozzle).
      (2) The installation of the exhaust nozzle.
   B. Use the procedures in AMM 70-51-00/201 to tighten the fasteners.

      NOTE: Tighten the fasteners to the torque values given in AMM 70-51-00/201 unless a torque value is specified in this procedure.

TASK 72-51-02-904-001-R00

2. Remove and Install the Exhaust Nozzle
   A. References
      (1) AMM 78-11-04/401, Common Nozzle Exhaust Collector
   B. Access
      (1) Location Zones
          410/420 Power Plant

   C. Remove the Exhaust Nozzle (Fig. 401)

      S 014-002-R00
      (1) Remove the common nozzle exhaust collector (AMM 78-11-04/401).

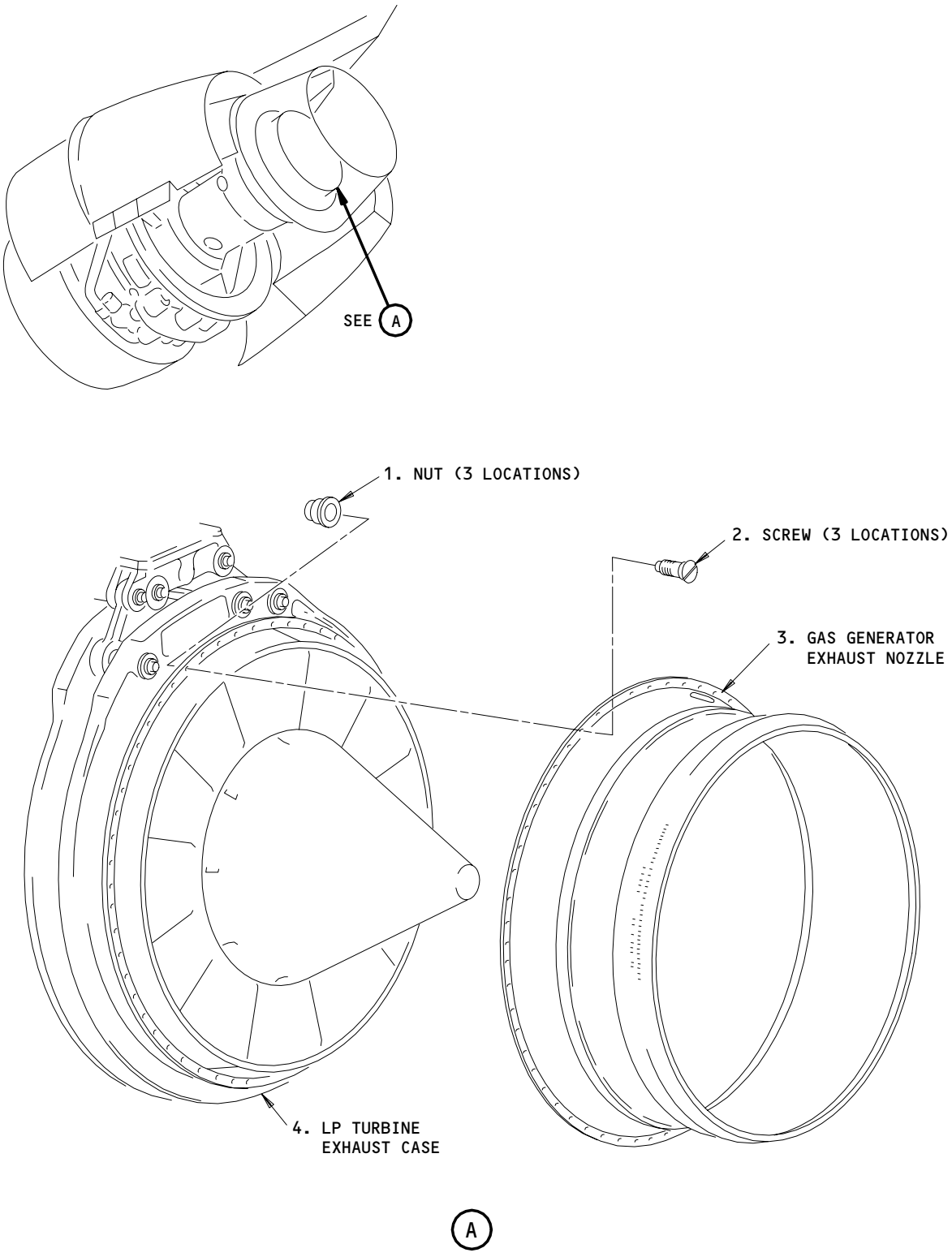
      S 024-003-R00
      (2) Hold the exhaust nozzle (3) while you remove the nuts (1) and the screws (2).

      S 024-007-R00
      (3) Carefully remove the exhaust nozzle (3) from the engine.
   D. Install the Exhaust Nozzle (Fig. 401)

      S 424-004-R00
      (1) Put the exhaust nozzle (3) in the correct position on the flange of the LP turbine exhaust case.

      S 424-008-R00
      (2) Install and tighten the screws (2) and nuts (1) which attach the exhaust nozzle (3).

      S 414-006-R00
      (3) Install the common nozzle exhaust collector (AMM 78-11-04/401).



Gas Generator Exhaust Nozzle - Removal/Installation
Figure 401

GAS GENERATOR EXHAUST NOZZLE - INSPECTION CHECK

1. General
   A. In this procedure the gas generator exhaust nozzle will be referred to as the exhaust nozzle.

TASK 72-51-02-206-001-R00

2. Inspect the Exhaust Nozzle
   A. References
      (1) AMM 78-11-04/401, Common Nozzle Exhaust Collector
   B. Access
      (1) Location Zone
          410/420 Power Plant
   C. Procedure

S 016-002-R00

(1) Remove the common nozzle for the exhaust collector (AMM 78-11-04/401).

S 216-003-R00

(2) Examine the inner and outer surfaces of the exhaust nozzle for cracks and dents.
   (a) Cracks - Reject
   (b) If dents have the conditions that follow - Accept
      1) Less than 0.125 inch (3.2 mm) in depth
      2) Less than 4.0 inches (101.6 mm) in diameter
      3) No cracks in the dents

S 416-004-R00

(3) Install the common nozzle for the exhaust collector (AMM 78-11-04/401).

LOW PRESSURE (LP) TURBINE CASE AND EXHAUST CASE - INSPECTION/CHECK

1. General
   A. This procedure contains the inspection limits for the LP turbine case and the exhaust case.

TASK 72-51-03-216-001-R00

2. Do an Inspection of the LP Turbine Case and the Exhaust Case
   A. References
      (1) AMM 70-42-11/201, Surfaces Affected by Minor Damage
      (2) AMM 78-31-00/201, Thrust Reverser System
   B. Prepare for the Inspection

S 866-002-R00

(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D19, ENGINES START CONT LEFT

S 866-003-R00

(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
   (a) P11-2 Overhead Circuit Breaker Panel
      1) 11D20, ENGINES START CONT RIGHT

S 016-004-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Open the thrust reverser (AMM 78-31-00/201).

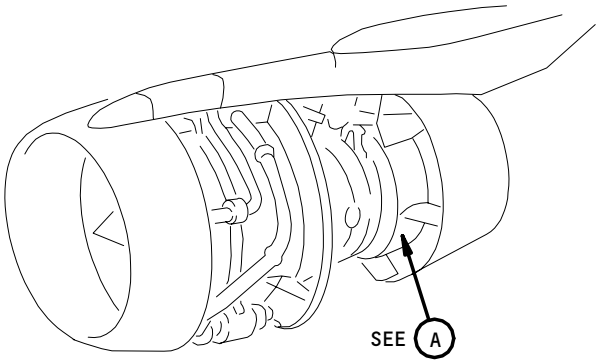
   C. Procedure (Fig. 601)

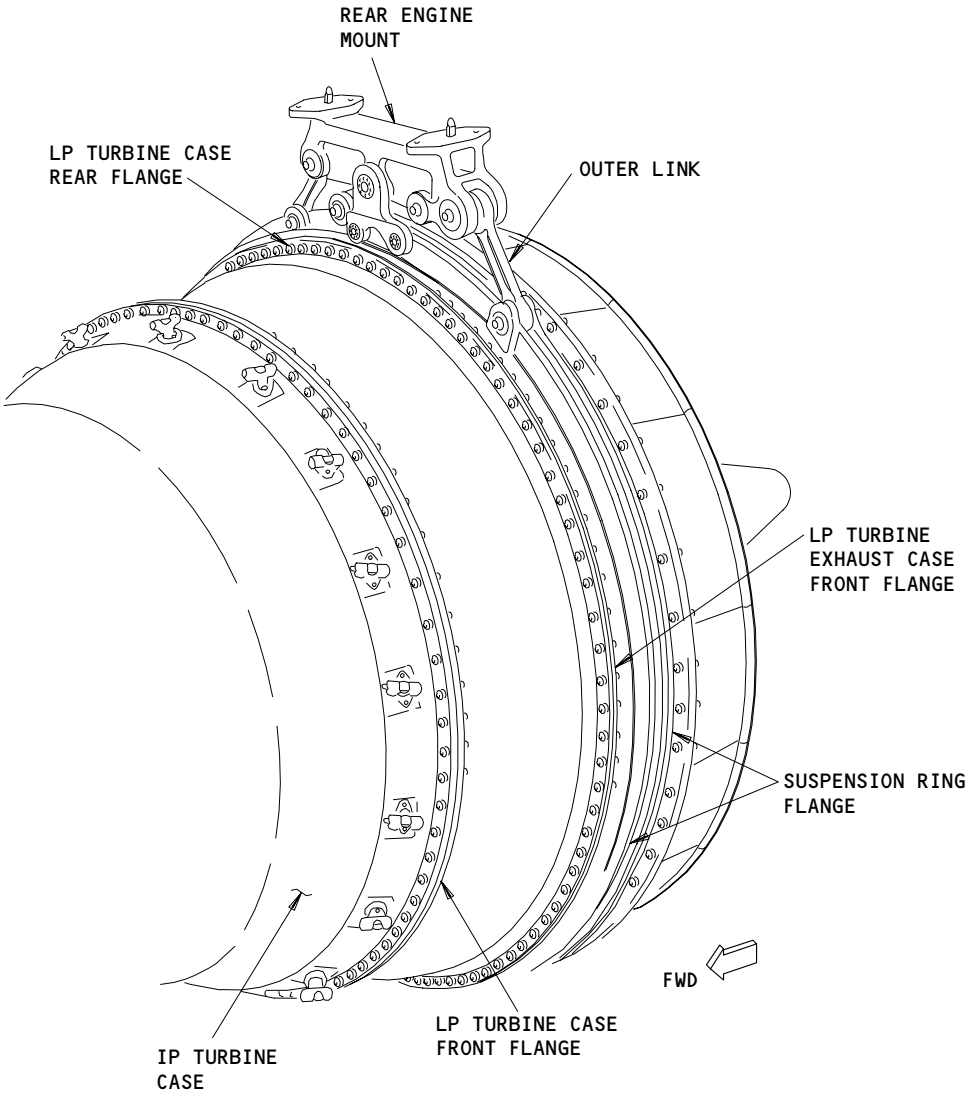
S 216-005-R00

(1) Examine the LP turbine case to find if it is worn.
   (a) Repair (FRS.3253) the case if the outer diameter of the front or rear flange is worn more than 0.05 inch (1.27 mm) but not more than 0.1 inch (25.4 mm) (AMM 70-42-11/201).
   (b) An outer diameter of the front or rear flange which is worn more than 1.00 inch (25.4 mm) is not permitted.
   (c) An external surface other than the flanges which is worn more than 0.010 inch (0.254 mm) is not permitted.

S 216-006-R00

(2) Examine the exhaust case to find if it is worn.
   (a) Repair (FRS.3253) the case if the outer diameter of the front flange is worn more than 0.050 inch (1.27 mm) but not more than 0.1 inch (25.4 mm) (AMM 70-42-11/201).
   (b) An outer diameter on the front flange which is worn more than 1.00 inch (25.4 mm) is not permitted.





A

A2265A

LP Turbine and Exhaust Casing Inspection
Figure 601

S 216-015-R00

(3) Examine the outer diameter of the suspension ring flange lower half, except at the 5 0'clock and 7 0'clock positions.
   (a) Wear must not be more than 0.020 inch (0.51 mm) in depth.
      1) Repair the damage to FRS.3253 (AMM 70-42-11/201).

S 216-016-R00

(4) Examine the outer diameter of the suspension ring flange at the 5 0'clock and 7 0'clock positions (viewed from the rear).
   (a) Wear must not be more than 0.125 inches (3.175 mm) in depth.
   (b) Repair the damage to FRS.3253 (AMM 70-42-11/201).

S 216-011-R00

(5) Examine the top half of the case for the rear suspension ring flange.
   (a) Wear must not be more than 0.100 inch (2.54 mm) in depth, this quantity of wear is permitted.
      1) The repair procedure must not remove the material that is less than 1.800 inches (45.70 mm) from the center of the mount outer links.
      2) Repair the damage to the FRS.3253 (AMM 70-42-11/201).

S 216-007-R00

(6) Examine the spoke fairings in the exhaust case for cracks.
   (a) Cracks in the joint between the outer shroud and the spoke fairing which extend into the outer shroud, use the limits that follow:
      1) Cracks not more than 1 inch are acceptable.
      2) For cracks more than 1 inch and not more than 2.5 inches, do the steps that follow:
         a) Stop drill the crack with FRS3255 (AMM 70-42-26/201).
         b) Do a repeat inspection at 80 to 120 flight hour intervals and use the limits that follow:
            1 If the crack length increases but is less than 2.5 inches, further stop drilling is necessary.

2 If the crack length has not increased after three consecutive 80 to 120 flight hour repeat inspections, the inspection period can be increased to every "A" check.

3) For cracks more than 2.5 inches and not more than 3.5 inches, do the steps that follow:
   a) Stop drill with FRS3255 (AMM 70-42-26/201).
   b) Do a repeat inspection at 40 to 60 flight hour intervals with the limits that follow:
      1 If the crack length increases but is less than 3.5 inches, further stop drilling is necessary.
      2 If the crack length has not increased after three consecutive 40 to 60 flight hour repeat inspections, the inspection period can be increased to 80 to 120 flight hour intervals.
      3 If the crack has not increased after three consecutive 80 to 120 flight hour repeat inspections, the inspection period can be increased to every "A" check.
4) For cracks more than 3.5 inches but not more than 5 inches, reject the engine in 20 flight hours.
5) For cracks more than 5 inches, reject the engine immediately.

(b) Cracks in the convex and concave surfaces
1) Cracks not more than 1 inch (24.4 mm), do the steps that follow:
   a) Do an inspection again at 80 to 120 flight hour intervals and use the limits that follows:
      1 If the crack length has not increased after three consecutive 80 to 120 flight hour inspections, the inspection period can be increased to every "A" check.
      2 If the crack length has increased, see the limits that follow:
2) Cracks more than one inch (25.4 mm) and not more than 2 inches (50.8 mm), do the steps that follow:
   a) Do an inspection again at 40 to 60 flight hour intervals and use the limits that follow:

1 If the crack length has not increased after three consecutive 40 to 60 flight hourinspections, the inspection period can be increased to 80 to 120 flight hours.
2 If the crack length has not increased after three consecutive 80 to 120 flight hour inspections.
3 The inspection period can be increased to every "A" check If the crack length has increased, reject the engine in 20 flight hours.

3) For cracks more than 2 inches (50.8 mm), but not more than 3 inches (76.2 mm), reject the engine in 20 flight hours.
4) For cracks more than 3 inches (76.2 mm) reject the engine immediately.

D. Put the Airplane Back to Its Usual Condition

S 416-010-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(1) Close the thrust reverser (AMM 78-31-00/201).

S 866-008-R00

(2) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 866-009-R00

(3) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

LP TURBINE REAR BEARING HOUSING END COVER - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. The first task is to remove the end cover. The second task is to install the end cover.
   B. In this procedure the LP turbine rear bearing housing end cover is referred to as the end cover.
   C. Use the procedures in AMM 70-51-00/201 to tighten the fasteners.
   D. Tighten the fasteners to the torque values in AMM 70-51-00/201 unless a torque value is specified in this procedure.

TASK 72-52-01-004-001-R00

2. Remove the End Cover
   A. References
      (1) AMM 71-00-00/501, Power Plant
      (2) AMM 72-51-01/401, Exhaust Cone
   B. Access
      (1) Location Zone
          410/420 Power Plant

   C. Remove the End Cover (Fig 401 and 402)

      S 014-002-R00
      (1) Remove the exhaust cone (AMM 72-51-01/401).

      S 034-003-R00
      (2) Disconnect the oil tube connector (5) from the oil transfer tube (2).

      S 034-004-R00
      (3) Remove the bolts and washers (7).

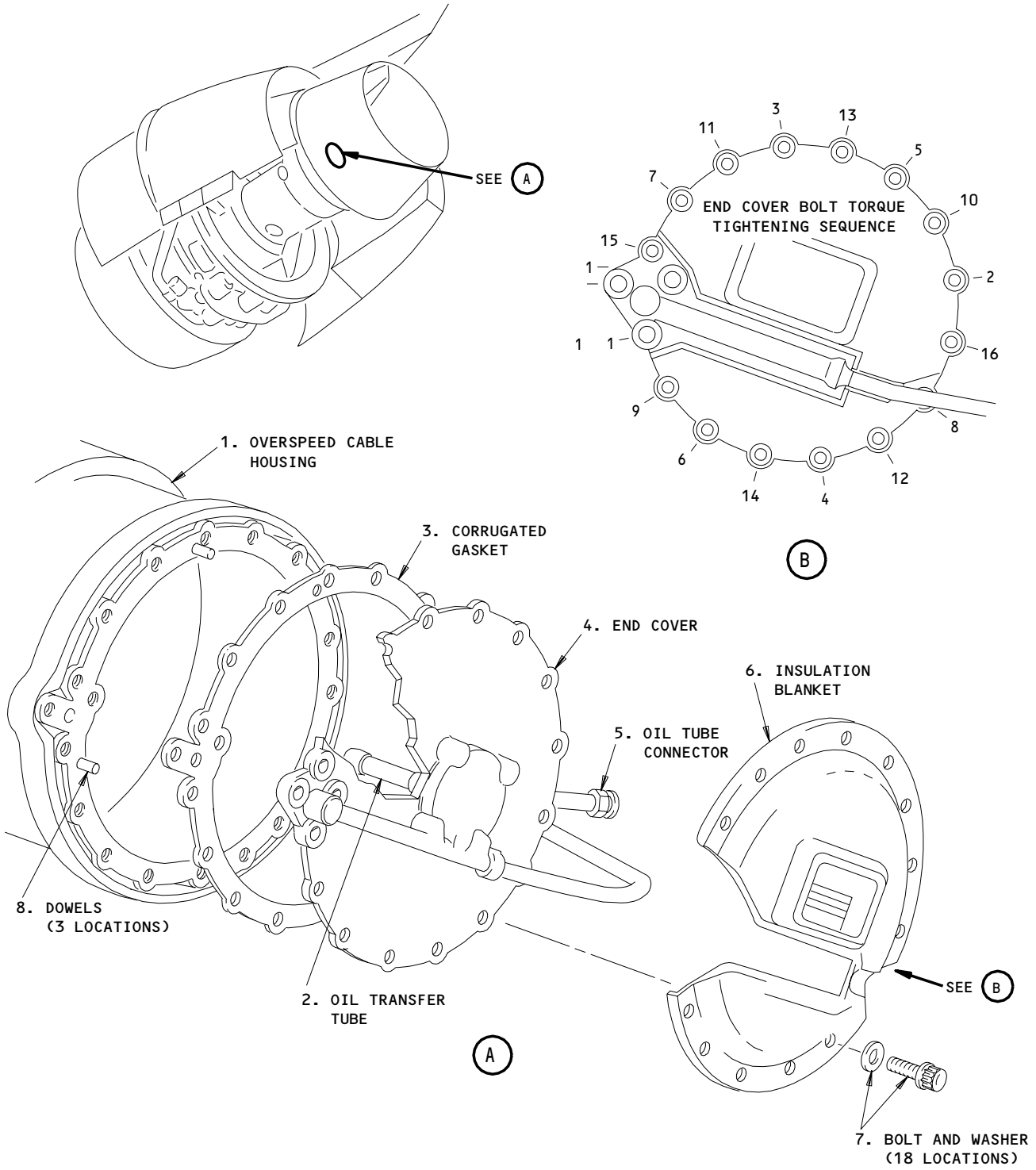
      S 034-005-R00
      (4) Remove the insulation blanket (6).

      S 024-006-R00
      (5) Remove the end cover (4) with the oil transfer tube (2).

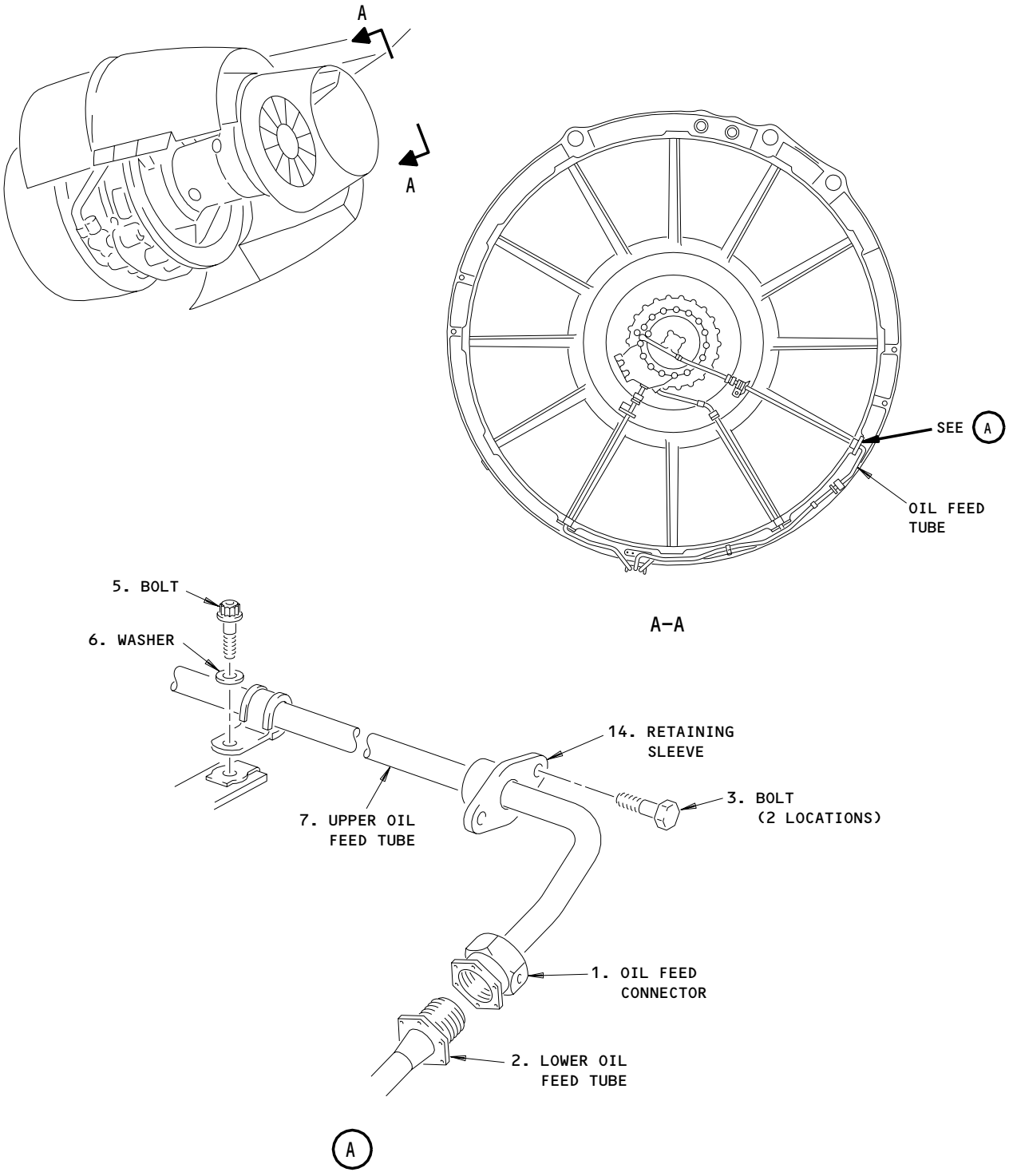
      S 034-007-R00
      (6) Remove the corrugated gasket (3).
          (a) Discard the corrugated gasket (3).

TASK 72-52-01-404-008-R00

3. Install the End Cover
   A. References
      (1) AMM 70-12-04/201, Locking Techniques for Threaded Parts



LP Turbine Bearing Housing Rear Cover Installation
Figure 401



Oil Tube Retaining Sleeves and Connectors – Removal/Installation
Figure 402

(2) AMM 70-51-00/201, Torque Tightening Techniques
(3) AMM 71-00-00/501, Power Plant
(4) AMM 72-51-01/401, Exhaust Cone
(5) AMM 78-31-00/201, Thrust Reverser System

B. Access
(1) Location Zone
410/420 Power Plant

C. Prepare to Install the End Cover (Fig. 402)

S 014-009-R00

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open the thrust reverser (AMM 78-31-00/201).

S 034-010-R00
(2) Disconnect the lower oil feed tube (2) from the oil feed connector (1) at the outboard end of the LP turbine support struts.

S 034-011-R00
(3) Remove the bolt (5) and the washer (6).

S 034-012-R00
(4) Remove the bolts (3).

S 034-013-R00
(5) Disengage the retaining sleeve (4) sufficiently to get free movement of the upper oil feed tube (7).

S 164-014-R00
(6) If it is necessary, clean the carbon from the oil tube at the inboard end.

D. Install the End Cover

S 214-015-R00
(1) Make sure the oil transfer tube (2) and the flange for the overspeed cable housing (1) is clean and dry.

S 434-016-R00
(2) Install the new gasket (3) on the dowels (8).

NOTE: The corrugated side of the gasket must face to the rear.

S 434-017-R00

(3) Install the end cover (4) on the gasket (3).
  (a) Make sure the end cover is aligned on the dowels.
  (b) Make sure the oil transfer tube is in the center location.

S 434-018-R00

(4) Do the steps that follow to install the insulation blanket (6) on the end cover (4).
  (a) Put the insulation blanket in position on top of the end cover.
    1) Make sure the empty space is on the right side.
  (b) Lift up the left side of the insulation blanket.
  (c) Move the insulation blanket to the right until the edges of the empty space touch the oil transfer tube.
  (d) Hold the right side forward, and turn the insulation blanket approximately 180 degrees in the clockwise direction.
    1) Make sure the empty space is below the oil transfer tube.

S 434-019-R00

CAUTION: MAKE SURE THE EDGE OF THE INSULATION BLANKET (6) HAS AN OVERLAP WITH THE EDGE OF THE OVERSPEED CABLE HOUSING. DAMAGE TO EQUIPMENT CAN OCCUR IF THE FIT IS NOT TIGHT.

(5) Install the insulation blanket (6) on the overspeed cable housing (1).

S 434-020-R00

(6) Install the bolts and washers (7).
  (a) Tighten the washers finger tight.
  (b) Do the steps that follow:
    1) Use the sequence in Figure 401 to tighten the bolts by increments.

      NOTE: All the bolts must be tightened to the same incremental torque value before you start to tighten the bolts to the next incremental torque value.

      The three bolts at position No. 1 must be tightened as a group.

2) Do the torque sequence again until all the bolts have the same torque value.

NOTE: It can be necessary to do the torque sequence as many as four times before all the bolts have the same torque value.

E. Install the Oil Feed Tube (Fig. 402)

S 434-021-R00
(1) Engage the retaining sleeve (4).

S 434-022-R00
(2) Install the bolts (3).

S 434-023-R00
(3) Tighten the bolts (3).

S 434-024-R00
(4) Install the washer (6) and the bolt (5).

S 434-025-R00
(5) Tighten the bolt (5).

S 424-026-R00
(6) Connect the lower tube (2) to the oil feed connector (1).

S 434-027-R00
(7) Tighten the oil feed connector (1).

S 434-028-R00
(8) Install a lockwire on the oil feed connector (1) (AMM 70-12-04/201).

F. Install the Oil Tube Connector (Fig. 402)

S 424-029-R00
(1) Connect the oil tube connector (5) to the oil feed tube.

S 434-030-R00
(2) Tighten the oil tube connector (5).

S 434-031-R00
(3) Install a lockwire on the oil tube connector (5) (AMM 70-12-04/201).

G. Put the Airplane Back to its Usual Condition

S 414-032-R00
(1) Install the exhaust cone (AMM 72-51-01/401).

S 414-033-R00

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the thrust reverser (AMM 78-31-00/201).

S 794-034-R00

(3) Do the Fuel and Oil Leak Test (AMM 71-00-00/501).

S 794-035-R00

(4) Examine the exhaust cone area for oil leakage.
    (a) Remove the exhaust cone (AMM 72-51-01/401).
    (b) If you see oil leakage, do the steps that follow:
        1) Examine and tighten all bolts and tube connections on the end cover and on the oil scavenge and overspeed cable housing.
        2) Do the steps to Put the Airplane to its Usual Condition again.

LP TURBINE REAR BEARING HOUSING END COVER - CLEANING/PAINTING

1. General
   A. This procedure contains the data to clean the LP turbine rear bearing housing end cover which will be referred to as the end cover.

TASK 72-52-01-107-001-R00

2. Clean the LP Turbine Bearing Housing End Cover (End Cover)
   A. Equipment
      (1) Scraper, aluminum
   B. Consumable Materials
      (1) Degreasing fluid or
          Kerosine
          British Spec/Ref - B.S. 4487, 1969
          American Spec/Ref -
          OMat No. 1/21A or 101
   C. Access
      (1) Location Zones
          410/420 Power Plant

   D. Procedure

      S 127-002-R00

      CAUTION: BE CAREFUL WHEN YOU USE THE SCRAPER. THE SCRAPER CAN CAUSE NOT SCRATCHES ON THE END COVER OR THE OIL SCAVENGE PORTS.

      (1) Use the scraper to remove the carbon deposits from the end cover.

      S 117-003-R00

      WARNING: DO NOT GET DEGREASING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE FLUID. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE FLUID. DEGREASING FLUIDS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PEROSNS OR DAMAGE TO EQUIPMENT.

      (2) Clean the end cover with degreasing fluid or kerosine to remove the carbon.

HIGH PRESSURE/INTERMEDIATE PRESSURE (HP/IP) TURBINE BEARING OIL SCAVENGE AND VENT TUBES - INSPECTION/CHECK

1. General
   A. Use the procedure in 70-51-00/201 to tighten the fasteners.
   B. Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is given in this procedure.

TASK 72-52-03-216-001-R00

2. Inspection for the HP/IP Turbine Bearing Oil Scavenge and Vent Tubes
   A. Equipment
      (1) Internal inspection equipment - commercially available
   B. Consumable Materials
      (1) Lockwire
          British Spec/Ref - DTD 189A, 22 S.W.G.
          American Spec/Ref - 21 A.W.G.
          OMat No. 238
   C. References
      (1) AMM 71-00-00/501, Power Plant
      (2) AMM 72-00-00/601, Engine
      (3) AMM 72-52-03/701, HP/IP Turbine Bearing Oil Scavenge and Vent Tubes
      (4) AMM 78-31-00/201, Thrust Reverser System
   D. Access
      (1) Location Zones
          410 No. 1 Engine (Left)
          420 No. 2 Engine (Right)

      (2) Access Panels
          415AL Thrust Reverser (Left)
          416AR Thrust Reverser (Right)
          425AL Thrust Reverser (Left)
          426AR Thrust Reverser (Right)

   E. Procedure

S 016-002-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(1) Open the thrust reverser (AMM 78-31-00/201).

S 036-003-R00

WARNING: DO NOT LET THE SYNTHETIC LUBRICATING OIL TOUCH YOUR SKIN. SYNTHETIC LUBRICATING OIL CONTAINS POISONOUS ADDITIVES.

BE CAREFUL WHEN YOU ARE NEAR THE ENGINE OIL SYSTEM COMPONENTS AND TUBES. IMMEDIATELY AFTER YOU SHUTDOWN THE ENGINE, THE OIL TEMPERATURE STAYS HIGH.

(2) Remove the oil scavenge tube (Fig. 601).

S 036-004-R00

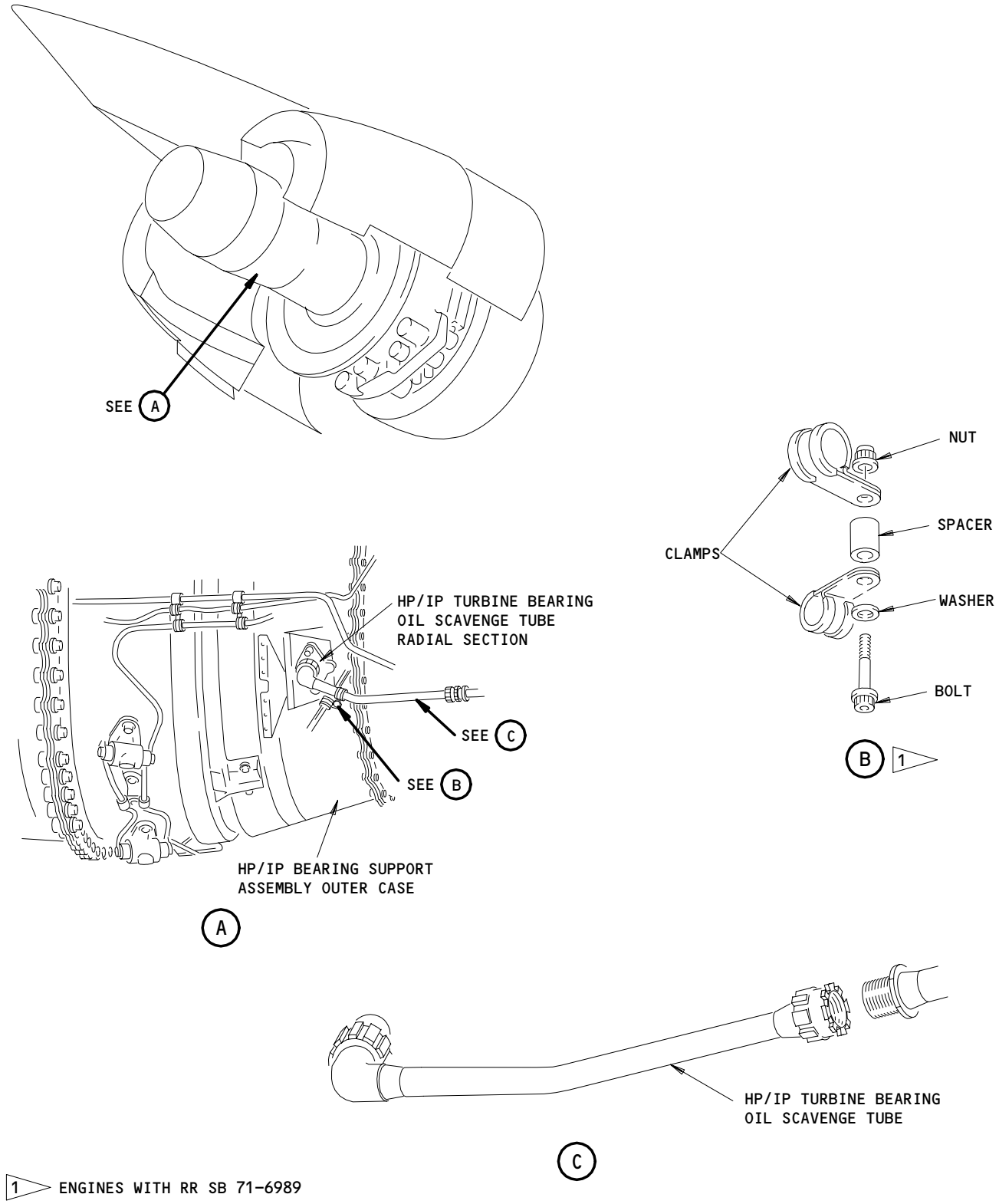
(3) ENGINES WITH RR SB 71-6989;
Remove the bolt, washer, spacer and nut from the clamps on the oil scavenge tube.

S 036-005-R00

(4) Disconnect the clamp and remove the oil vent tube (Fig. 602).

S 216-006-R00

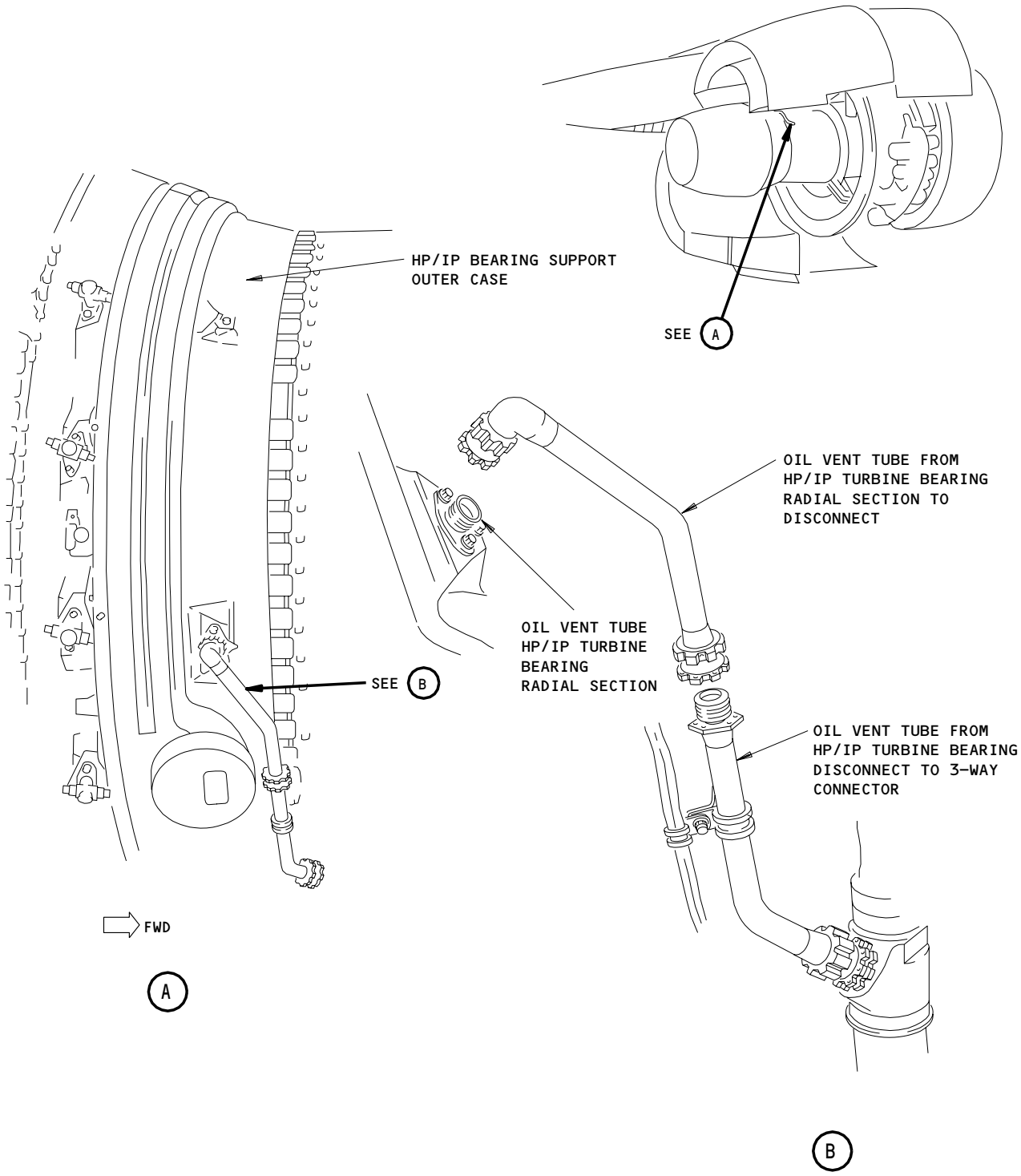
(5) Examine the oil scavenge and vent tubes for signs of carbon material.
   (a) Examine the internal diameter of the oil scavenge and vent tubes for signs of carbon material.
   (b) Examine the internal diameter of the radial sections of the oil scavenge and vent tubes for signs of carbon material with a flexible internal inspection probe (AMM 72-00-00/601).



1 ENGINES WITH RR SB 71-6989

92379

HP/IP Turbine Bearing Oil Scavenge Tube Disconnect Points
Figure 601



HP/IP Turbine Bearing Oil Vent Tube Disconnect Points 94009
Figure 602

F. Acceptance Standards

S 216-007-R00
(1) If you do not find signs of carbon material - Accept

S 216-008-R00
(2) If you find signs of carbon formation - Clean (AMM 72-52-03/701).

G. Put the Airplane Back to Its Usual Condition

S 436-009-R00
(1) Install the oil scavenge tube (Fig. 601).

S 436-010-R00
(2) ENGINES WITH RR SB 71-6989;
Install the bolt, washer, spacer and nut to the clamps on the oil scavenge tube.

S 436-011-R00
(3) Install the oil vent tube and connect the clamp (Fig. 602).

S 416-012-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(4) Close the thrust reverser (AMM 78-31-00/201).

S 716-013-R00
(5) Do the necessary test shown in the Power Plant Reference Table (AMM 71-00-00/501).
(a) Examine the oil scavenge and vent tube connections for signs of leakage.

HIGH PRESSURE/INTERMEDIATE PRESSURE (HP/IP) TURBINE BEARING OIL SCAVENGE AND VENT TUBES - CLEANING/PAINTING

1. General
   A. This procedure contains the data to clean the high pressure/intermediate pressure (HP/IP) turbine bearing oil scavenge and vent tubes (referred to as the oil scavenge and vent tubes).

   TASK 72-52-03-147-001-R00

2. Clean the Oil Scavenge and Vent Tubes
   A. Equipment
      (1) Cleaning Tool - Rolls Royce HU31042/1
      (2) Strainer Element - Rolls-Royce LK29974
      (3) Clean container - minimum capacity:

          2.4 U.S. Pints
          2.0 Imperial Pints
          1.0 Liter

   B. References
      (1) AMM 71-00-00/201, Power Plant
      (2) AMM 71-00-00/501, Power Plant
      (3) AMM 72-52-03/601, HP/IP Turbine Bearing Oil Scavenge and Vent Tubes
      (4) AMM 78-31-00/201, Thrust Reverser System
      (5) AMM 79-21-03/401, Magnetic Chip Detector
      (6) AMM 79-21-08/401, Scavenge Oil Filter Element
   C. Access
      (1) Location Zones

410	No. 1 Engine (Left)
420	No. 2 Engine (Right)

      (2) Access Panels

415AL	Thrust Reverser (Left)
416AR	Thrust Reverser (Right)
425AL	Thrust Reverser (Left)
426AR	Thrust Reverser (Right)

D. Procedure

S 017-002-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(1) Open the thrust reversers (AMM 78-31-00/201).

S 217-022-R00

WARNING: DO NOT LET THE SYNTHETIC LUBRICATING OIL TOUCH YOUR SKIN. SYNTHETIC LUBRICATING OIL CONTAINS POISONOUS ADDITIVES.

BE CAREFUL WHEN YOU ARE NEAR THE ENGINE OIL SYSTEM COMPONENTS AND TUBES. IMMEDIATELY AFTER YOU SHUTDOWN THE ENGINE, THE OIL TEMPERATURE STAYS HIGH.

CAUTION: DO NOT LET THE OIL FLOW ON PARTS THAT DO NOT USUALLY TOUCH THE OIL. THE OIL CAN CAUSE DAMAGE TO PAINT AND SOME TYPES OF RUBBER. ALL OIL THAT GETS ON TO THESE PARTS MUST BE CLEANED IMMEDIATELY.

VERY SMALL QUANTITIES OF SOME TYPES OF ALKALINE CLEANING FLUIDS CAN CAUSE FAILURE OF THE SYNTHETIC OIL. USE VERY CLEAN CONTAINERS AND EQUIPMENT.

(2) Examine the oil scavenge and vent tubes for signs of carbon (AMM 72-52-03/601).

S 167-004-R00

(3) Remove all the carbon from the radial section of the oil scavenge and vent tubes to the disconnect.

S 177-005-R00

(4) Flush the oil scavenge and vent tubes with oil.

S 147-006-R00

(5) Remove all the carbon from the radial section of the oil scavenge and vent tubes as follows:

CAUTION: SET THE IMMERSION COLLAR ON THE CLEANING TOOL. SET THE IMMERSION COLLAR TO PREVENT PROTRUSION OF THE CLEANING TOOL INTO THE HP/IP TURBINE. IF YOU DO NOT SET THE IMMERSION COLLAR, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(a) Set the immersion collar on the cleaning tool to get the maximum immersion of 17.0 inches (431.8 mm).
(b) Put the cleaning tool into the internal diameter of the radial section of the oil tube to a depth of 1.0 inch (25.4 mm).
(c) Turn the tool five times then remove the tool.
1) Remove the loose carbon.
(d) Do these steps at increments of 1.0 inch (25.4 mm) until you use the full 17.0 inches (431.8 mm).

S 177-007-R00

(6) If the radial sections of the oil scavenge tube is clear of carbon, flush the tube.

S 437-008-R00

(7) If the radial section of the oil vent tube is clear of carbon, connect the oil vent tube (AMM 72-52-03/601).

S 147-009-R00

WARNING: USE PROTECTIVE GLOVES WHEN YOU USE THE CLEANING TOOL DURING THE POWERED OPERATION. IF YOU DO NOT USE GLOVES, AN INJURY CAN OCCUR.

CAUTION: DO NOT USE THE POWERED OPERATION FOR A LONG PERIOD. TOO MUCH POWERED OPERATION CAN CAUSE DAMAGE TO THE WALLS OF THE OIL TUBES.

(8) Do the steps again if you find hard plugs of carbon.

E. Flush the Oil Scavenge Tube

S 037-010-R00

(1) Disconnect the oil scavenge tube.

S 867-011-R00

(2) Use the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/201) until approximately two pints (1.0 liter) of oil drains through the open tube.

NOTE: If the local environment does not permit you to dry motor the engine, do not do this step.

S 437-012-R00

(3) Connect the oil scavenge tube.

S 437-013-R00

(4) Attach the clean scavenge strainer element to the HP/IP turbine bearing housing Magnetic Chip Detector (MCD) position (AMM 79-21-03/401).

NOTE: Engines POST-RR-SB 72-7654 do not have a scavenge strainer at the HP/IP turbine bearing housing MCD position. Make sure that the strainers are available. The strainer element bolt is an important part of the strainer housing.

S 417-014-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(5) Close the thrust reversers (AMM 78-31-00/201).

S 867-015-R00
(6) Use the Power Plant Operation (Normal) procedure to start the engine (AMM 71-00-00/201).
(a) Operate the engine at idle for approximately one minute.

S 867-016-R00
(7) Use the Power Plant Operation (Normal) procedure to do the engine shutdown (AMM 71-00-00/201).

S 037-017-R00
(8) Remove the HP/IP turbine bearing scavenge strainer (AMM 79-21-03/401).
(a) Examine the strainer for carbon.
(b) Do the steps that follow if you find carbon:
1) Clean the strainer.
2) Install the strainer (AMM 79-21-03/401).
3) Do the steps to operate the engine.
4) Examine the strainer for carbon again.
(c) If the strainer is clean, continue with the procedure.

S 437-018-R00

CAUTION: MAKE SURE YOU REMOVE THE SCAVENGE STRAINER ELEMENT FROM THE HP/IP TURBINE BEARING HOUSING ON ENGINES POST-RR-SB 72-7654 BEFORE IT IS PUT BACK INTO OPERATION. IF YOU DO NOT REMOVE THE SCAVENGE STRAINER ELEMENT, DAMAGE CAN OCCUR.

(9) ENGINES PRE-RR-SB 72-7654;
Install the scavenge strainer element (AMM 79-21-03/401).

S 437-019-R00
(10) ENGINES POST-RR-SB 72-7654;
Install the scavenge strainer element (AMM 79-21-03/401).
(a) Install the bolt to the strainer housing.

S 967-020-R00
(11) Replace the scavenge oil filter element (AMM 79-21-08/401).

S 797-021-R00
(12) Do Test No. 2 - Fuel and Oil Leaks Test (AMM 71-00-00/501).

EMERGENCY FUEL CUT-OFF CABLE AND GUIDE - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks:
      (1) The removal of the emergency fuel cut-off cable and guide (referred to as the cable and guide).
      (2) The installation of the cable and guide.
   B. Use the procedures in AMM 70-51-00/201 to tighten the fasteners.
   C. Tighten the fasteners to the torque values in 70-51-00/201 unless a torque value is given in this procedure.

TASK 72-52-04-004-001-R00

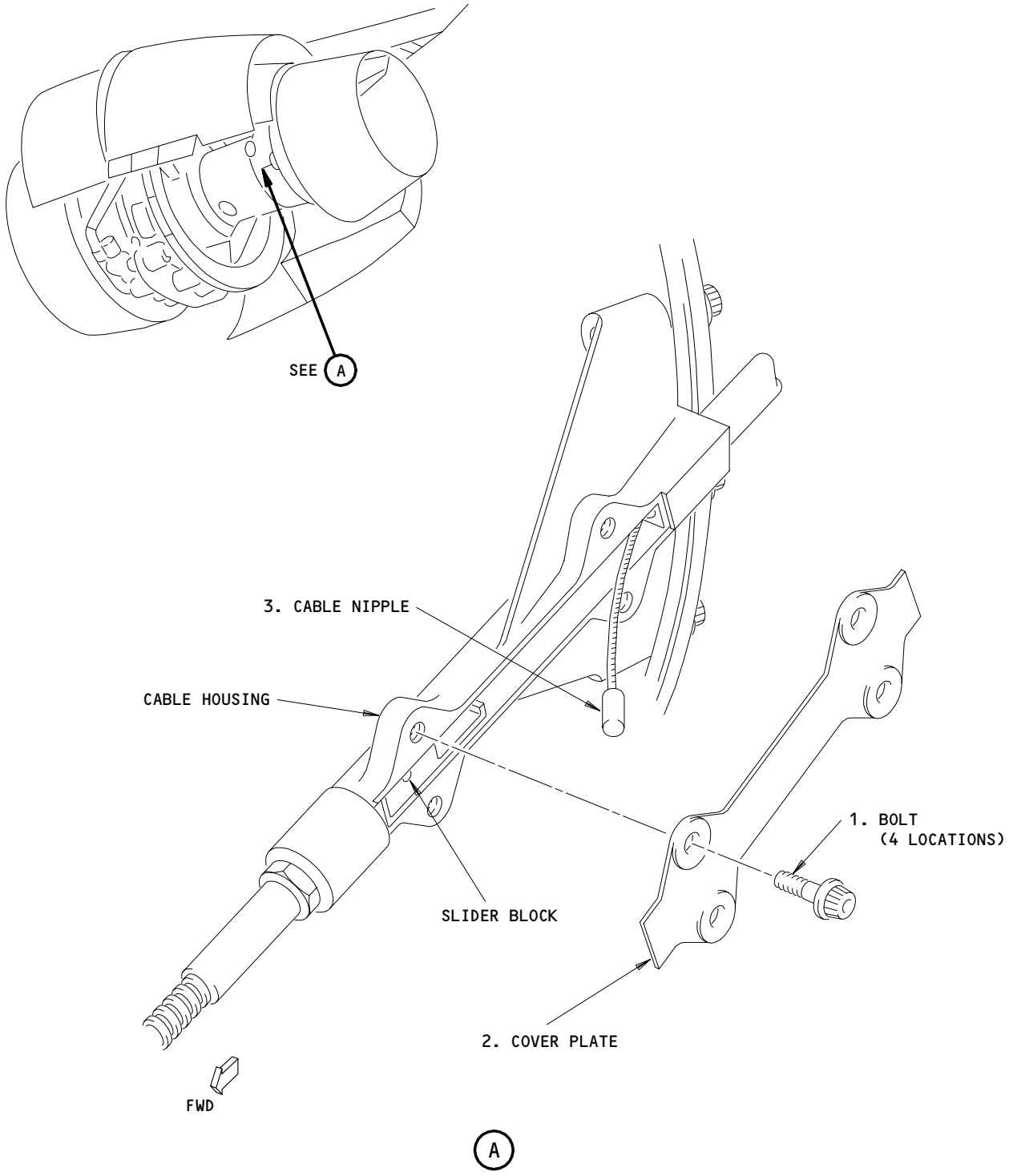
2. Remove the Emergency Fuel Cut-off Cable and Guide
   A. References
      (1) AMM 72-51-02/401, Gas Generator Exhaust Nozzle
      (2) AMM 72-52-01/401, LP Turbine Rear Bearing Housing End Cover
   B. Access
      (1) Location Zones
          410 No. 1 Engine (Left)
          420 No. 2 Engine (Right)

   C. Procedure

      S 024-002-R00
      (1) Do the steps that follow to remove the cable and guide:
          (a) Remove the exhaust nozzle of the gas generator (AMM 72-51-02/401).
          (b) Remove the end cover of the rear bearing housing of the LP turbine (AMM 72-52-01/401).
          (c) Disconnect the cable nipple and the slider block (Fig. 401).
              1) Remove the bolts (1) from the coverplate (2).
              2) Disengage the cable nipple (3) from the slider block.
          (d) Remove the insulation blankets (Fig. 402).

              CAUTION: CAREFULLY REMOVE THE INSULATION BLANKETS. YOU CAN CAUSE DAMAGE TO THE THERMAL PROPERTIES OF THE INSULATION BLANKETS IF YOU ARE NOT CAREFUL.

              1) Remove the center insulation blanket (1).
              2) Remove the front insulation blanket (2).
              3) Remove the top insulation blanket (3).
          (e) Remove the oil scavenge and the overspeed cable housing (referred to as the cable housing) (Fig. 403).
              1) Remove the oil scavenge unions on the tubes (1 and 2).
              2) Remove the bolt (3) and the washer (4) that attaches the oil scavenge tube (2) to the bracket.
              3) Remove the bolts (5) that attach the cable housing (6) to the bearing support housing of the LP turbine.



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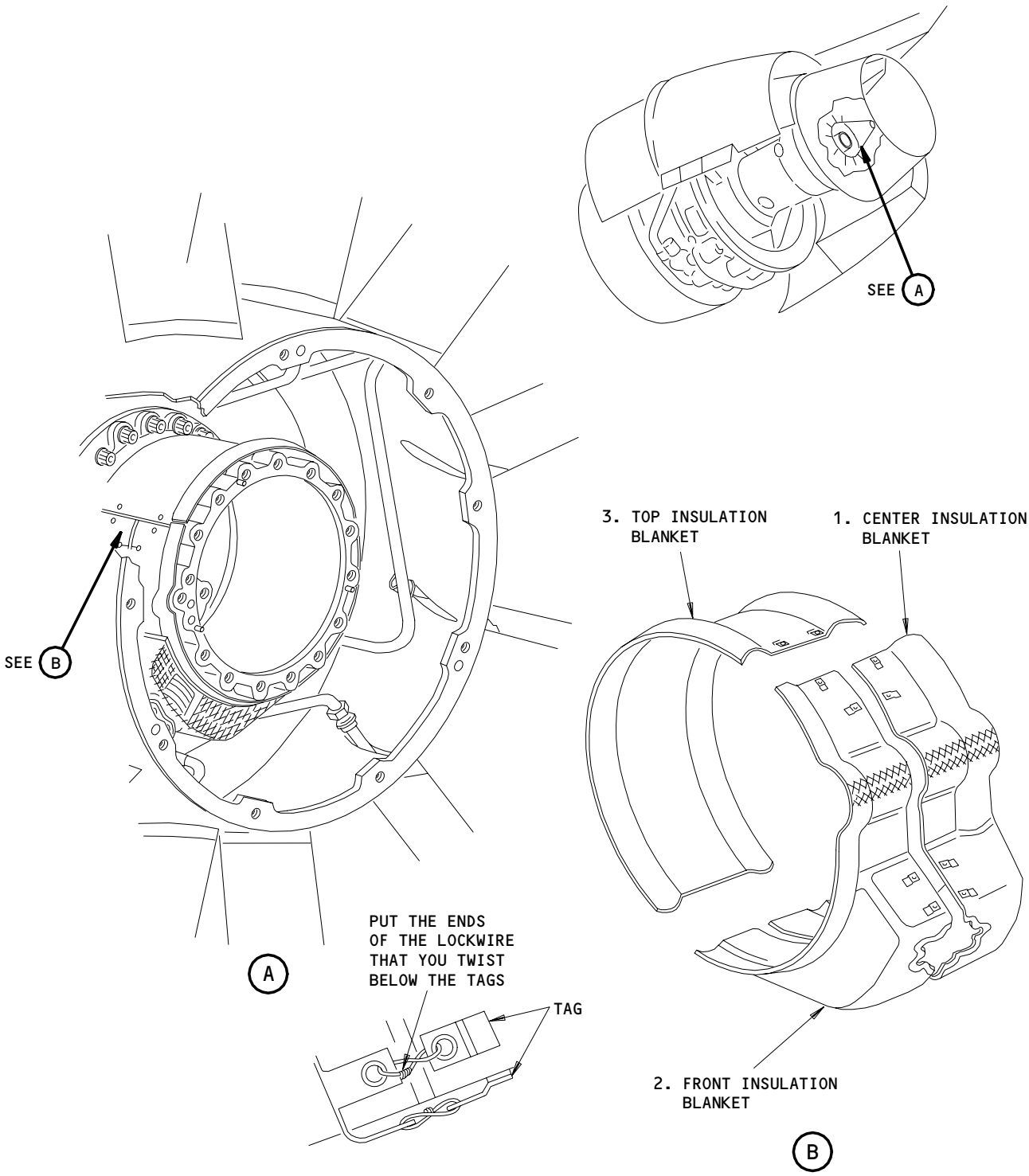
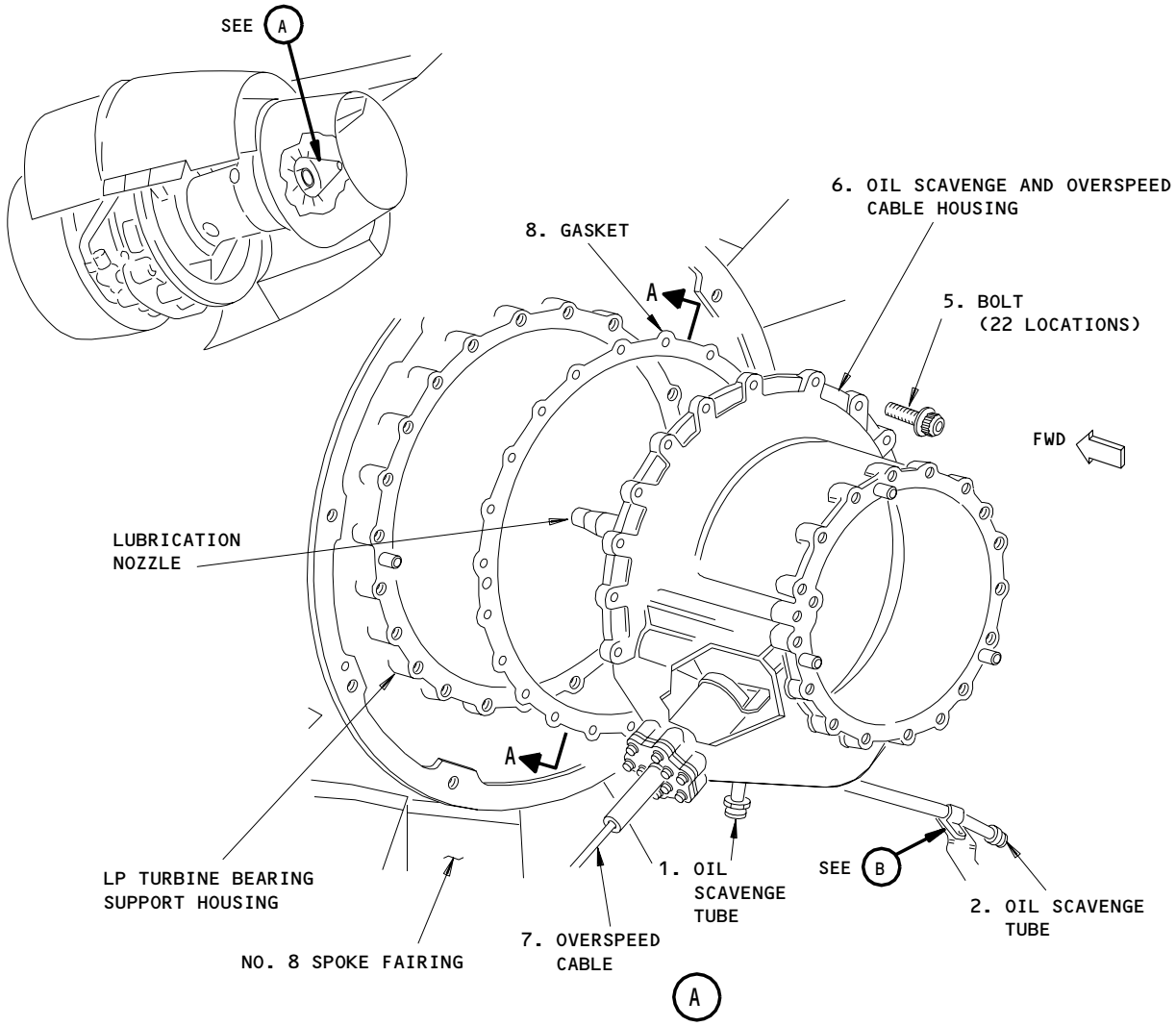
Cable Nipple and Slider Block Installation
Figure 401

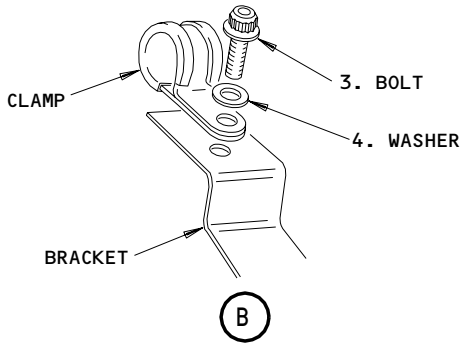


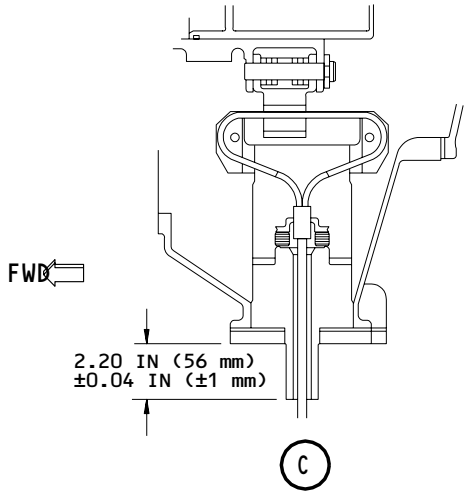
LOCKWIRE INSTALLATION (EXAMPLE)

93808

LP Turbine Bearing Housing Insulation Blankets Installation
Figure 402







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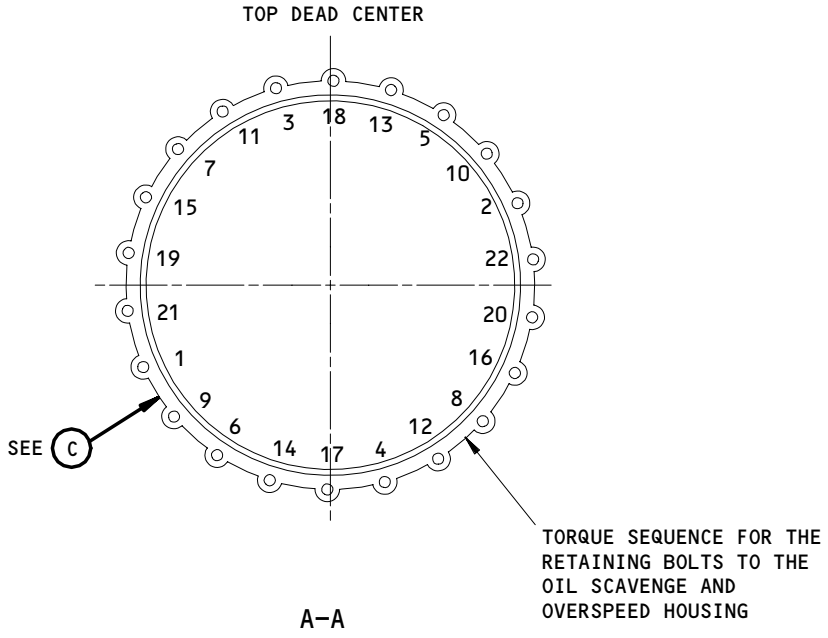
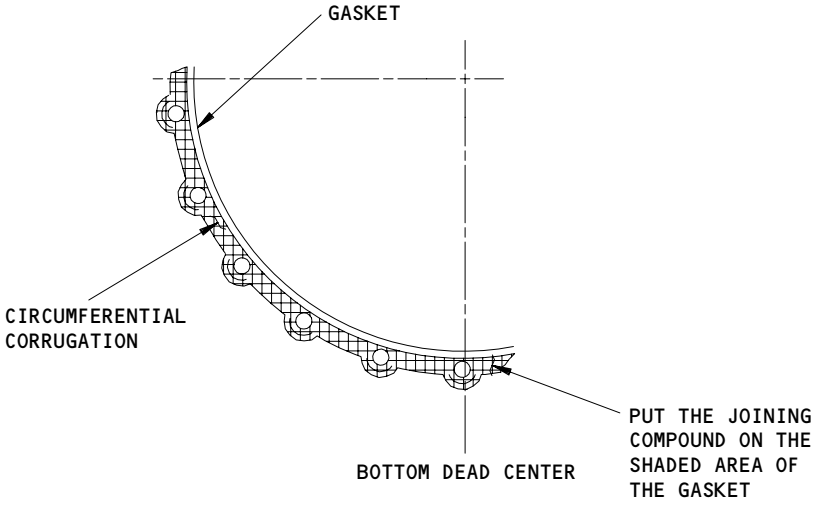
Oil Scavenge and Overspeed Cable Housing Installation
Figure 403 (Sheet 1)



A–A



B–B

C

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Oil Scavenge and Overspeed Cable Housing Installation
Figure 403 (Sheet 2)

CAUTION: CAREFULLY REMOVE THE CABLE HOUSING. YOU CAN CAUSE DAMAGE TO THE ATTACHED LUBRICATION NOZZLE WHEN YOU REMOVE THE CABLE HOUSING IF YOU ARE NOT CAREFUL.

4) Remove the cable housing (6) from the support housing of the LP turbine.
5) Remove the overspeed cable (7) from the conduit and the No. 8 spoke fairing.
6) Discard the gasket (8).

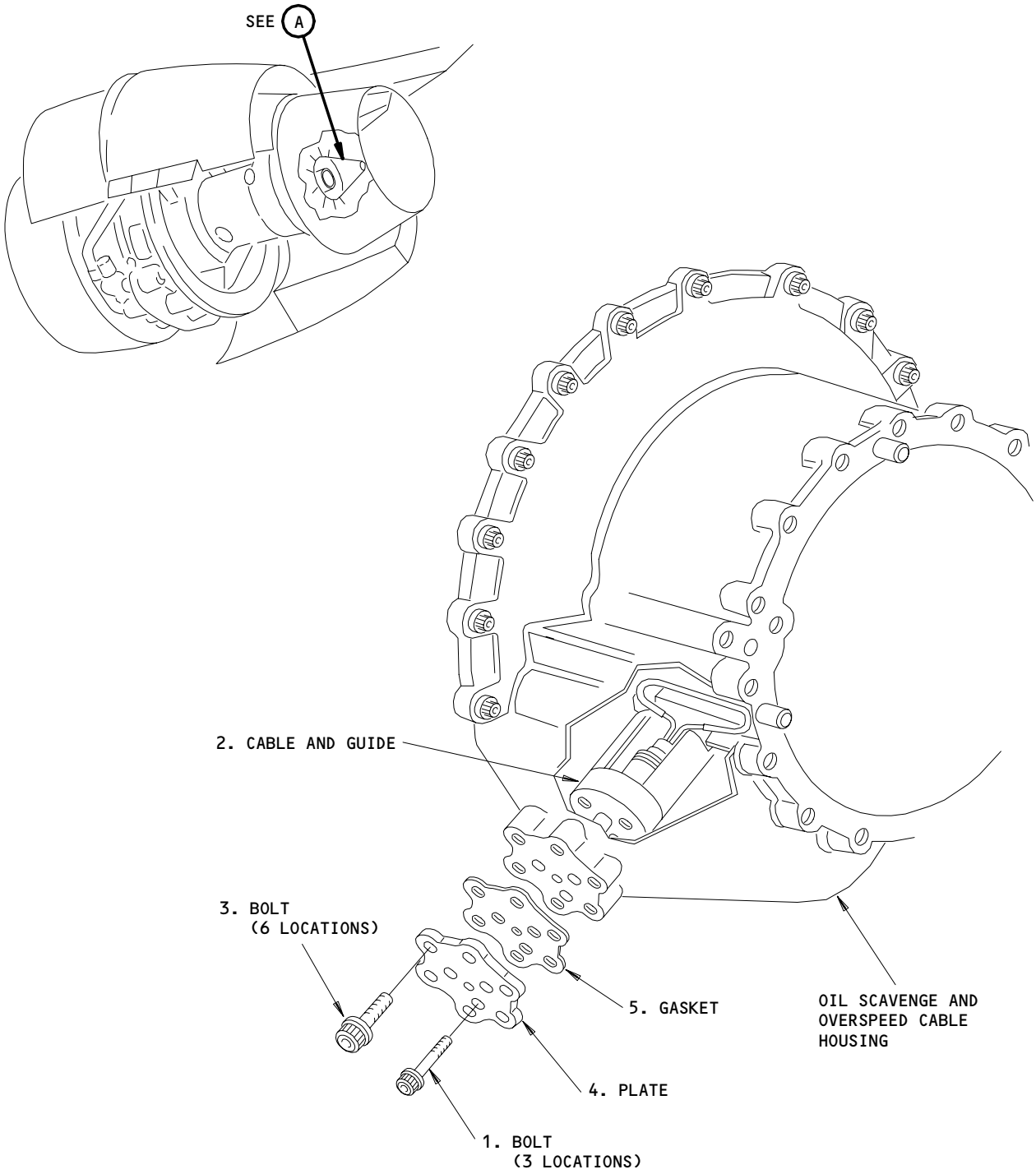
(f) Remove the cable and guide (Fig. 404).
1) Remove the bolts (1).
2) Remove the cable and guide (2) from the recess in the cable housing.
3) Remove the bolts (3), plate (4) and gasket (5) from the cable housing.
4) Discard the gasket (5).

TASK 72-52-04-404-003-R00

3. Install the Emergency Fuel Cut-off Cable and Guide

A. Equipment
(1) Spanner - HU36653 Rolls-Royce
(2) Guide Tube - HU34790 Rolls-Royce
or
Guide Tube - HU38941 Rolls-Royce

B. Consumable Material
(1) Lockwire
British Spec/Ref - DTD189A, 22 S.W.G.
American Spec/Ref - 21 A.W.G.
OMat No. 238
(2) Lockwire (Insulating Blankets)
British Spec/Ref - 0.031 inch (0.80 mm) Diameter
American Spec/Ref -
OMat No.
(3) Jointing Compound, Hylomar
British Spec/Ref - PL 32 (Light) DTD.9001, 4586
American Spec/Ref -
OMat No. 4/46



Cable and Guide Installation
Figure 404

(4) Paint brush - Local Resource

C. References
(1) AMM 70-12-04/201, Locking Techniques for Threaded Parts
(2) AMM 70-51-00/201, Torque Tightening Technique
(3) AMM 72-51-02/401, Gas Generator Exhaust Nozzle
(4) AMM 72-52-01/401, LP Turbine Rear Bearing Housing End Cover

D. Access
(1) Location Zones
410 No. 1 Engine (Left)
420 No. 2 Engine (Right)

E. Procedure

S 424-006-R00
(1) Install the cable and guide (Fig. 404).
(a) Install the cable and guide (2) in the cable housing recess.
(b) Install the gasket (5) with the corrugation peaks inwards and the plate (4) on the cable housing.
(c) Tighten the bolts (1 and 3) with your hand.
(d) Make sure the the guide assembly comes out 2.20 in. plus or minus 0.04 in. (56 mm plus or minus 1 mm) from the cover plate (Fig. 403).
(e) Tighten the bolts (3) in the opposite sequence.

NOTE: Tighten the bolts until you get the correct torque value on all the bolts during one full sequence.

(f) Tighten the bolts (1) in the opposite sequence.

NOTE: Tighten the bolts until you get the correct torque value on all the bolts during one full sequence.

S 414-005-R00
(2) Install the cable housing (Fig. 403).

CAUTION: YOU MUST NOT APPLY JOINTING COMPOUND TO THE AREA OF THE NEW GASKET THAT IS BETWEEN THE INNER EDGE AND THE CIRCUMFERENTIAL CORRUGATION PEAKS. IF THE JOINTING COMPOUND IS NOT CORRECTLY APPLIED, THE OIL SYSTEM CAN BECOME BLOCKED AND CAUSE ENGINE DAMAGE.

(a) Apply a thin layer of jointing compound to the area of the new gasket, that is between the outer edge of the gasket and the circumferential corrugation peaks.
(b) Put the gasket (8), with the corrugation peaks aft, on the dowels in the flange of the bearing support housing of the LP turbine.

CAUTION: USE THE HU34790 GUIDE TUBE OR THE ALTERNATIVE TO INSTALL THE OVERSPEED CABLE. IF THE GUIDE TUBE IS NOT USED, DAMAGE TO THE OVERSPEED CABLE CAN OCCUR.

(c) Put the overspeed cable (7) through the No. 8 spoke fairing with the HU34790 guide tube or the applicable alternative.
(d) Put the cable housing (6) on the housing of the LP turbine.

NOTE: Make sure the dowel is located correctly and the lubrication nozzle is in the oil feed orifice.

(e) Apply the jointing compound, with a brush, to the four bolts that are installed in positions 1, 6, 9 and 14.

NOTE: The jointing compound must be applied to the bottom face of the bolt head and the area of the plain shank.

(f) Tighten with your hand 3 bolts (5) that are an equal distance apart to make sure the gasket (8) is in the correct location.
(g) Install the four bolts, that had jointing compound applied to them, at positions 1, 6, 9 and 14.
1) Tighten the bolts with your hand.
(h) Install the other bolts (5).
1) Tighten the bolts with your hand.
(i) Tighten the bolts (5), except positions 1, 6, 9 and 14, to 120 pound-inches (13.2 Newton meters) in the sequence shown in Fig. 403.

NOTE: If you use PTFE paste, then the torque value to be used is 100 pound-inches (11.0 Newton meters).

(j) Use the spanner, HU36653, for bolt positions 1, 6, 9 and 14.
1) Tighten the bolts until you get the correct torque value on all the bolts during one full sequence.

(k) Remove the unwanted jointing compound from around the four bolt heads in the housing when it is correctly tightened.

(l) Install the oil scavenge unions on the tubes (1, 2).
1) Tighten the unions.
(m) Lockwire the oil scavenge tube unions.
(n) Install the bolt (3), washer (4) and clamp on the bracket to attach the oil scavenge tube (2).
1) Tighten the bolt (3).

S 414-007-R00
(3) Install the insulation blankets (Fig. 402).

CAUTION: CAREFULLY REMOVE THE INSULATION BLANKETS. YOU CAN CAUSE DAMAGE TO THE THERMAL PROPERTIES OF THE INSULATION BLANKETS IF YOU ARE NOT CAREFUL.

(a) Put the top insulation blanket (3) on the cable housing.
(b) Put the center insulation blanket (1) on the top insulation blanket.
1) Install a lockwire on the blankets.
(c) Put the front insulation blanket (2) on the two center and top insulation blanket.
1) Install a lockwire on the blankets.

S 414-008-R00
(4) Install the cable nipple and the slider block (Fig. 401).
(a) Put the cable nipple (3) in the slider block.
(b) Put the coverplate (2) on the cable disconnect housing and install the bolts (1).
1) Tighten the bolts (1).

S 424-009-R00
(5) Install the end cover of the rear bearing housing of the LP turbine (AMM 72-52-01/401).

S 424-010-R00

(6) Install the exhaust nozzle of the gas generator (AMM 72-51-02/401).

COOLING AIR MANIFOLD - INSPECTION/CHECK

1. General
   A. This procedure contains the inspection of the cooling air manifold at the 17 thermocouple borescope positions around the engine.

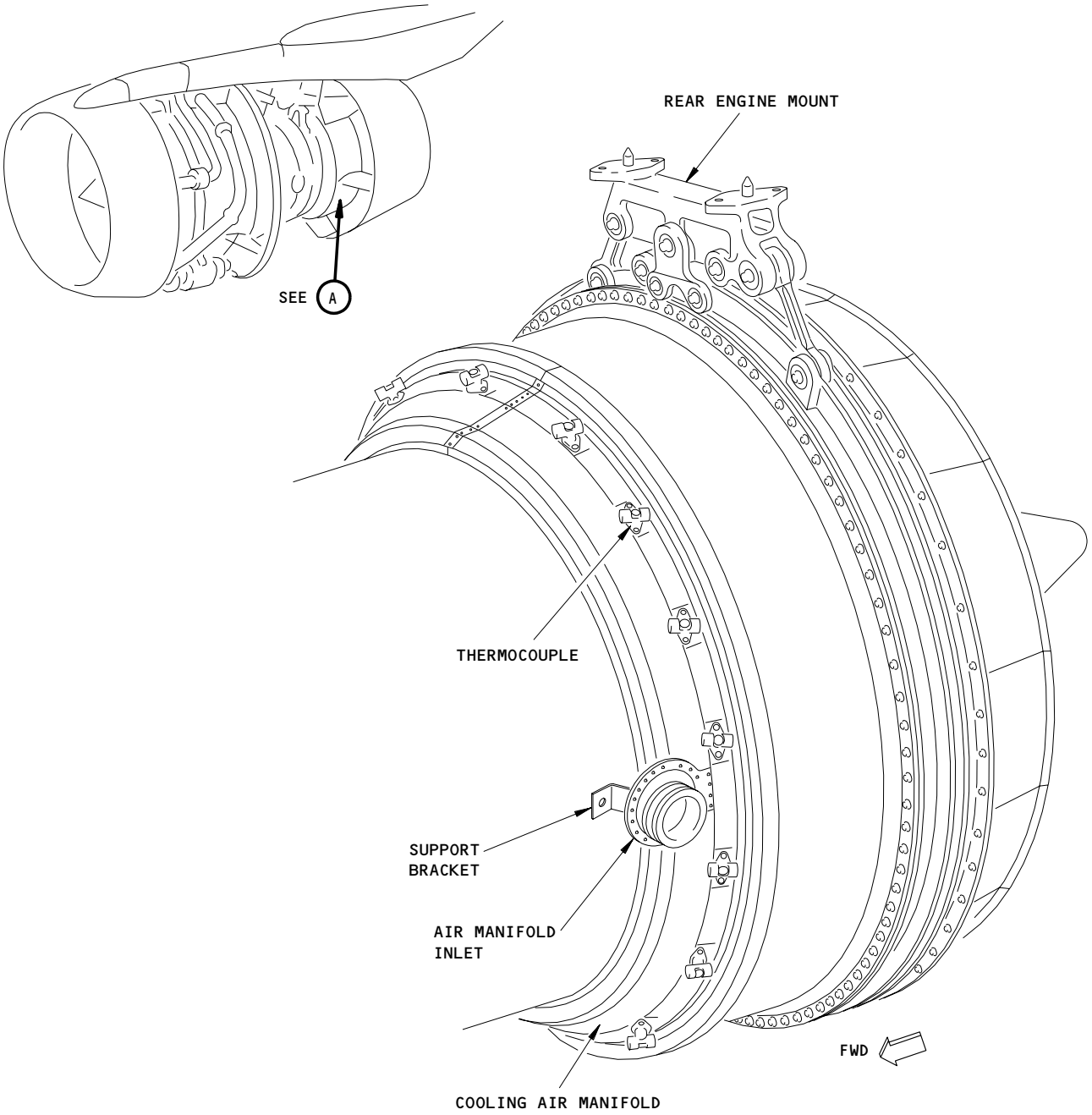
TASK 72-52-05-206-001-R00

2. Inspection of the Cooling Air Manifold
   A. Access
      (1) Location Zones
          411/421 Engine

   B. Do an Inspection of the Cooling Air Manifold (Fig. 601)

      S 216-002-R00
      (1) Examine the cooling air manifold for cracks at each thermocouple and borescope position.
          (a) Cracks that are not more than 4.0 inches (101.6 mm) in length are acceptable.
          (b) Cracks that are more than 4.0 inches (101.6 mm), accept only if you examine them again before 700 hours.
          (c) Cracks that can cause a hole more than 0.5 inches squared (161 millimeters squared) - reject the manifold.

      S 216-004-R00
      (2) Examine the air manifold inlet support brackets.
          (a) Cracked - Accept only if the bracket is replaced within 700 hours.



LEFT SIDE VIEW
(RIGHT SIDE IS EQUIVALENT)
A

DE000A7906A

Cooling Air Manifold - Inspection/Check
Figure 601

LP TURBINE CASE FUEL DRAIN TUBE - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks.
      (1) The removal of the LP turbine case fuel drain tube.
      (2) The installation of the LP turbine case fuel drain tube.

   TASK 72-52-06-724-001-R00

2. Remove the LP Turbine Case Fuel Drain Tube
   A. References
      (1) AMM 78-31-00/201, Thrust Reverser.
   B. Access
      (1) Location Zone
         (a) 410/420 Power Plant
   C. Procedure

      S 014-008-R00
      (1) Remove the LP Turbine Case Fuel Drain Tube (Fig. 401).

      S 014-003-R00

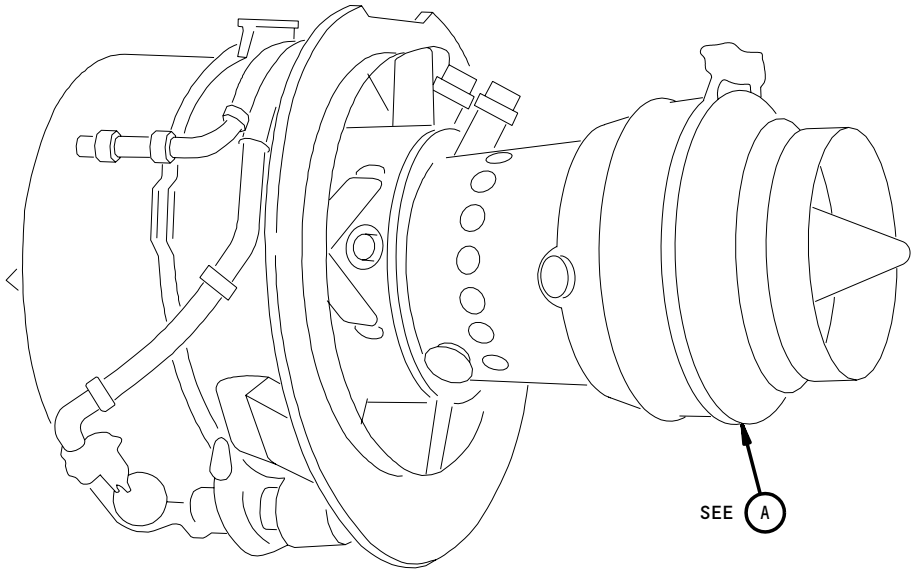
      WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

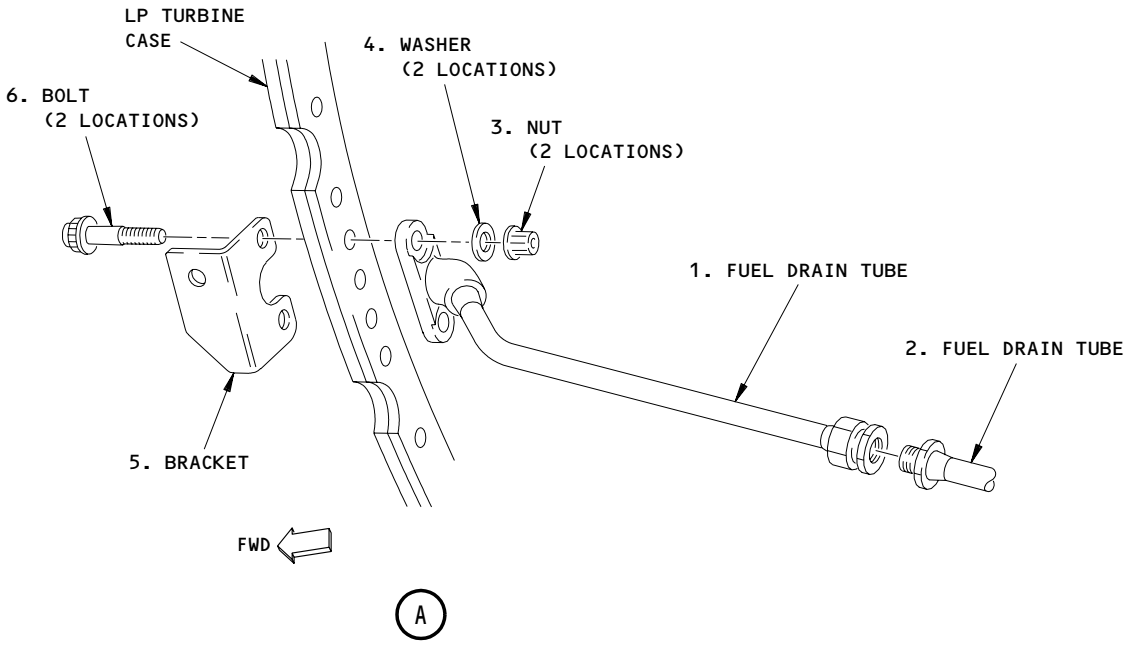
      (2) Do this procedure: Thrust Reverser opening (AMM 78-31-00/201).

      S 014-005-R00
      (3) Disconnect the tube (1) connection with tube (2).

      S 014-006-R00
      (4) Remove the bolts (6), bracket (5), washers (4), and nuts (3) that attach the tube at the LP turbine case flange

      S 014-007-R00
      (5) Remove the fuel drain tube.





DEE0006608A

LP Turbine Case Fuel Drain Tube - Removal/Installation
Figure 401

TASK 72-52-06-724-002-R00

3. Install the LP Turbine Case Fuel Drain Tube.

A. References
(1) AMM 70-12-04/201, Locking Techniques for threaded parts.
(2) AMM 70-51-00/201, Torque tightening Technique.
(3) AMM 78-31-00/201, Thtrust Reverser.

B. Consumable Material
(1) Lockwire
British Spec/Ref - DTD189A, 22 S.W.G.
American Spec/Ref - 21 A.W.G
OMat No. 238

C. Access
(1) Location Zone
(a) 410/420 Power Plant

D. PrOcedure

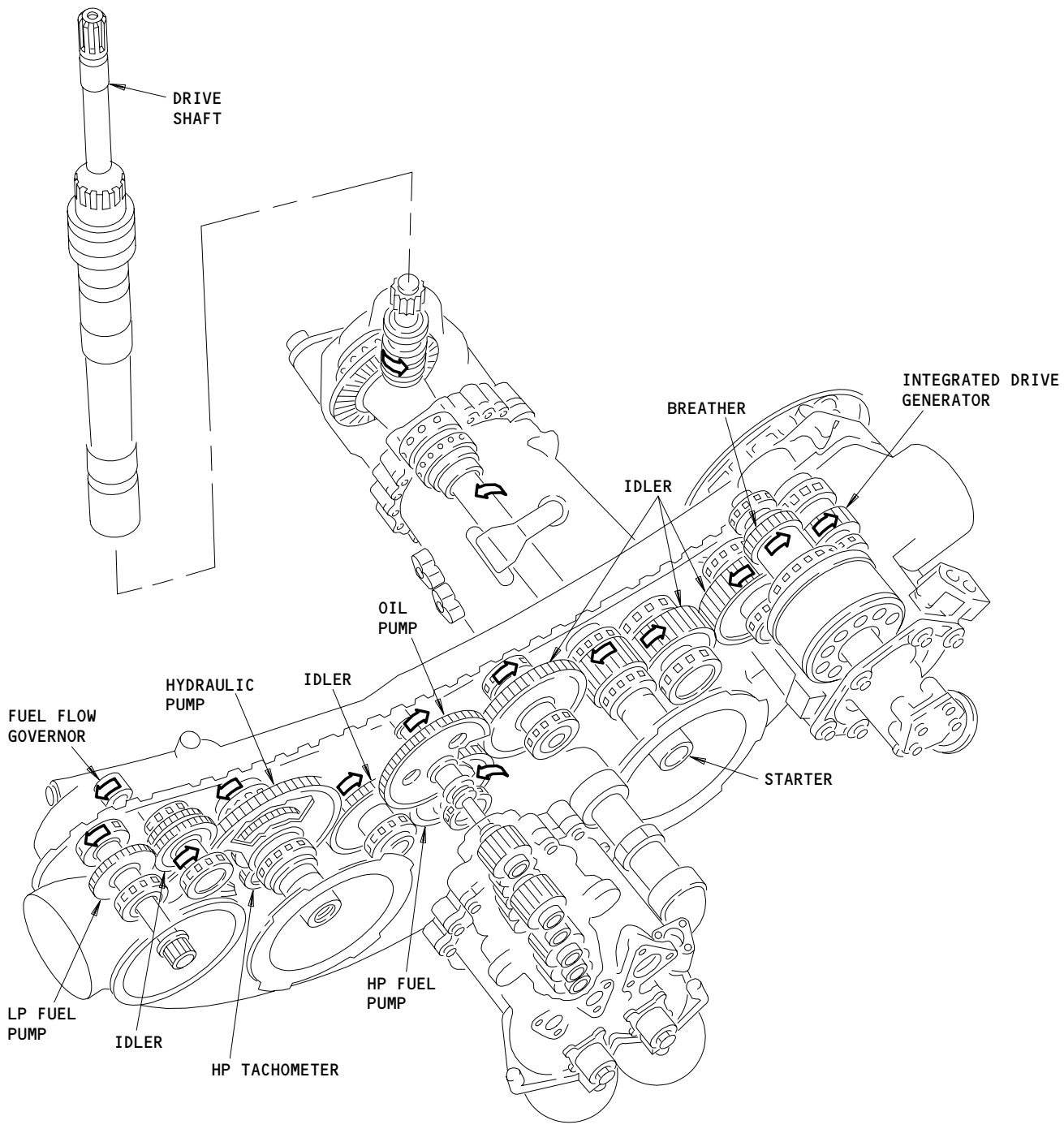
S 424-015-R00
(1) Install the LP Turbine Case Fuel Drain Tube (Fig. 401).
(a) Put the tube in position on the engine.
(b) Loosly fit the bolts (6), bracket (5), washers (4), and nuts (3) to the LP turbine case.
(c) Connect tube (1) to tube (2).
(d) Tighten tube (1) nut and lockwire (AMM 70-51-00/201).
(e) Tighten tube (1) attachment bolts (6) to the LP Turbine case (AMM 70-51-00/201).

NOTE: Tighten the bolts until you get the correct torque value on all the bolts during one full sequence.

S 414-014-R00
(2) Do this procedure: Thrust Reverser Closing (AMM 78-31-00/201).

ACCESSORY DRIVES - DESCRIPTION AND OPERATION

1. General
   A. Power, taken from the high pressure (HP) compressor, through a bevel gear mounted within the intermediate case, drives certain accessory units. These units mounted on the high-speed external gearbox, are listed below (Fig. 1).
      (1) Integrated drive generator (AMM 24-11-00).
      (2) Hydraulic pump (AMM 29-11-00)
      (3) LP and HP fuel pumps (AMM 73-11-00)
      (4) Fuel flow governor (AMM 73-21-00)
      (5) Dedicated generator (AMM 73-21-00)
      (6) HP tachometer (AMM 77-12-00)
      (7) Centrifugal breather (AMM 79-21-00)
      (8) Pressure and scavenge oil pumps (AMM 79-21-00)
      (9) Pneumatic starter (AMM 80-11-00)
   B. The accessory drives receive their power from the N3 compressor by way of the internal gearbox through the radial driveshaft to the high speed external gearbox.
2. Component Details
   A. Internal Gearbox
      (1) The internal gearbox comprises two spiral bevel gears. One is attached to the HP compressor stub shaft and the other is supported on ball and roller bearings housed within the intermediate case and contains internal splines into which the radial driveshaft locates.
   B. Radial Driveshaft
      (1) The drive to the high speed external gearbox is transmitted by a radial driveshaft from the internal gearbox, through one of the intermediate casing struts.
      (2) The radial driveshaft is externally splined at one end and internally splined at the other.
   C. High Speed External Gearbox
      (1) The high speed external gearbox comprises two half cases, containing a series of bevel and spur gears and shafts. The gearbox is located by a spigot and retained by two suspension links to the bottom left side of the LP compressor case.
      (2) Each spur gearshaft is mounted between two roller bearings and drives various accessory units mounted on faces from the gearbox.



High-Speed External Gearbox
Figure 1

MAIN GEARBOX HIGH PRESSURE (HP) FUEL PUMP DRIVE SHAFT - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task removes the drive shaft from the HP fuel pump. The second task installs the drive shaft on the HP fuel pump.

TASK 72-61-72-004-001-R00

2. Remove the Drive Shaft from the HP Fuel Pump
   A. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
      (2) AMM 73-11-03/401, HP Fuel Pump
   B. Access
      (1) Location Zones
          414/424 Fan Cowl Panel (Right)

   C. Remove the Drive Shaft (Fig. 401)

      S 014-015-R00

      CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

      (1) Open the fan cowl panel on the right side of the engine (AMM 71-11-04/201).

      S 014-003-R00
      (2) Remove the HP fuel pump (AMM 73-11-03/401).

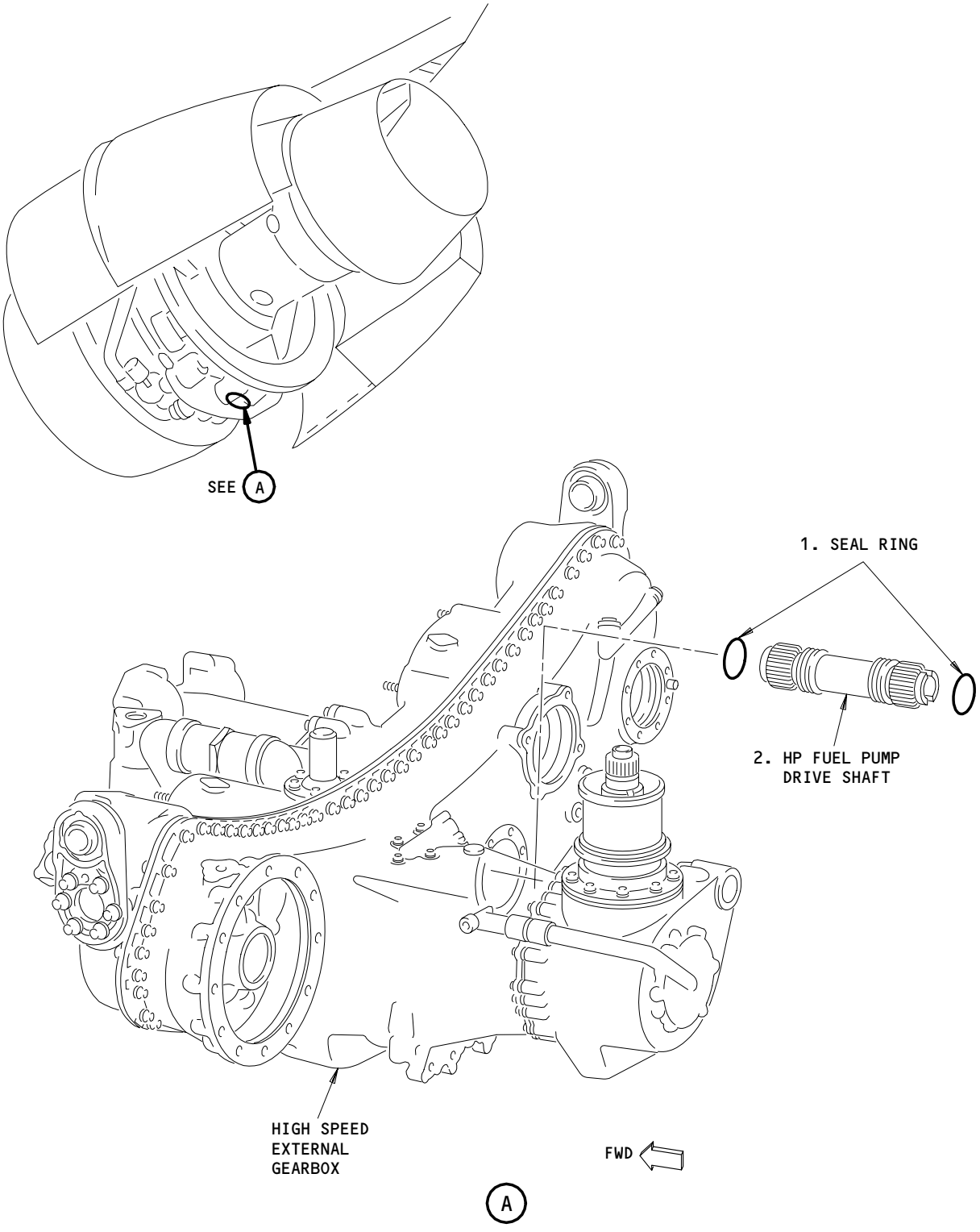
      S 024-004-R00
      (3) Remove the drive shaft (2) from the gear shaft splines.

      S 034-005-R00
      (4) Remove the two seal rings (1) from the drive shaft (2).
          (a) Discard the seal rings (1).

      S 034-006-R00
      (5) Install a cover on the opening in the HP fuel pump.

TASK 72-61-72-404-007-R00

3. Install the Drive Shaft on the HP Fuel Pump
   A. General
      (1) Use the procedure in 70-02-01/201 to install the seal rings.
   B. References
      (1) AMM 71-11-04/201, Fan Cowl Panels



Main Gearbox HP Fuel Pump Drive Shaft Installation
Figure 401

(2) AMM 73-11-03/401, HP Fuel Pump

C. Access

(1) Location Zones

414/424 Fan Cowl Panel (Right)

D. Install the Drive Shaft (Fig. 401)

S 434-008-R00

(1) Remove the cover from the opening in the HP fuel pump.

S 434-009-R00

(2) Lubricate and install two new seal rings (1) on the drive shaft (2).

S 644-010-R00

(3) Apply a thin layer of engine oil to the gear shaft splines.

S 424-011-R00

(4) Install the drive shaft (2) into the gear shaft splines.

S 414-012-R00

(5) Install the HP Fuel Pump (AMM 73-11-03/401).

S 414-014-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(6) Close the fan cowl panel on the right side of the engine (AMM 71-11-04/201).

MAIN GEARBOX LOW PRESSURE (LP) FUEL PUMP DRIVE SHAFT - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task removes the drive shaft from the LP fuel pump. The second task installs the drive shaft in the LP fuel pump.

TASK 72-61-74-004-001-R00

2. Remove the Drive Shaft from the LP Fuel Pump
   A. References
      (1) AMM 71-11-04/201, Fan Cowl Panels
      (2) AMM 73-11-01/401, LP Fuel Pump
   B. Access
      (1) Location Zones
          414/424 Fan Cowl Panel (Right)

   C. Remove the Drive Shaft (Fig. 401)

      S 014-015-R00

      CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU OPEN THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

      (1) Open the fan cowl panel on the right side of the engine (AMM 71-11-04/201).

      S 014-005-R00
      (2) Remove the LP fuel pump (AMM 73-11-01/401).

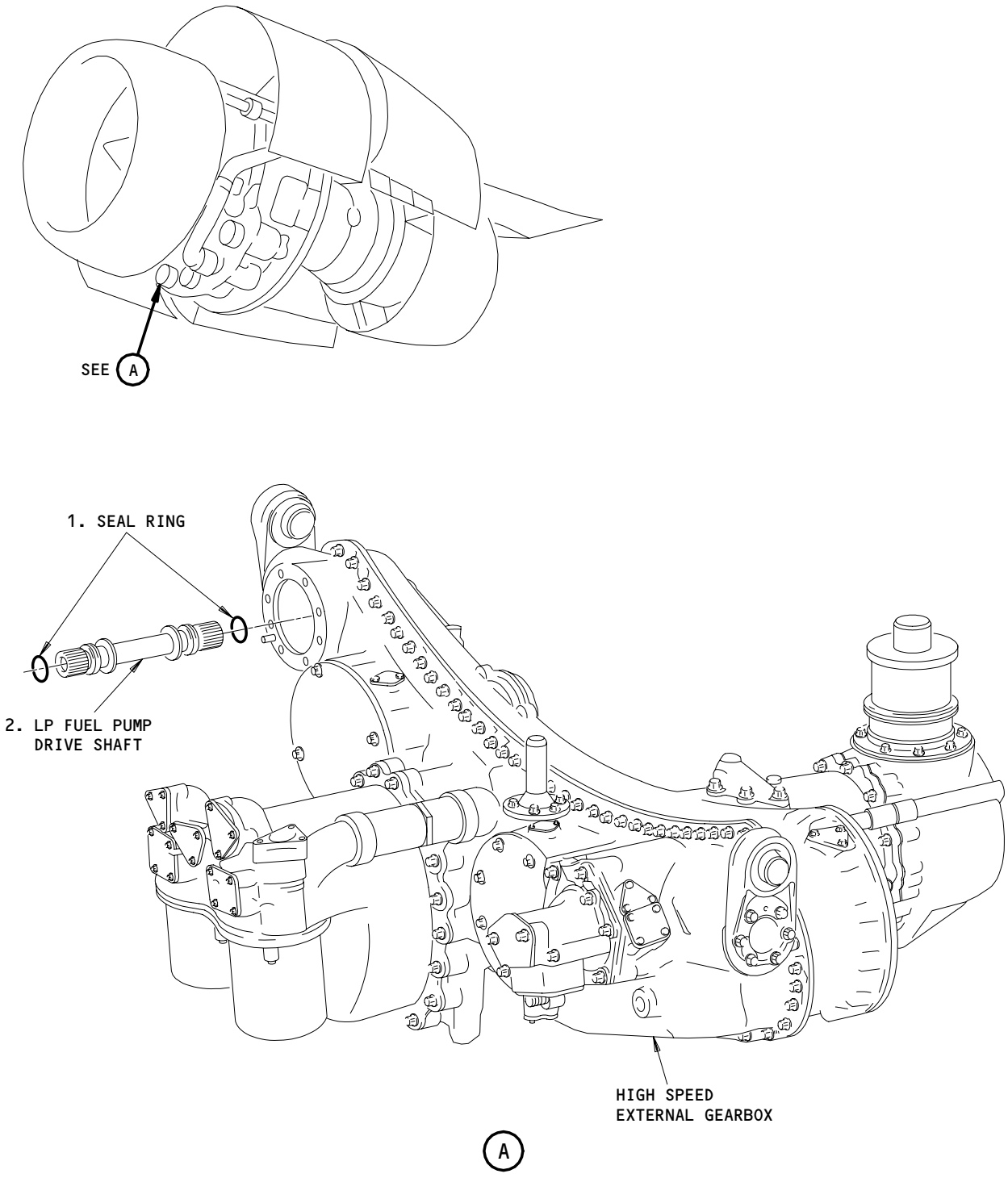
      S 024-006-R00
      (3) Remove the drive shaft (2) from the gear shaft splines.

      S 034-007-R00
      (4) Remove the two seal rings (1) from the drive shaft (2).
          (a) Discard the seal rings (1).

      S 034-008-R00
      (5) Install a cover on the opening in the LP fuel pump.

TASK 72-61-74-404-002-R00

3. Install the Drive Shaft in the LP Fuel Pump
   A. General
      (1) Use the procedure in 70-02-01/201 to install the seal rings.
   B. References
      (1) AMM 71-11-04/201, Fan Cowl Panels



Main Gearbox LP Fuel Pump Drive Shaft Installation
Figure 401

(2) AMM 73-11-01/401, LP Fuel Pump

C. Access

(1) Location Zones

414/424 Fan Cowl Panel (Right)

D. Install the Drive Shaft (Fig. 401)

S 434-009-R00

(1) Remove the cover from the opening in the LP fuel pump.

S 434-010-R00

(2) Lubricate and install two new seal rings (1) on the drive shaft (2).

S 644-011-R00

(3) Apply a thin layer of engine oil to the gear shaft splines.

S 424-012-R00

(4) Install the drive shaft (2) in the gear shaft splines.

S 414-013-R00

(5) Install the LP Fuel Pump (AMM 73-11-01/401).

S 414-016-R00

CAUTION: OBEY THE PRECAUTIONS FOR THE KEVLAR WRAPPING WHEN YOU CLOSE THE FAN COWL PANELS. IF THE PRECAUTIONS ARE NOT OBEYED, DAMAGE TO THE KEVLAR WRAPPING CAN OCCUR.

(6) Close the fan cowl panel on the right side of the engine (AMM 71-11-04/201).

HIGH SPEED GEARBOX RADIAL DRIVE SHAFT - REMOVAL/INSTALLATION

1. General
   A. This procedure refers to these Rolls-Royce service bulletins:
      (1) SB 72-7860 - H.S. Gearbox Drive Shaft - Use a coupling on the radial drive shaft which has holes for the jacking screw
      (2) SB 72-8044 - H.S. Gearbox - Changed the oil seal on the input bevel splines of the outer drive shaft
      (3) SB 72-8704 - H.S. Gearbox Drive Shaft - Changed the bolts which safety the shaft bearing from bi-hexagon heads to 'D' heads
      (4) SB 72-9008 - H.S. Gearbox - Added shroud tubes with oil sealing sleeves.
      (5) SB 72-9246 - H.S. Gearbox Drive Shaft - Added torque values for clamps on the rubber sealing sleeves for the shroud tube on the radial drive shaft.
      (6) SB 72-9343 - H.S. Gearbox Drive Shaft and Shroud - Strengthened Sealing Sleeves and Fixings.
      (7) SB 72-9359 - H.S. Gearbox Drive Shaft and Shroud - Revised balancing procedure.
      (8) SB 72-B061 - H.S. Gearbox Drive Shaft and Shroud - Introduction of Modified Oil Sealing Sleeves.
   B. This procedure contains two tasks. The first task removes the radial drive shaft for the high speed gearbox. The second task installs the radial drive shaft for the high speed gearbox.

TASK 72-62-01-004-001-R00

2. Remove the High Speed Gearbox Radial Drive Shaft
   A. General
      (1) This task contains contains instructions to remove the radial drive shaft from the high speed gearbox.
      (2) The position name is used to help identify the location of the inner and the outer shroud tubes on the radial drive shaft. The name of the part and the position name are given in Figure 401 in the format that follows:
      - Inner (higher) shroud tube assembly
      - Outer (lower) shroud tube assembly

      NOTE: If heavy spline wear is seen on components of the radial drive shaft then you must inspect the radial drive oil distributor, as it is possibly damaged.

   B. References
      (1) AMM 70-42-11/201, Repair of Surfaces Affected by Minor Damage
      (2) AMM 70-51-00/201, Torque Tightening Technique
      (3) AMM 72-03-01/401, Compressor Fairings
      (4) AMM 72-62-01/401, High Speed Gearbox Radial Drive Shaft
      (5) AMM 78-31-00/201, Thrust Reverser System

C. Access
(1) Location Zones
210 Control Cabin
410 Left Power Plant
420 Right Power Plant

D. Prepare to Remove the Radial Drive Shaft from the High Speed Gearbox

S 864-002-R00
(1) For the left engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 864-003-R00
(2) For the right engine, open this circuit breaker and attach a DO-NOT-CLOSE tag:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 014-004-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Open the thrust reversers (AMM 78-31-00/201).

S 014-005-R00
(4) Remove the gas generator fairings for the radial drive shaft of the high speed gearbox (AMM 72-03-01/401).

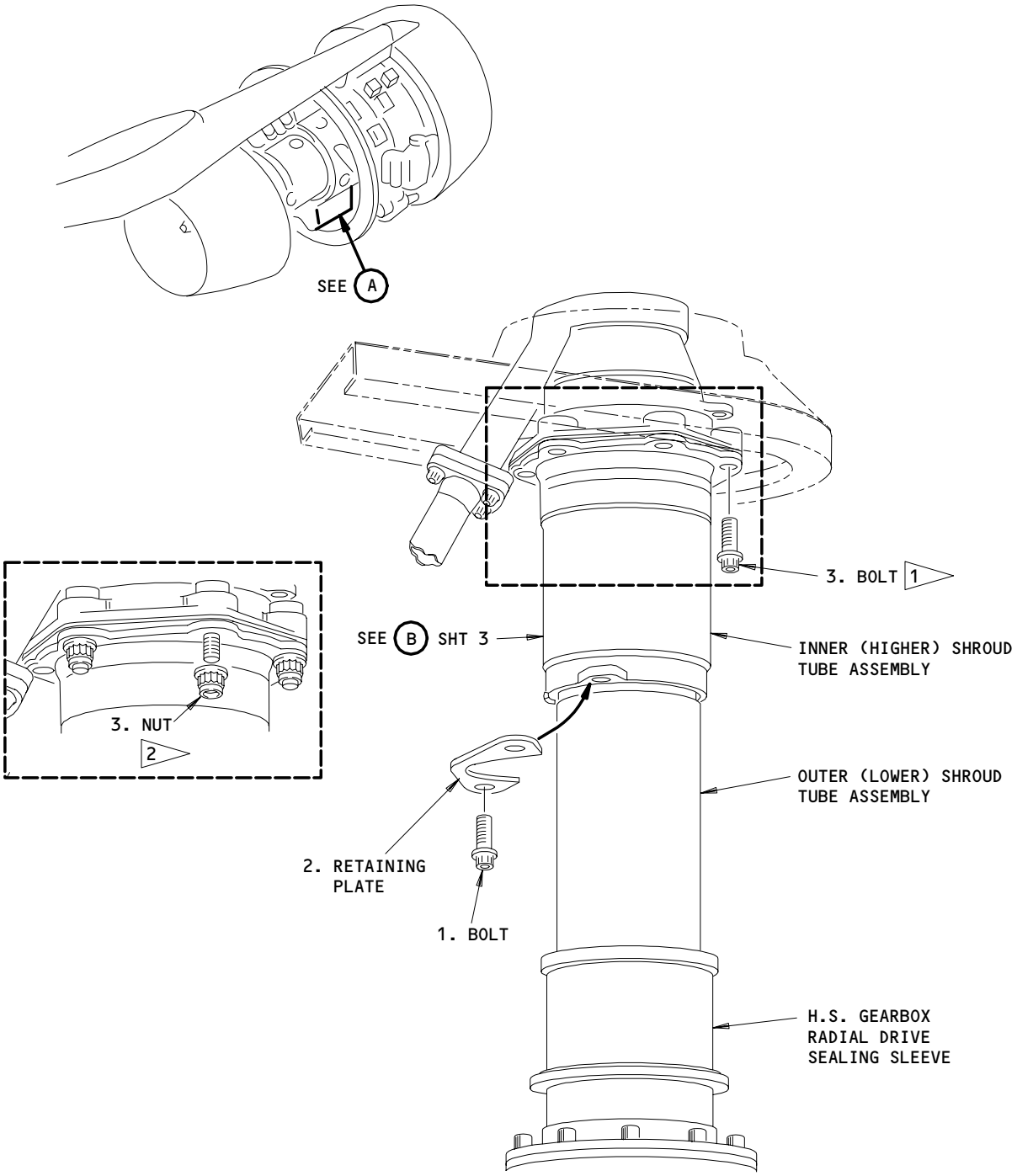
E. Remove the radial drive shaft for the high speed gearbox (Fig. 401 and 402)

S 034-055-R00

CAUTION: RADIAL DRIVE SHAFTS WITH RR SB 72-9359 ARE SPECIALLY BALANCED AS ASSEMBLIES. THE PARTS OF THE ASSEMBLY ARE SETS AND ARE NOT INTERCHANGEABLE. EACH SET IS IDENTIFIED WITH AN APPLICABLE SERIAL NUMBER. THE SERIAL NUMBER IS FOUND ON EACH OF THE THREE ADJACENT FLANGES OF THE ASSEMBLY. THESE ARE THE INNER DRIVE SHAFT FLANGE, THE INNER/OUTER SHAFT COUPLING FLANGE (21) AND THE OUTER SHAFT LOCATING COUPLING FLANGE (19).

(1) ENGINES PRE-RR-SB 72-9008;
Release bolts (1) and remove retaining plate (2).

S 034-007-R00
(2) ENGINES POST-RR-SB 72-9008, 72-9246, 72-9343 AND 72-B061;
Do these steps to remove the oil sealing sleeve:
(a) Remove the applicable band or jubilee clamps (6, 7 and 8).



ENGINES WITHOUT RR SB 72-9008

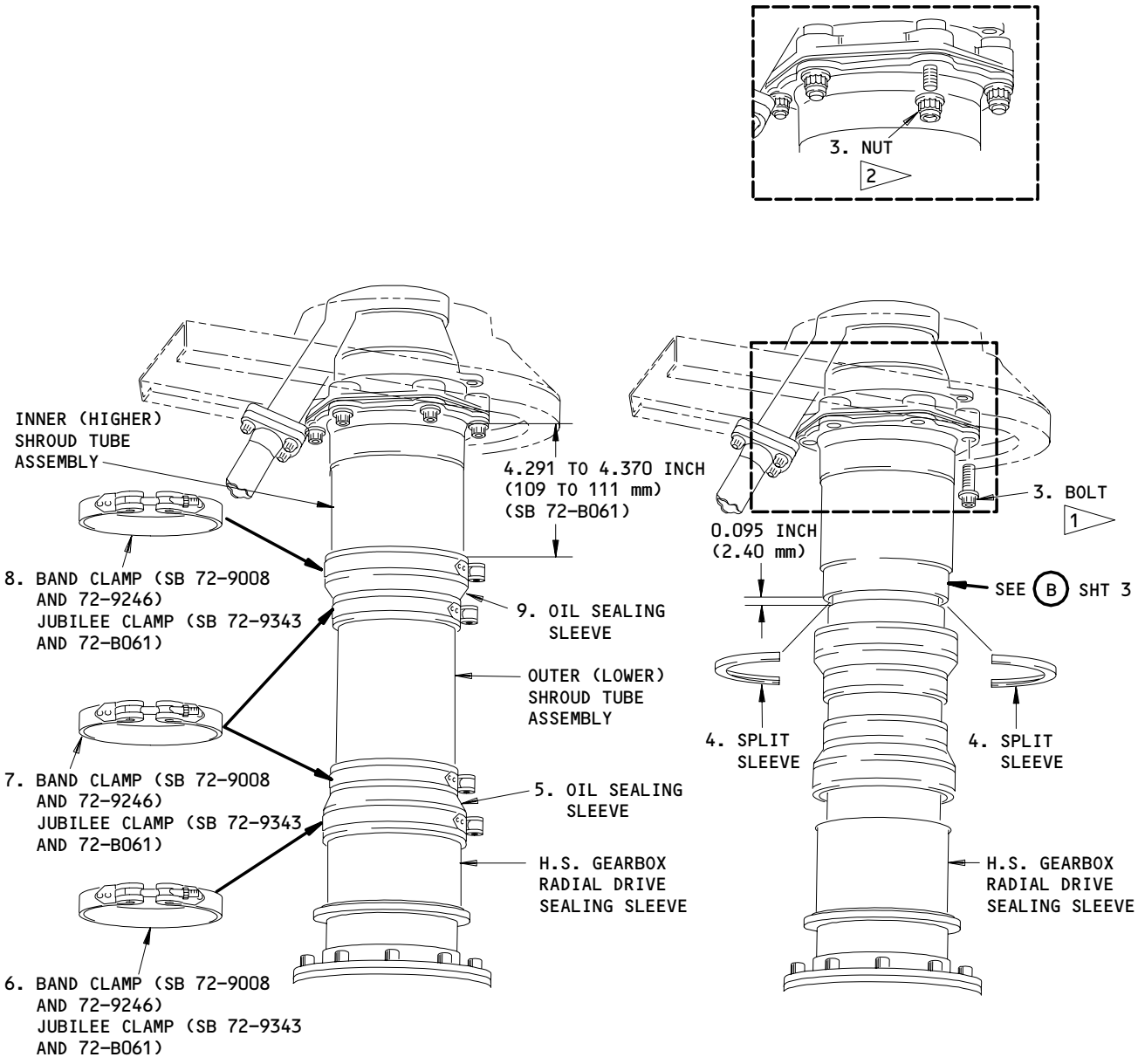
A

1 ENGINES WITHOUT RR SB 72-8704

2 ENGINES WITH RR SB 72-8704

84473B

High Speed Gearbox Radial Drive Shaft Installation
Figure 401 (Sheet 1)



ENGINES WITH RR SB 72-9008, 72-9246, 72-9343 AND 72-B061

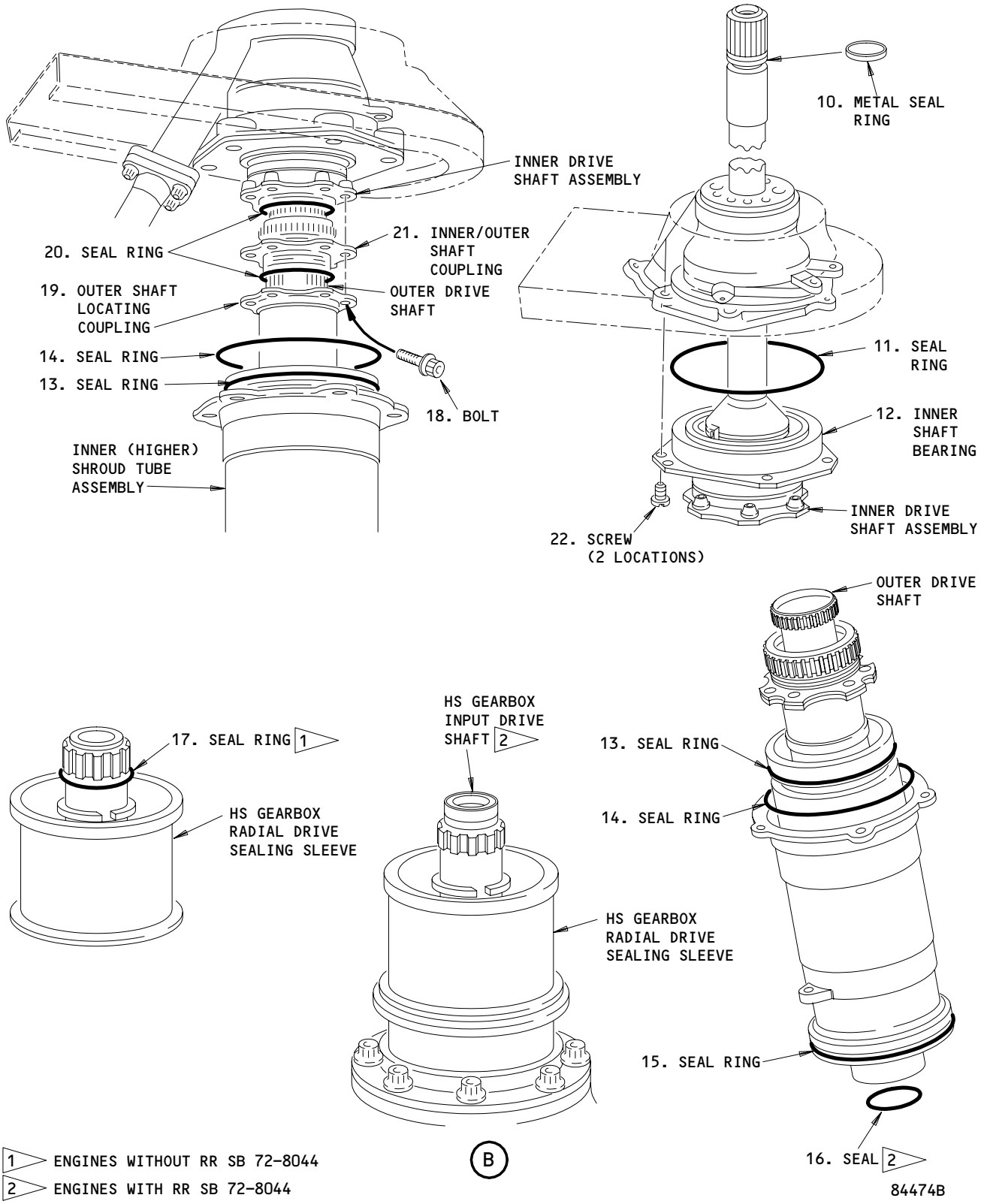
(A)

1 ENGINES WITHOUT RR SB 72-8704

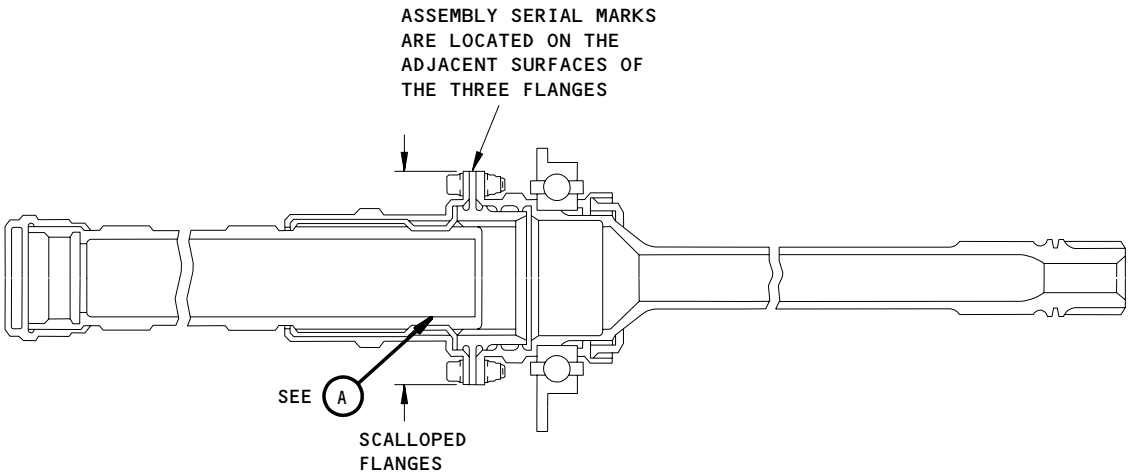
2 ENGINES WITH RR SB 72-8704

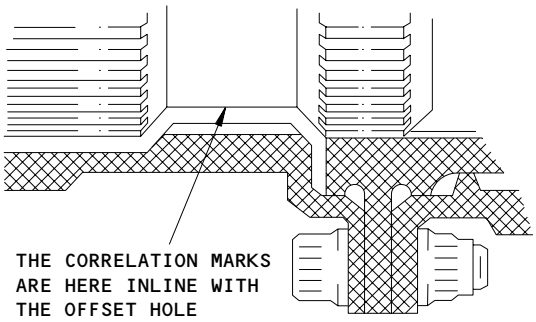
A6267E

High Speed Gearbox Radial Drive Shaft Installation
Figure 401 (Sheet 2)



High Speed Gearbox Radial Drive Shaft Installation
Figure 401 (Sheet 3)





A

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ENGINES WITH RR SB 72-9359

High Speed Gearbox Radial Drive Shaft Assembly - Alignment of Correlation Markings
Figure 402

(b) Move the oil sealing sleeves (5, 9) onto the lower shroud tube assembly.
(c) Remove the split sleeve (4).

S 034-009-R00
(3) ENGINES PRE-RR-SB 72-8704;
Remove the bolts (3).

S 034-008-R00
(4) ENGINES POST-RR-SB 72-8704;
Remove the nuts (3).

S 024-045-R00
(5) Move the higher shroud tube assembly down over the lower shroud tube assembly to permit access to the outer shaft locating coupling.

S 034-010-R00
(6) Disconnect the outer shaft locating coupling (19) and inner/outer shaft coupling (21) from the inner drive shaft assembly as follows:
(a) ENGINES PRE-RR-SB 72-7860;
Do these steps:
1) Remove the bolts (18).
2) Move the couplings (19, 21) down the outer drive shaft.
(b) ENGINES POST-RR-SB 72-7860;
Do these steps:
1) Remove the bolts (18).
2) Put the three bolts (18) into the jacking screw holes of the outer shaft locating coupling (19).

CAUTION: USE NEW BOLTS FOR THE INSTALLATION IF YOU MUST TORQUE THE BOLTS TOO MUCH (AMM 70-51-00/201) TO GET THE NECESSARY FLANGE SEPARATION. DO AN INSPECTION OF THE COUPLING FLANGES FOR DISTORTION (AMM 72-62-01/601).

3) Use a torque spanner to tighten the bolts (18) in the same order by increments.
a) Tighten the bolts until the outer shaft locating coupling (19) moves apart from the inner/outer shaft coupling (21).
4) Remove the bolts (18).
5) Move the coupling (19) down the outer drive shaft.
6) Put the bolts (18) into the jacking screw holes of the inner/outer shaft coupling (21).

CAUTION: USE NEW BOLTS FOR THE INSTALLATION IF YOU MUST TORQUE THE BOLTS TOO MUCH (AMM 70-51-00/201) TO GET THE NECESSARY FLANGE SEPARATION. DO AN INSPECTION OF THE COUPLING FLANGES FOR DISTORTION (AMM 72-62-01/601).

7) Use a torque spanner to tighten the bolts (18) in the same order by increments.
   a) Tighten the bolts until the inner/outer shaft coupling (21) moves apart from the inner drive shaft assembly.
8) Remove the bolts (18).
9) Slide the inner/outer shaft coupling (21) down the outer drive shaft.

S 024-046-R00

(7) Move the higher shroud tube assembly back up the lower shroud tube assembly.

S 014-013-R00

(8) Remove the lower shroud tube assembly from the radial drive sealing sleeve on the high speed gearbox.
   (a) This will permit access to the lower end of the outer drive shaft.

S 024-014-R00

(9) Do these steps to remove the outer drive shaft assembly:
   (a) Lift the outer drive shaft clear of the input drive shaft on the high speed gearbox.
   (b) Move the lower end of the outer drive shaft sideways and remove it from the inner drive shaft assembly.
      1) This will also remove the higher and lower shroud tube assemblies, outer shaft locating coupling (19) and inner/outer shaft coupling (21).

S 024-015-R00

(10) Release the screws (22) and remove the inner drive shaft assembly.

S 034-016-R00

(11) Remove and discard seal rings (11, 13, 14, 15 and 20) and seal (16) or seal ring (17) as applicable.

S 214-017-R00

(12) Make sure the metal seal ring (10) is free to move in the locating groove.
   (a) Replace the seal ring (10) if it is necessary.

S 324-018-R00

(13) Remove any burrs from the mating faces of the inner drive shaft, the inner/outer shaft coupling (19) and the outer shaft locating coupling (21) (AMM 70-42-11/201).

TASK 72-62-01-404-019-R00

3. Install the High Speed Gearbox Radial Drive Shaft

A. General

(1) This task contains instructions to install the radial drive shaft of the high speed gearbox.

B. Equipment

(1) E2J55787 Fitting Tool, Rolls-Royce, or
HU34332 Pressing Tool with HU34782 Clamp Ring, Rolls-Royce

C. Consumable Materials

(1) Oil - Clean, Engine

D. References

(1) AMM 70-02-01/201, Identification, Lubrication and Fitting of Rubber Sealing Rings
(2) AMM 70-51-00/201, Torque Tightening Technique
(3) AMM 71-00-00/501, Power Plant
(4) AMM 72-03-01/401, Compressor Fairings
(5) AMM 72-62-01/601, High Speed Gearbox Radial Drive Shaft
(6) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones
210 Control Cabin
410 Left Power Plant
420 Right Power Plant

F. Install the Radial Drive Shaft of the High Speed Gearbox (Fig. 401)

S 434-020-R00

CAUTION: DO NOT MIX COMPONENTS FROM ENGINES WITH RR SB 72-8044 WITH COMPONENTS FROM ENGINES WITHOUT RR SB 72-8044. MAKE SURE THE INNER AND OUTER DRIVE SHAFTS ON THE HIGH SPEED GEARBOX ARE CORRECT FOR THE ASSEMBLY. IF THE DRIVE SHAFTS ARE NOT CORRECT, DAMAGE TO THE DRIVE SHAFTS WILL OCCUR.

(1) Do these steps to install the seal to the drive shaft:

(a) ENGINES PRE-RR-SB 72-8044;
Lubricate and install a new seal ring (17) to input drive shaft of the high speed gearbox (AMM 70-02-01/201).

CAUTION: MAKE SURE THE GROOVES ON THE SEAL (16) POINT RADIALLY INWARDS. IF NOT, THE DRIVESHAFT MAY NOT BE LUBRICATED CORRECTLY AND DAMAGE TO THE DRIVESHAFT SPLINES CAN OCCUR.

(b) ENGINES POST-RR-SB 72-8044;
Lubricate and install a new seal (16) to high speed gearbox outer shaft seal housing oil weir (AMM 70-02-01/201).

S 434-021-R00

(2) Lubricate and install a new seal ring (11) to the inner shaft bearing (12) (AMM 70-02-01/201).

S 434-022-R00
(3) Lubricate the metal seal ring (10) with engine oil and install to the inner drive shaft if removed.

S 424-023-R00
(4) Install the inner drive shaft assembly and secure with screws (22) (AMM 70-51-00/201).

S 434-024-R00
(5) Lubricate and install new seal rings (13) and (15) to the lower shroud tube assembly (AMM 70-02-01/201).

S 434-025-R00
(6) Lubricate and install a new seal ring (14) to the higher shroud tube assembly (AMM 70-02-01/201).

S 424-047-R00
(7) Move the higher shroud tube assembly over the lower shroud tube assembly.

S 434-027-R00
(8) Lubricate and install new seal rings (20) to the inner/outer shaft coupling (21) (AMM 70-02-01/201).

S 424-048-R00
(9) ENGINES PRE-RR-SB 72-8044;
Loosely assemble the outer shaft locating coupling (19) around the outer drive shaft.

S 424-049-R00
(10) Move the inner/outer shaft coupling (21) onto the outer drive shaft splines.

S 424-050-R00
(11) Loosely assemble the higher and lower shroud tubes around the outer drive shaft.

S 424-051-R00
(12) ENGINES POST-RR-SB 72-9008, 72-9246, 72-9343 AND 72-B061;
Make sure the oil sealing sleeves are installed on the lower shroud tube assembly.

S 424-032-R00
(13) Do these steps to install the outer drive shaft:
(a) Put the upper end of the outer drive shaft into the inner drive shaft assembly at an angle.
(b) Move the lower end of the outer drive shaft sideways to align it with the input drive shaft of the high speed gearbox.
(c) Pull the outer drive shaft down to engage the splines of the input drive shaft.

S 424-052-R00

(14) Move the lower shroud tube assembly down into the radial drive sealing sleeve of the high speed gearbox.

S 824-034-R00

(15) Do these steps to correctly assemble the outer shaft locating coupling (19), the inner/outer shaft coupling (21) and the inner drive shaft assembly:

NOTE: The above components have assembly marks on their scalloped flanges.

(a) Align the assembly marks on the outer shaft location coupling (19), the inner/outer shaft coupling (21) and the inner drive shaft assembly.
(b) ENGINES POST-RR-SB 72-9359;
Align the hand etched mark on the outer shaft assembly with the correlation marks for the bolt holt positions on the scalloped flanges (Fig. 402).

NOTE: Make sure the hand etched marks and the correlation mark align correctly.

NOTE: ENGINES POST-RR-SB 72-B141;
The outer shaft hand marks do not need to be aligned.

(c) ENGINES POST-RR-SB 72-9359;
Move the inner/outer shaft coupling (21) up the outer shaft until the splines engage with the inner shaft (Fig. 402).
(d) Make sure the correlation mark on the outer drive shaft aligns correctly.
(e) Move the location coupling (19) up the outer drive shaft until it disengages from the splines.
(f) Align the location coupling with the assembly marks.
(g) Install the bolts (18).
(h) Tighten the bolts (AMM 70-51-00/201).
1) Make sure the the balance mark on the outer drive shaft aligns correctly.
(i) Move the location coupling (19) up the outer drive shaft.
1) Install the bolts (18).
2) Tighten the bolts (AMM 70-51-00/201).

S 214-064-R00

(16) ENGINES POST-RR-SB 72-9359;
Make sure that the same serial number is found on each of the three adjacent flanges.
(a) This will identify the assembly as a balanced set.

S 934-056-R00
(17) ENGINES POST-RR-SB 72-B061;
Make a temporary line on the shroud tube at a distance of 4.291-4.370 inch (109-111 mm) from the flange spot face.

S 434-036-R00
(18) ENGINES PRE-RR-SB 72-8704;
Slide the higher shroud tube assembly up and secure with bolts (3) (AMM 70-51-00/201).

S 434-037-R00
(19) ENGINES POST-RR-SB 72-8704;
Slide the inner shroud tube assembly up and secure with nuts (3) (AMM 70-51-00/201).

S 424-057-R00
(20) Attach the tool E2J55787 or HU34332 with HU34782 around the bottom of the lower shroud tube and drive the shroud tube down to engage in the HS gearbox radial drive sealing sleeve.
(a) ENGINES POST-SB 72-B061;
Set the shroud tube to get a clearance of 0.095 inch (2.40 mm) (between the lower edge of the higher shroud tube and the bottom of the lower shroud tube location groove).

S 434-038-R00
(21) ENGINES PRE-RR-SB 72-9008;
Position the retaining plate (2) and secure with bolts (1) (AMM 70-51-00/201).

S 434-039-R00
(22) ENGINES POST-RR-SB 72-9008, 72-9246, 72-9343 AND 72-B061;
Do these steps to install the oil sealing sleeves:
(a) Move the oil sealing sleeve (5) down until it is equally on the lower shroud tube and the radial drive sealing sleeve.
(b) ENGINES POST-RR-SB 72-9008 AND 72-9246;
Do these steps to install the band clamps on the oil sealing sleeve (5):

NOTE: The angular position of the band clamps is important to give sufficient clearance with the radial drive fairing.

1) Install the small band clamp (7) on the oil sealing sleeve (5).
a) Make sure the clamp bolt aligns with the vertical center at the front of the engine.
2) Install the large band clamp (6) on the oil sealing sleeve (5).
a) Make sure the clamp bolt aligns with the vertical center at the front of the engine.

3) Tighten the clamps (6, 7) to 40 pound-inches (4.4 Newton meters).

(c) ENGINES POST-RR-SB 72-9343;
Do these steps to install the jubilee clamps on the oil sealing sleeve:

NOTE: The angular position of the jubilee clamps is important to give sufficient clearance with the radial drive fairing.

When the jubilee clamp is tight, use metal cutters to cut the part of the clamp that is not used to a length of 0.393-0.472 inch (10.00-12.00 mm).

1) Install the small jubilee clamp (7) on the oil sealing sleeve (5).
   a) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
   b) Tighten the clamp to 60 pound-inches (6.7 Newton meters) (AMM 70-51-00/201).
2) Install the large jubilee clamp (6) on the sealing sleeve (5).
   a) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
   b) Tighten the clamp to 60 pound-inches (6.7 Newton meters) (AMM 70-51-00/201).

(d) ENGINES POST-RR-SB 72-B061;
Do these steps to install the jubilee clamps on th oil sealing sleeve:

NOTE: The angular position of the jubilee clamp is important to give sufficient clearance with the radial drive fairing.

When the jubilee clamp is tight, use metal cutters to cut the part of the clamp that is not used to a length of 0.393-0.472 inch (10.0-12.0 mm).

1) Install the small jubilee clamp (7) on the oil sealing sleeve (5).
   a) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.

b) Tighten the clamp to 35 pound-inches (3.95 Newton meters) (AMM 70-51-00/201).

2) Install the large jubilee clamp (6) on the oil sealing sleeve (5).
   a) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
   b) Tighten the clamp to 35 pound-inches (3.95 Newton meters) (AMM 70-51-00/201).

(e) Put the split sleeves (4) on the higher shroud tube with the sleeves in the lower shroud tube.

(f) ENGINES POST-RR-SB 72-B061;
Hold the sleeves (4) against the shroud tubes and move the oil sealing sleeve (9) up to hold the sleeves.
1) Put the sealing sleeve (9) higher edge at the temporary line on the higher shroud tube.

(g) ENGINES PRE-RR-SB 72-B061;
Hold the sleeves (4) against the shroud tube and move the oil sealing sleeve (9) up until it is equally on the higher and the lower shroud tubes.
1) This will hold the split sleeves (4) in the correct position.

(h) ENGINES POST-RR-SB 72-9008 AND 72-9246;
Do these steps to install the band clamps on the oil sealing sleeve (9):

NOTE: The angular position of the band clamps is important to give sufficient clearance with the radial drive fairing.

1) Keep a force up on the sealing sleeve (9) to make sure the split sleeves (4) do not move.
2) Install the medium band clamp (8) on the oil sealing sleeve (9).
   a) Make sure the clamp bolt aligns with the vertical center at the front of the engine.
3) Install the small band clamp (7) on the oil sealing sleeve (9).
   a) Make sure the clamp bolt aligns with the vertical center at the front of the engine.

4) Torque the clamps (7, 8) to 40 pound-inches (4.4 Newton meters).

(i) ENGINES POST-RR-SB 72-9343;
Do these steps to install the jubilee clamps on the oil sealing sleeve:

NOTE: The angular position of the jubilee clamps is important to give sufficient clearance with the radial drive fairing.

When the jubilee clamp is tight, use metal cutters to cut the part of the clamp that is not used to a length of 0.393-0.472 inch (10.00-12.00 mm).

1) Keep a force up on the sealing sleeve (9) to make sure the split sleeves (4) do not move.
   a) Install the medium jubilee clamp (8).
   b) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
   c) Tighten the clamp to 60 pound-inches (6.7 Newton meters) (AMM 70-51-00/201).
2) Install the small jubilee clamp (7) on the oil sealing sleeve (5).
   a) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
   b) Tighten the clamp to 60 pound-inches (6.7 Newton meters) (AMM 70-51-00/201).

(j) ENGINES POST-RR-SB 72-B061;
Do these steps to install the jubilee clamps on th oil sealing sleeve:

NOTE: The angular position of the jubilee clamp is important to give sufficient clearance with the radial drive fairing.

When the jubilee clamp is tight, use metal cutters to cut the part of the clamp that is not used to a length 0.393-0.472 inch (10.0-12.0 mm).

1) Keep a force up on the sealing sleeve (9) to make sure the split sleeves (4) do not move.
   a) Install the medium jubilee clamp (8).

b) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
c) Tighten the clamp to 35 pound-inches (3.95 Newton meters) (AMM 70-51-00/201).

2) Install the small jubilee clamp (7) on the oil sealing sleeve (5).
a) Make sure the worm drive clamp aligns with the vertical center at the front of the engine.
b) Tighten the clamp to 35 pound-inches (3.95 Newton meters) (AMM 70-51-00/201).

(k) Put the radial drive fairings on the installation brackets.
(l) Do these steps if the clearance between the clamps (6, 7 and 8) and the fairing is not sufficient:
1) Loosen the clamps that touch the fairing.
2) Adjust the position of the loose clamps until they do not touch the fairing.
3) Tighten the clamps to the correct value.

G. Put the Engine Back to Its Usual Condition

S 414-040-R00

(1) Install the gas generator fairings for the radial drive shaft of the high speed gearbox (AMM 72-03-01/401).

S 414-041-R00

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(2) Close the thrust reversers (AMM 78-31-00/201).

S 864-042-R00

(3) For the left engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D19, ENGINES START CONT LEFT

S 864-043-R00

(4) For the right engine, remove the DO-NOT-CLOSE tag and close this circuit breaker:
(a) P11-2 Overhead Circuit Breaker Panel
1) 11D20, ENGINES START CONT RIGHT

S 714-044-R00

(5) Do the required test for the installation of the high speed gearbox radial drive shaft that is shown in the Power Plant Reference Table (AMM 71-00-00/501).

HIGH SPEED GEARBOX RADIAL DRIVE SHAFT - INSPECTION/CHECK

1. General
   A. This procedure contains two tasks. The first task gives an inspection for the high speed gearbox radial drive shaft (referred to as the drive shaft). The second task gives the acceptance standards for the inspection.

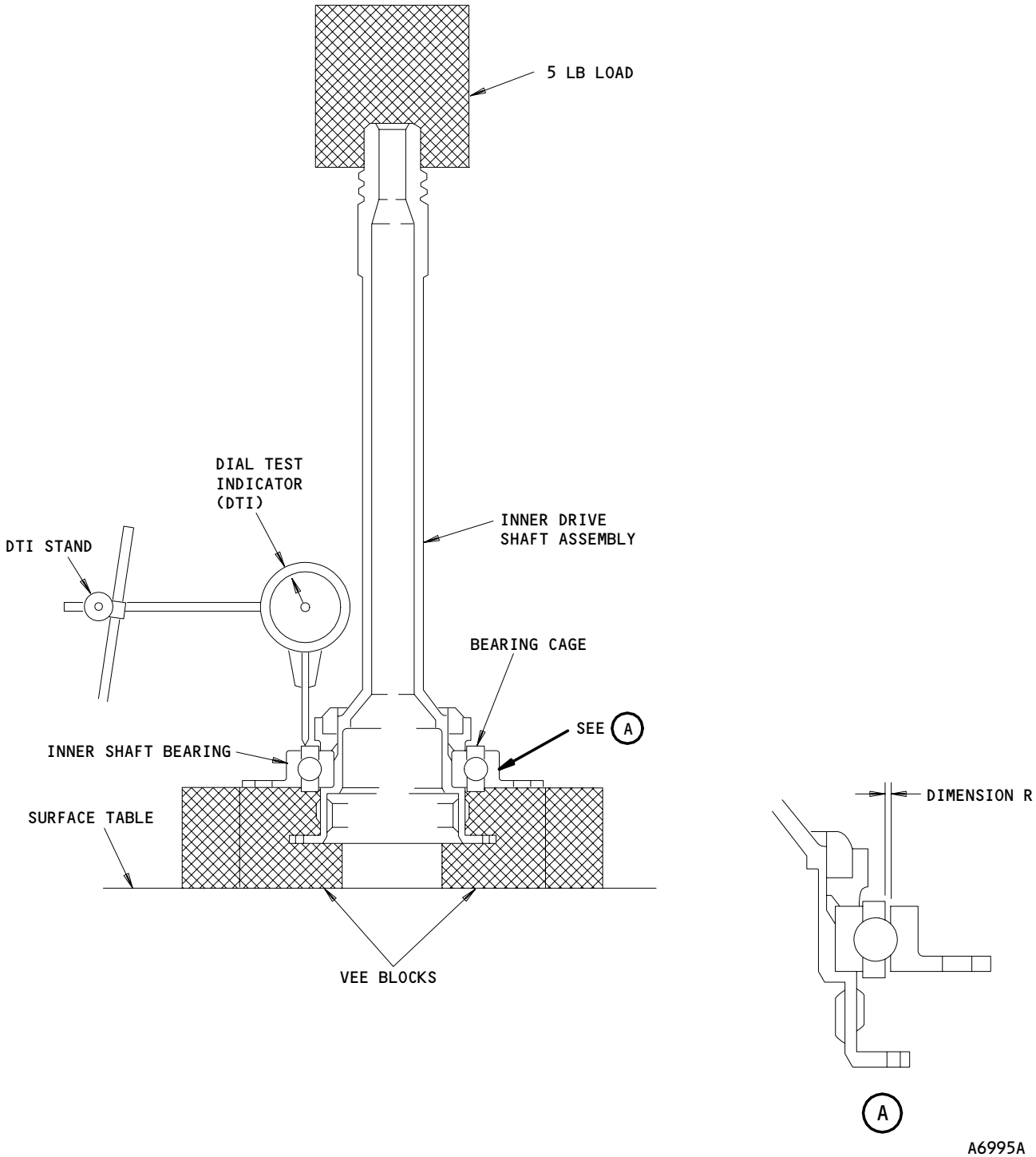
TASK 72-62-01-216-001-R00

2. ENGINES PRE-SB 72-C925;
   Inspection for the High Speed Gearbox Radial Drive Shaft
   A. Equipment
      (1) Dial Test Indicator or
          Vertical Height Gauge
      (2) Feeler Gauges
   B. Access
      (1) Location Zones
          210 Control Cabin
          410 Left Power Plant
          420 Right Power Plant

   C. Do the Inspection for the Drive Shaft

      S 216-002-R00
      (1) Examine the inner drive shaft assembly.
          (a) Examine the drive shaft for cracks.
          (b) Examine the splines for scores and galling.
          (c) Examine the drive shaft for corrosion.
          (d) Examine the housing of the inner shaft bearing.
              1) Examine the bearing housing flange for burrs and distortion.
              2) Examine the bearing to make sure it is free to turn.

      S 216-003-R00
      (2) ENGINES WITHOUT SB 72-C925;
          Examine the inner shaft bearing.
          (a) Do a dimensional inspection of the bearing cage axial float (Fig. 601).
              1) Use the applicable vee-blocks to hold the inner assembly of the drive shaft.
              2) Apply a five pound load to the inner drive shaft.
              3) Put a dial test indicator or vertical height gauge on the top surface of the bearing cage.
              4) Set the dial test indicator or vertical height gauge to zero.
              5) Lift the bearing cage by hand and make a record of the axial movement.



Inner Shaft Bearing - Inspection/Check
Figure 601

6) Put the feeler gauges between the bearing outer race and the bearing cage until you get it correctly aligned.

NOTE: Use tapered feeler gauges that have an end width of 0.250 inch (6.35 mm).

a) Write the radial clearance of the bearing cage (dimension 'R').

S 216-004-R00

(3) Examine the outer drive shaft.
(a) Examine the drive shaft for cracks.
(b) Examine the splines for scores and galling.

S 216-005-R00

(4) Examine the inner/outer shaft coupling.
(a) Examine the coupling for cracks.
(b) Examine the coupling flange for distortion and burrs.
(c) Examine the splines for scores and galling.

S 216-006-R00

(5) Examine the outer shaft locating coupling.
(a) Examine the coupling for cracks.
(b) Examine the coupling flange for distortion and burrs.
(c) Examine the splines for scores and galling.

S 216-007-R00

(6) Examine the assembly of the outer shroud tube.
(a) Examine the shroud tube for cracks, burrs, galling and scoring.

S 216-008-R00

(7) Examine the assembly of the inner shroud tube.
(a) Examine the shroud tube flange for cracks, distortion and burrs.
(b) Examine the shroud tube for cracks, burrs and galling.

S 216-009-R00

(8) ENGINES WITHOUT SB 72-9008;
Do an inspection of the retaining plate.
(a) Examine the retaining plate for galling.

S 216-010-R00

(9) ENGINES WITH SB 72-9008;
Do an inspection of these components:
(a) Do an inspection of the split retaining sleeve.
1) Examine the split retaining sleeve for galling.
(b) Do an inspection of the oil sealing sleeves.
1) Examine the oil sealing sleeves for splits.

(c) Do an inspection of the band clamps.
1) Examine the band clamps for cracks and fretting.

TASK 72-62-01-216-011-R00

3. Acceptance Standards

A. References

(1) AMM 70-42-11/201, Repair of Surfaces Affected by Minor Damage FRS.3253

B. Acceptance Standards for the Drive Shaft Assembly

S 216-012-R00

(1) Inner drive shaft assembly.
(a) Too much visual damage - Replace the part.
(b) Cracked - Replace the part.
(c) Distortion
1) Distortion of the innner drive shaft to the inner/outer shaft coupling face or the bearing housing flange - Replace the part.
(d) Seized
1) If the bearing is seized - Replace the part.
(e) Scored
1) Scoring of the splines to 0.002 inch (0.050 mm) in depth - Repair per FRS.3253 (AMM 70-42-11/201).
2) Scoring of the splines more than 0.002 inch (0.050 mm) in depth - Replace the part.
(f) Galled
1) Galling at a point along the splines, which decreases the width at the top of the splines more than 25 percent - Replace the part.
2) Total galling, which decreases the width at the top of the splines more than 10 percent - Replace the part.
(g) Corrosion
1) General corrosion pitting to a maximum depth of 0.001 inch (0.025 mm) - Accept.
a) Remove the corrosion with an alkaline derusting procedure.
(h) Burred
1) Burrs on the inner drive shaft to the inner/outer shaft coupling face or the bearing housing flange - Repair per FRS.3253 (AMM 70-42-11/201).

S 216-013-R00

(2) ENGINES WITHOUT SB 72-C925;
Inner Shaft Bearing
(a) If the axial movement of the bearing cage is more than 0.017 inch (0.430 mm) and/or the radial clearance of the bearing cage is more than or equal to 0.040 inch (1.020 mm) - Reject the bearing.

(b) If the axial movement of the bearing cage is less than or equal to 0.017 inch (0.430 mm), do the steps that follow:
1) Turn the bearing cage 60 degrees and measure the axial movement again.
2) Turn the bearing cage four times in increments of 60 degrees and measure the axial movement each time the cage is turned.
3) If one or all of the axial movement dimensions is more than 0.017 inch (0.430 mm) - Reject the bearing.
4) If the cause of the inspection was bronze particles or flakes in the scavenge filter - Accept the H.S. gearbox.

(c) If the radial clearance of the bearing cage is not more than 0.040 inch (1.020 mm), do the steps that follow:
1) Turn the bearing cage 60 degrees and measure the radial clearance again.
2) Turn the bearing cage four times in increments of 60 degrees and measure the radial clearance each time the cage is turned.
3) If one or all of the radial clearance dimensions is more than or equal to 0.040 inch (1.020 mm) - Reject the bearing.
4) If the cause of the inspection was bronze particles or flakes in the scavenge filter - Accept the H.S. gearbox.

(d) If the axial movement of the bearing cage is less than or equal to 0.017 inch (0.430 mm) - Accept the bearing.

NOTE: The dimensions for the axial movement of the bearing cage must be measured at six positions that are equal distances apart.

(e) If the radial clearance of the bearing cage is not more than 0.040 inch (1.02 mm) - Accept the bearing.

NOTE: The dimensions for the radial clearances of the bearing cage must be measured at six positions that are equal distances apart.

1) If the cause of the inspection was bronze particles or flakes in the scavenge filter - Reject the H.S. gearbox.

S 216-014-R00

(3) Outer Drive Shaft
(a) Too much visual damage - Replace the part.

(b) Cracked - Replace the part.
(c) Scored
1) Scoring of the splines to 0.002 inch (0.050 mm) in depth - Repair per FRS.3253 (AMM 70-42-11/201).
2) Scoring of the splines more than 0.002 inch (0.050 mm) in depth - Replace the part.
(d) Galled
1) Galling at a point along the splines, which decreases the width at the top of the splines more than 25 percent - Replace the part.
2) Total galling, which decreases the width at the top of the splines more than 10 percent - Replace the part.

S 216-015-R00

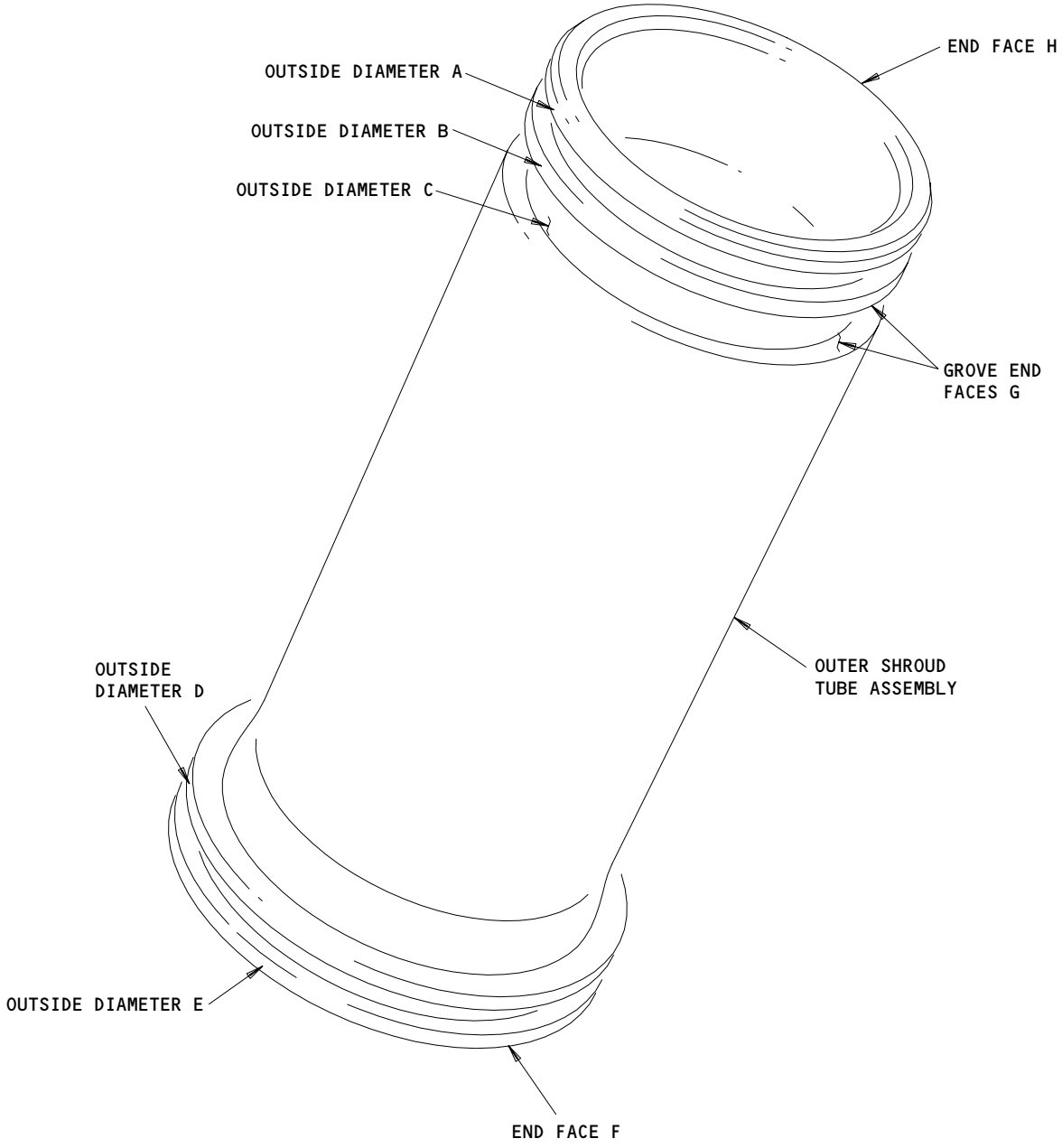
(4) Inner/outer shaft coupling
(a) Too much visual damage - Replace the part.
(b) Cracked - Replace the part.
(c) Distortion
1) Distortion of coupling flange - Replace part.
(d) Burred
1) Burrs on the coupling flange - Repair per FRS.3253 (AMM 70-42-11/201).
(e) Scored
1) Scoring of the splines to 0.002 inch (0.050 mm) in depth - Repair per FRS.3253 (AMM 70-42-11/201).
2) Scoring of the splines more than 0.002 inch (0.050 mm) in depth - Replace the part.
(f) Galled
1) Galling at a point along the splines, which decreases the width at the top of the splines more than 25 percent - Replace the part.
2) Total galling, which decreases the width at the top of the splines more than 10 percent - Replace the part.

S 216-016-R00

(5) Outer shaft locating coupling
(a) Too much visual damage - Replace the part.

(b) Cracked - Replace the part.
(c) Distortion
1) Distortion of the coupling flange - Replace the part.
(d) Burred
1) Burrs on the coupling flange - Repair per FRS.3253 (AMM 70-42-11/201).
(e) Scored
1) Scoring of the splines to 0.002 inch (0.050 mm) in depth - Repair per FRS.3253 (AMM 70-42-11/201).
2) Scoring of the splines more than 0.002 inch (0.050 mm) in depth - Replace the part.
(f) Galled
1) Galling at a point along the splines which decreases the width at the top of the splines more than 25 percent - Replace the part.
2) Total galling, which decreases the width at the top of the splines more than 10 percent - Replace the part.

S 216-017-R00
(6) Outer shroud tube assembly (Fig. 602)
(a) Too much visual damage - Replace the part.
(b) Cracked - Replace the part.
(c) Burred
1) Burrs on the edge of the seal ring grooves - Repair per FRS.3253 (AMM 70-42-11/201).
(d) Galled
1) Repair the part (FRS.3253) if galling of the outer diameters (A, B, D and E) is not more than 0.003 inch (0.080 mm) in depth (AMM 70-42-11/201).
2) Galling of the outer diameter (C) which is not more than 0.006 inch (0.150 mm) in depth is permitted.
3) Galling of the top or bottom groove end faces (G) which is not more than 0.025 inch (0.635 mm) in depth is permitted.
4) Replace the part if galling is more than the damage of the outer diameters (A, B, C, D, E and G).



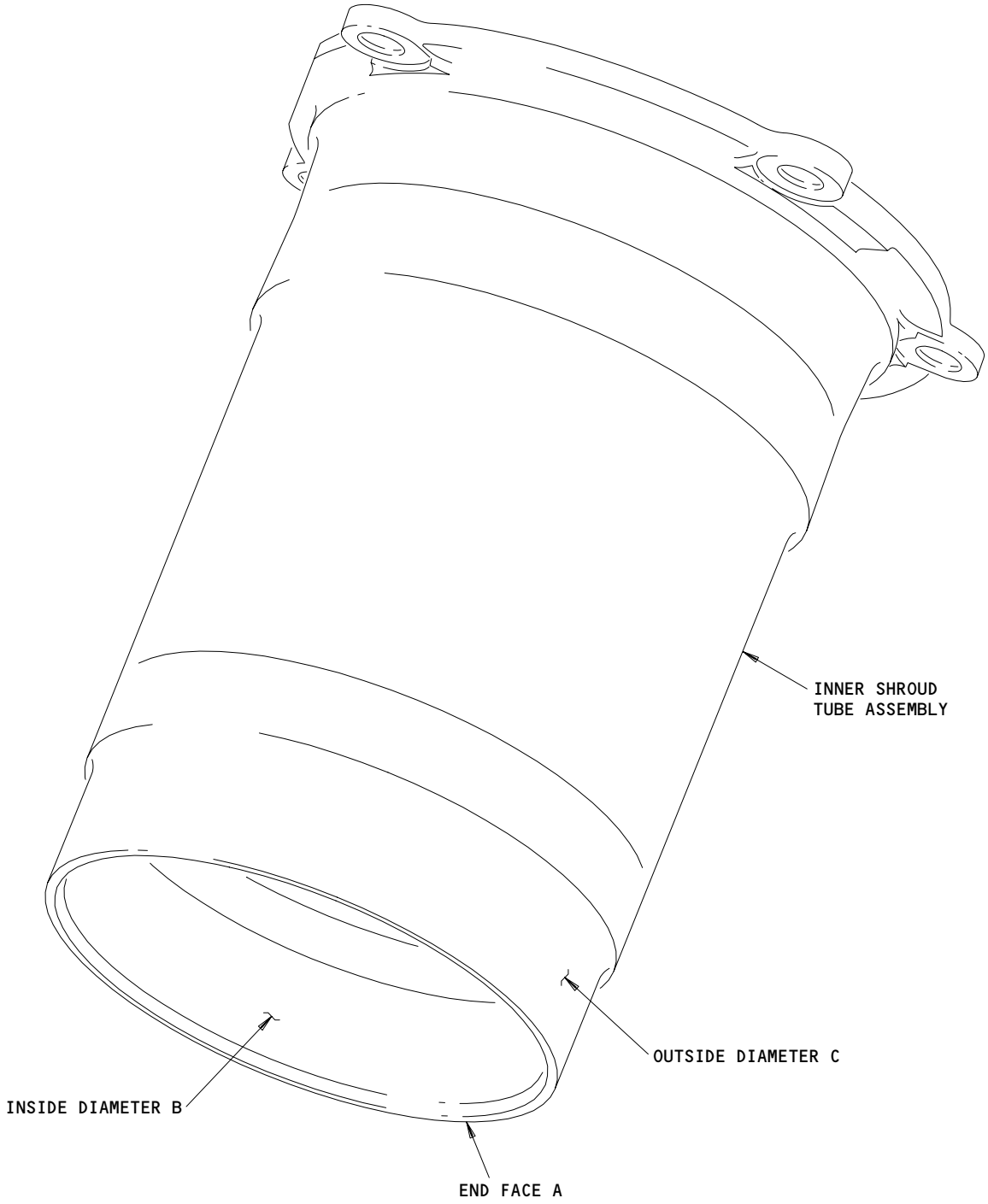
Outer Shroud Tube Assembly - Inspection/Check
Figure 602

(e) Scored
1) Repair the part (FRS.3253) if scoring of the end faces (F, H) is not more than 0.005 inch (0.130 mm) in depth (AMM 70-42-11/201).
2) If scoring of the end faces (F, H) of part (FRS.3253) is more than 0.005 inch (0.130 mm) in depth - Replace the part.

S 216-018-R00
(7) Inner shroud tube assembly (Fig. 603)
(a) Too much visual damage - Replace the part.
(b) Cracked - Replace the part.
(c) Distortion
1) Distortion of the shroud tube flange - Replace the part.
(d) Burred
1) Burrs on the bolt holes or edges of the flange seal groove - Repair with FRS.3253 (AMM 70-42-11/201).
(e) Galled
1) Repair the part (FRS.3253) if galling of the inner diameter (B) is not more than 0.001 inch (0.025 mm) in depth (AMM 70-42-11/201).
2) Galling of the outer diameter (C) which is not more than 0.010 inch (0.250 mm) in depth is permitted.
3) Galling of the end face (A) which is not more than 0.010 inch (0.250 mm) in depth is permitted.
4) Replace the part if galling is more than the inner diameter (B), the outer diameter (C) and the end face (A).

S 216-019-R00
(8) ENGINES WITHOUT SB 72-9008;
Retaining Plate
(a) Replace the part if galling is more than 0.010 inch (0.250 mm) in depth.

S 216-020-R00
(9) ENGINES WITH SB 72-9008;
Split Retaining Sleeve
(a) Galling of the cylindrical section which is not more than 0.005 inch (0.130 mm) in depth is permitted.



Inner Shroud Tube Assembly – Inspection/Check
Figure 603

(b) Galling of the flanges, caused when they touch the outer shroud tube, which is not more than 0.007 inch (0.180 mm) in depth is permitted.
(c) Replace the part if galling is more than the cylindrical section and the flanges.

S 216-021-R00
(10) ENGINES WITH SB 72-9008;
Oil Sealing Sleeves
(a) Surface damage
1) A small quantity of surface damage is permitted.
2) Too much damage which you can see is not permitted.
(b) Splits in the sleeves are not permitted.

S 216-022-R00
(11) ENGINES WITH SB 72-9008;
Band Clamps
(a) Too much visual damage is not permitted.
(b) Cracks are not permitted.
(c) Fretting more than 0.010 inch (0.250 mm) in depth is not permitted.