



Aero Energy

LM2500+ Report

# Borescope Inspection Report

April 06, 2010

For

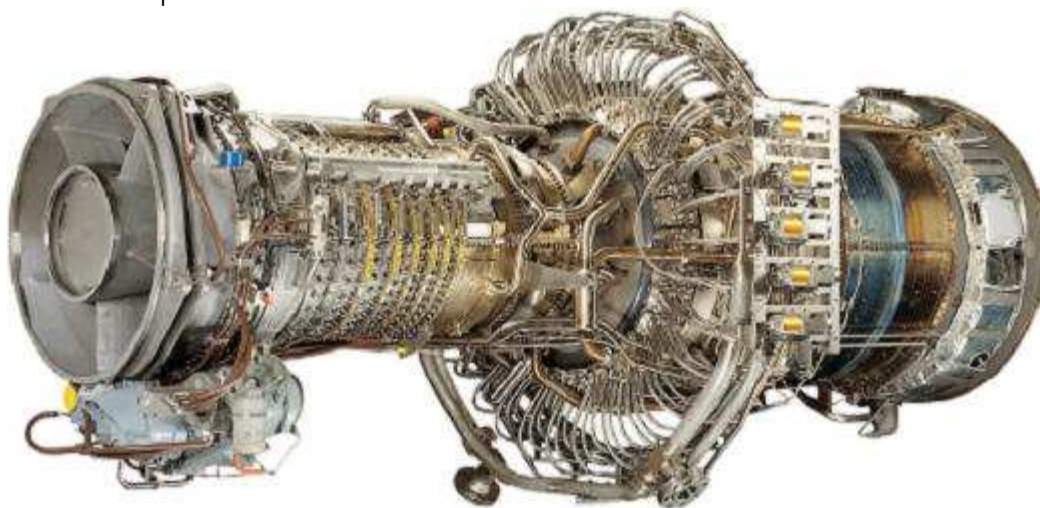
**GE Packaged Power Inc.**

**Unit 2  
ESN 557-116**

Under

**GE Oracle Project 7232298**

Customer Representative: Tom Jones  
GE Field Service Representative: Juan M. Carmona



All technical recommendations and information contained in this report are based on GE manuals that have been developed and approved for use with GE engines and parts that have been operated and maintained in accordance with GE technical documentation and recommendations.

GE has no technical knowledge of, nor obligation for, non GE-approved parts and repairs. Accordingly, this report is not intended to apply to non GE-approved parts and repairs, nor to any parts that may be directly or indirectly affected by non GE-approved parts and repairs.



## **CONCLUSIONS & RECOMMENDATIONS**

The purpose of this visit was to perform a Periodic Borescope Inspection.

This Periodic Borescope inspection was completed in accordance with WP 406 00.

The unit **is** available for continued operation.

### **Outage Data:**

Engine Data:

ESN	557-116	Engine Fired Hours		Package Hours	
Model	7LM2500-PK-MGD04	Engine Fired starts		Package Fired Starts	

Maintenance Data:

WP, SB, SL, PB, PL Performed	Revision/manual reference	Date completed	Comments
WP 406 00	Borescope Inspection		Engine Serviceable

### **Open Action Items:**

The following items require attention:

- Number of shims of igniter should be verified before starting up the engine.

## **DETAILS AND DATA**

### **Purpose of visit:**

The purpose of this visit was to perform a Periodic Borescope Inspection IAW WP 406 00.

### **Work performed:**

A borescope of the engine was performed using a flexscope and a turning tool.

### **Notes:**

Tuesday; April 06, 2010.

- Engine container was located and moved to building D.
- Container upper case was removed to access engine.
- Borescope inspection was performed.



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## Inspection Details:

<b>Menu Directed</b>	LM2500+SAC
<b>Engine Serial Number</b>	557-116
<b>Site</b>	2
<b>Unit No</b>	2
<b>Model</b>	SAC+
<b>Customer</b>	Q
<b>GE Field Service Rep.</b>	J.
<b>GE Oracle Proj No.</b>	72
<b>Engine Fired Hours</b>	0
<b>Engine Fired Starts</b>	0
<b>Package Fired Hours</b>	0
<b>Date</b>	06 Apr 2010
<b>Time</b>	09:22:32



VIGVs\_LE001.JPG

Section	VIGVs
Stage	LE
Comments	



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12:07 04/06/2010

Stage 0 LE



Stage\_0\_LE002.JPG

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Section	Stage 0
Stage	LE
Comments	



12:08 04/06/2010

Stage 0 LE



Stage\_0\_LE003.JPG

Section	Stage 0
Stage	LE
Comments	



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HPC1-8\_Stage1\_LE001.JPG

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Section	HPC1-8
Stage	Stage1
Component	LE
Comments	



HPC1-8\_Stage1\_LE002.JPG

Section	HPC1-8
Stage	Stage1
Component	LE
Comments	



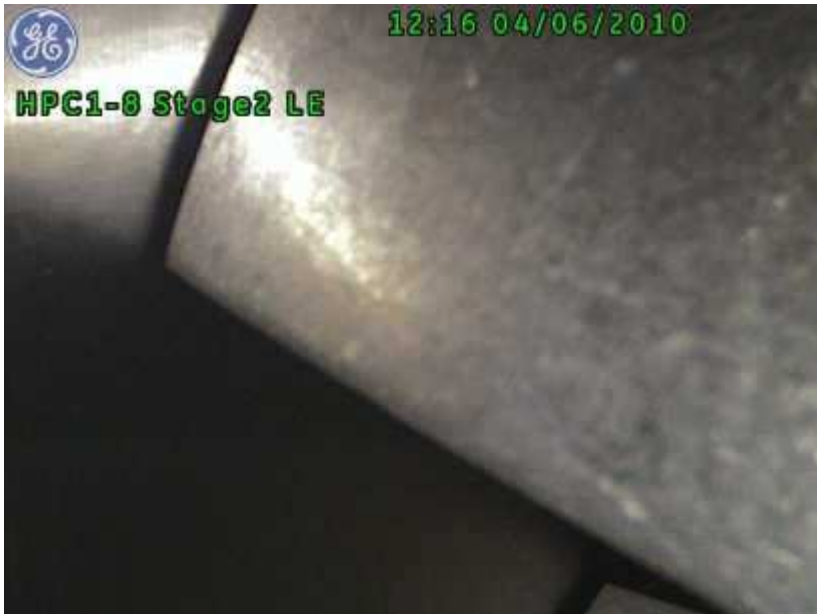
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HPC1-8\_Stage2\_LE001.JPG

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Section	HPC1-8
Stage	Stage2
Component	LE
Comments	



HPC1-8\_Stage2\_LE002.JPG

Section	HPC1-8
Stage	Stage2
Component	LE
Comments	





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HPC1-8\_Stage3\_LE001.JPG

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Section	HPC1-8
Stage	Stage3
Component	LE
Comments	



HPC1-8\_Stage3\_LE002.JPG

Section	HPC1-8
Stage	Stage3
Component	LE
Comments	



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HPC1-8\_Stage4\_LE001.JPG

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Section	HPC1-8
Stage	Stage4
Component	LE
Comments	



HPC1-8\_Stage4\_LE002.JPG

Section	HPC1-8
Stage	Stage4
Component	LE
Comments	





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HPC1-8\_Stage5\_LE001.JPG

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Section	HPC1-8
Stage	Stage5
Component	LE
Comments	

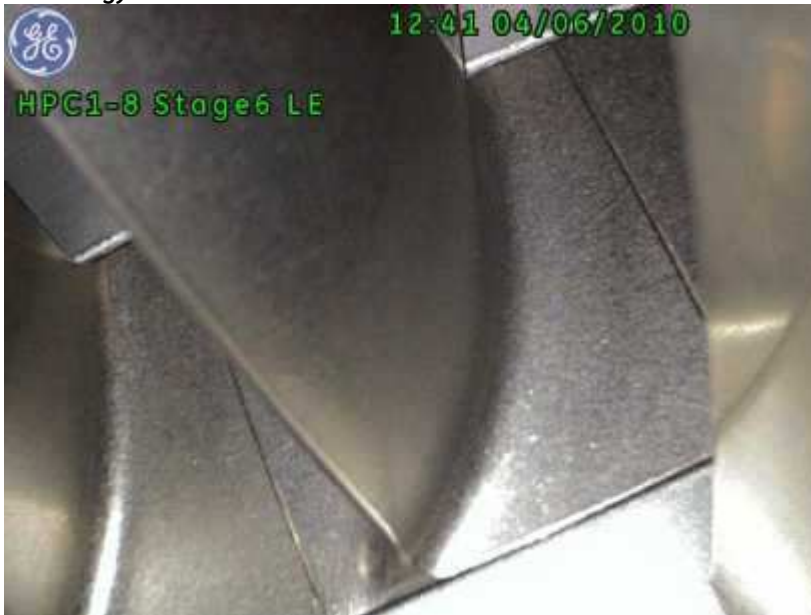


HPC1-8\_Stage5\_LE002.JPG

Section	HPC1-8
Stage	Stage5
Component	LE
Comments	



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HPC1-8\_Stage6\_LE001.JPG

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Section	HPC1-8
Stage	Stage6
Component	LE
Comments	



HPC1-8\_Stage6\_LE002.JPG

Section	HPC1-8
Stage	Stage6
Component	LE
Comments	



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HPC1-8\_Stage7\_LE001.JPG

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Section	HPC1-8
Stage	Stage7
Component	LE
Comments	



HPC1-8\_Stage7\_LE002.JPG

Section	HPC1-8
Stage	Stage7
Component	LE
Comments	



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HPC1-8\_Stage8\_LE001.JPG

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Section	HPC1-8
Stage	Stage8
Component	LE
Comments	



HPC1-8\_Stage8\_LE002.JPG

Section	HPC1-8
Stage	Stage8
Component	LE
Comments	



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HPC9-16\_Stage9\_LE001.JPG

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Section	HPC9-16
Stage	Stage9
Component	LE
Comments	



HPC9-16\_Stage9\_LE002.JPG

Section	HPC9-16
Stage	Stage9
Component	LE
Comments	





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HPC9-16\_Stage10\_LE001.JPG

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Section	HPC9-16
Stage	Stage10
Component	LE
Comments	



HPC9-16\_Stage10\_LE002.JPG

Section	HPC9-16
Stage	Stage10
Component	LE
Comments	





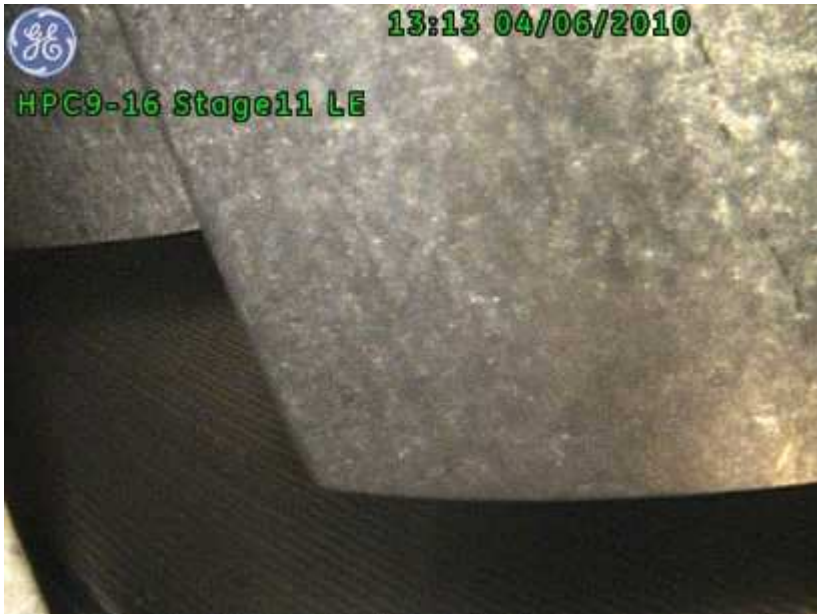
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HPC9-16\_Stage11\_LE001.JPG

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Section	HPC9-16
Stage	Stage11
Component	LE
Comments	



HPC9-16\_Stage11\_LE002.JPG

Section	HPC9-16
Stage	Stage11
Component	LE
Comments	



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13:14 04/06/2010

HPC9-16 Stage12 LE



HPC9-16\_Stage12\_LE001.JPG

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Section	HPC9-16
Stage	Stage12
Component	LE
Comments	



13:15 04/06/2010

HPC9-16 Stage12 LE



HPC9-16\_Stage12\_LE002.JPG

Section	HPC9-16
Stage	Stage12
Component	LE
Comments	



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HPC9-16\_Stage15\_TE001.JPG

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Section	HPC9-16
Stage	Stage15
Component	TE
Comments	



HPC9-16\_Stage15\_TE002.JPG

Section	HPC9-16
Stage	Stage15
Component	TE
Comments	



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13:35 04/06/2010

HPC9-16 Stage16 LE



HPC9-16\_Stage16\_LE001.JPG

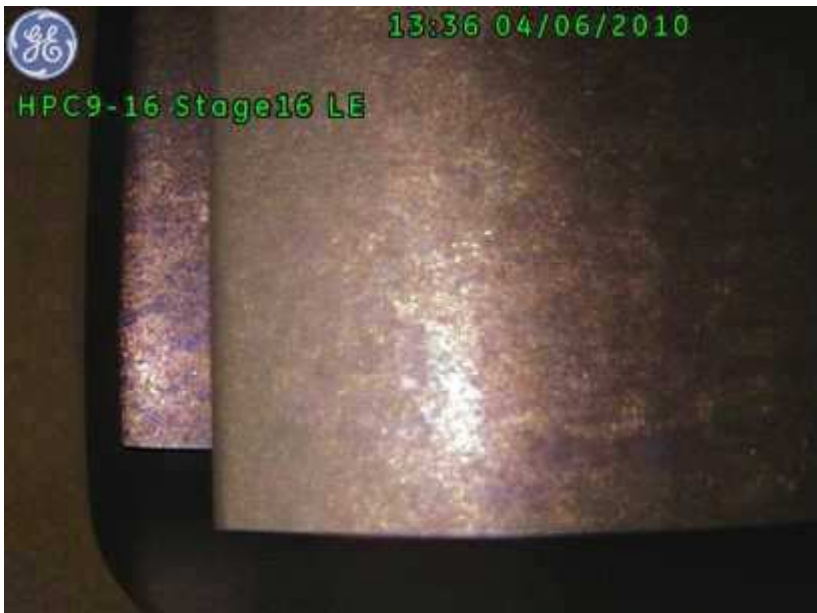
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Section	HPC9-16
Stage	Stage16
Component	LE
Comments	



13:36 04/06/2010

HPC9-16 Stage16 LE



HPC9-16\_Stage16\_LE002.JPG

Section	HPC9-16
Stage	Stage16
Component	LE
Comments	



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Comb\_General001.JPG

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Section	Comb
Component	Inner Liner
Comments	



Comb\_General002.JPG

Section	Comb
Component	Inner Liner
Comments	





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Comb\_General003.JPG

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Section	Comb
Component	Inner Liner
Comments	



Comb\_General004.JPG

Section	Comb
Component	Outer Liner
Comments	





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Comb\_General005.JPG

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Section	Comb
Component	Outer Liner
Comments	



Comb\_General006.JPG

Section	Comb
Component	Outer Liner
Comments	



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Comb\_General007.JPG

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Section	Comb
Component	Trumpets & Inner/Outer Dome Plates
Comments	



Comb\_General008.JPG

Section	Comb
Component	Fuel Nozzle, Venturi and Trumpet
Comments	



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Comb\_General009.JPG

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Section	Comb
Component	Trumpets, venturis and fuel nozzles
Comments	



Comb\_General010.JPG

Section	Comb
Component	Trumpets
Comments	



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Comb\_General012.JPG

#### LM2500+ Report

Section	Comb
Component	Fuel nozzle, swirler, venture and swirl cup
Comments	



Comb\_General013.JPG

Section	Comb
Component	Fuel nozzle, swirler, venture, swirl cup & igniter hole
Comments:	This engine has one igniter only





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Comb General

09:41 04/06/2010



Comb\_General014.JPG

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Section	Comb
Component	Fuel Nozzle, Swirler & Venturi
Comments	



Comb General

09:43 04/06/2010



Comb\_General015.JPG

Section	HPT
Component	Stage 1 Nozzle
Comments	



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Comb General

09:44 04/06/2010



Comb\_General016.JPG

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Section	HPT
Component	Stage 1 Nozzle
Comments	



Comb General

09:45 04/06/2010



Comb\_General017.JPG

Section	HPT
Component	Stage 1 Nozzle
Comments	





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Comb\_General018.JPG

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Section	Comb
Component	Igniter
Comments	



HPT\_General001.JPG

Section	HPT
Stage	Stage 1 Blades
Comments	



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HPT\_General002.JPG

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Section	HPT
Stage	Stage 1 Blades & Shroud
Comments	



HPT\_General003.JPG

Section	HPT
Stage	Stage 1 Nozzles (Trailing Edge)
Comments	



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HPT\_General004.JPG

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Section	HPT
Stage	Stage 1 Shroud Segments.
Comments	



HPT\_General005.JPG

Section	HPT
Stage	Stage 1 Shroud
Comments	7 shroud segments show wear.



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HPT\_General006.JPG

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Section	HPT
Stage	Stage 1 Shroud
Comments	



HPT\_General009.JPG

Section	HPT
Stage	Stage 1 Shroud
Comments	7 shroud segments show wear.



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HPT\_General011.JPG

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Section	HPT
Stage	Stage 1 Shroud
Comments	7 shroud segments show wear.



HPT\_General012.JPG

Section	HPT
Stage	Stage 2 Blades
Comments	



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HPT\_General013.JPG

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Section	HPT
Stage	Stage 2 Blades & Shroud
Comments	



HPT\_General014.JPG

Section	HPT
Stage	Stage 2 Shroud.
Comments	





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HPT\_General015.JPG

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Section	HPT
Stage	Stage 2 Shroud
Comments	



HPT\_General016.JPG

Section	HPT
Stage	Stage 2 shroud and nozzles (trailing edge).
Comments	



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HPT\_General018.JPG

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Section	HPT
Stage	Stage 2 shroud and nozzles (trailing edge).
Comments	



Thermocouple

Section	HPT
Stage	General
Comments	



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PT\_General020.JPG

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Section	PT
Stage	Stage 1 Blades
Comments	



PT\_General021.JPG

Section	PT
Stage	Stage 1 Blades
Comments	



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PT\_General022.JPG

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Section	PT
Stage	Stage 6 Blades
Comments	



PT\_General023.JPG

Section	PT
Stage	Stage 6 Blades
Comments	



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HPT\_General024.JPG

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Section	TMF
Stage	Inner Liner & Rivets
Comments	



HPT\_General026.JPG

Section	TMF
Stage	Outer Liner & Strut
Comments	





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HPT\_General028.JPG

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Section	TMF
Stage	Struts & Rivets
Comments	



HPT\_General029.JPG

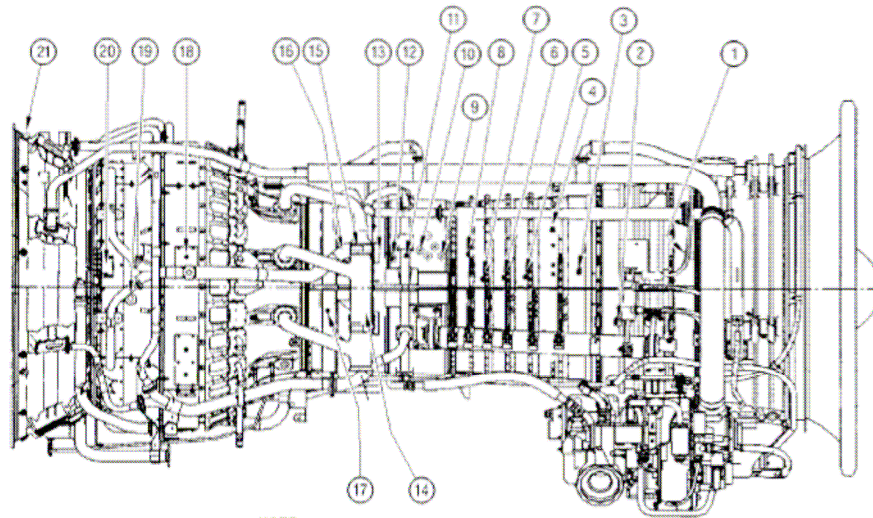
Section	TMF
Stage	Outer Liner
Comments	



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## High Pressure Compressor

Inspection Area	Comments
<input type="checkbox"/> Inspect stages 0 through 16 blades for cracks, nicks, tears, burrs, dents, missing material, evidence of tip clang, curl or deformation.	
<input type="checkbox"/> IGV	Shows in good condition
<input type="checkbox"/> Stage 0 Blisk	Shows in good condition
<input type="checkbox"/> Stage 1 Blades (Qty 26) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 2 Blades (Qty 26) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 3 Blades (Qty 42) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 4 Blades (Qty 45) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 5 Blades (Qty 48) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 6 Blades (Qty 54) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 7 Blades (Qty 56) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 8 Blades (Qty 64) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 9 Blades (Qty 66) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 10 Blades (Qty 66) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 11 Blades (Qty 76) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 12 Blades (Qty 76) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 13 Blades (Qty 76) & Vanes	
<input type="checkbox"/> Stage 14 Blades (Qty 76) & Vanes	
<input type="checkbox"/> Stage 15 Blades (Qty 76) & Vanes	Shows in good condition
<input type="checkbox"/> Stage 16 Blades (Qty 76) & Vanes	Shows in good condition
<input type="checkbox"/> Inspect for erosion, corrosion or deposits.	Not erosion / corrosion noted
<input type="checkbox"/> Inspect for platform shingling, bowing, distortion or cracks	Shows in good condition

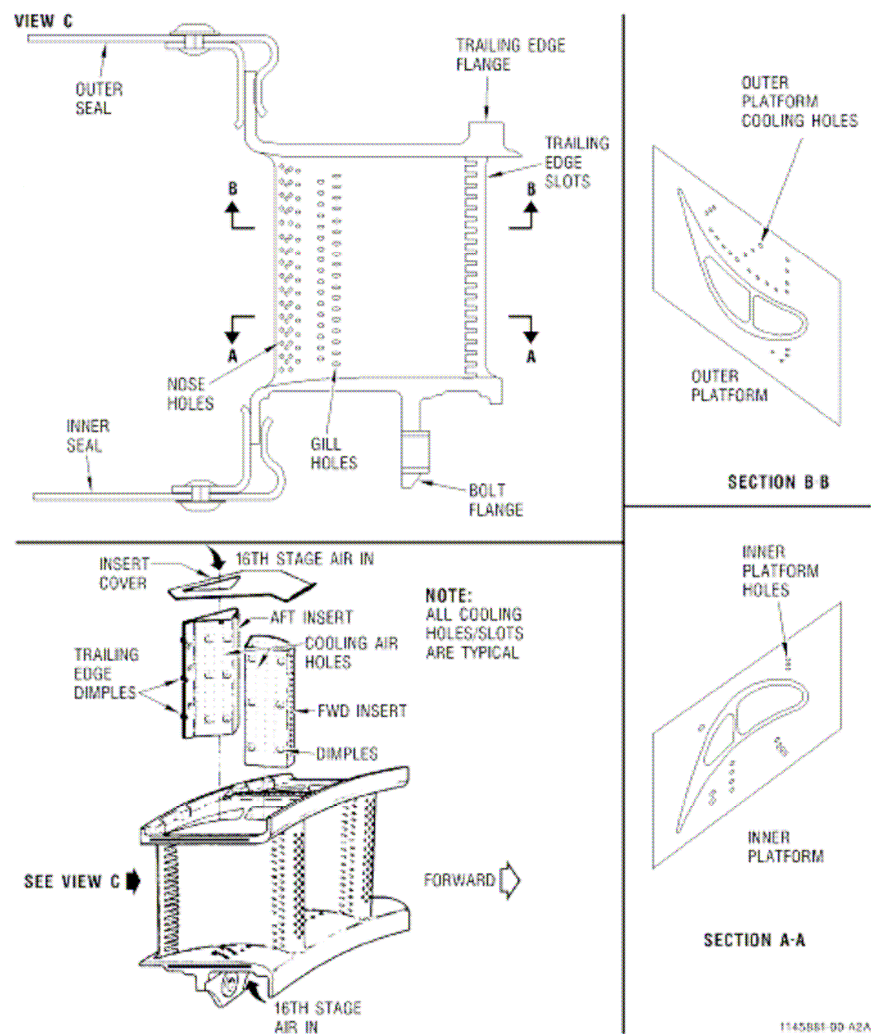


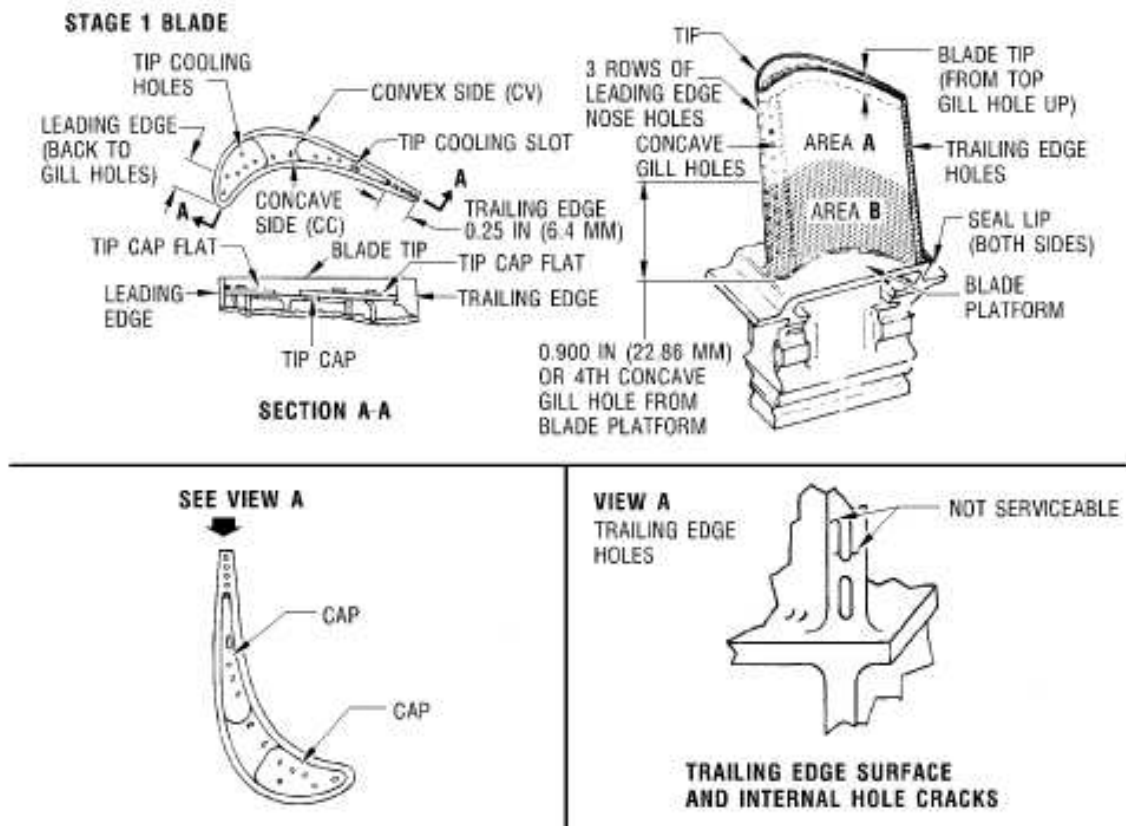
**NOTE:**  
FUEL MANIFOLD SHOWN REMOVED FOR CLARITY.

**LEGEND:**

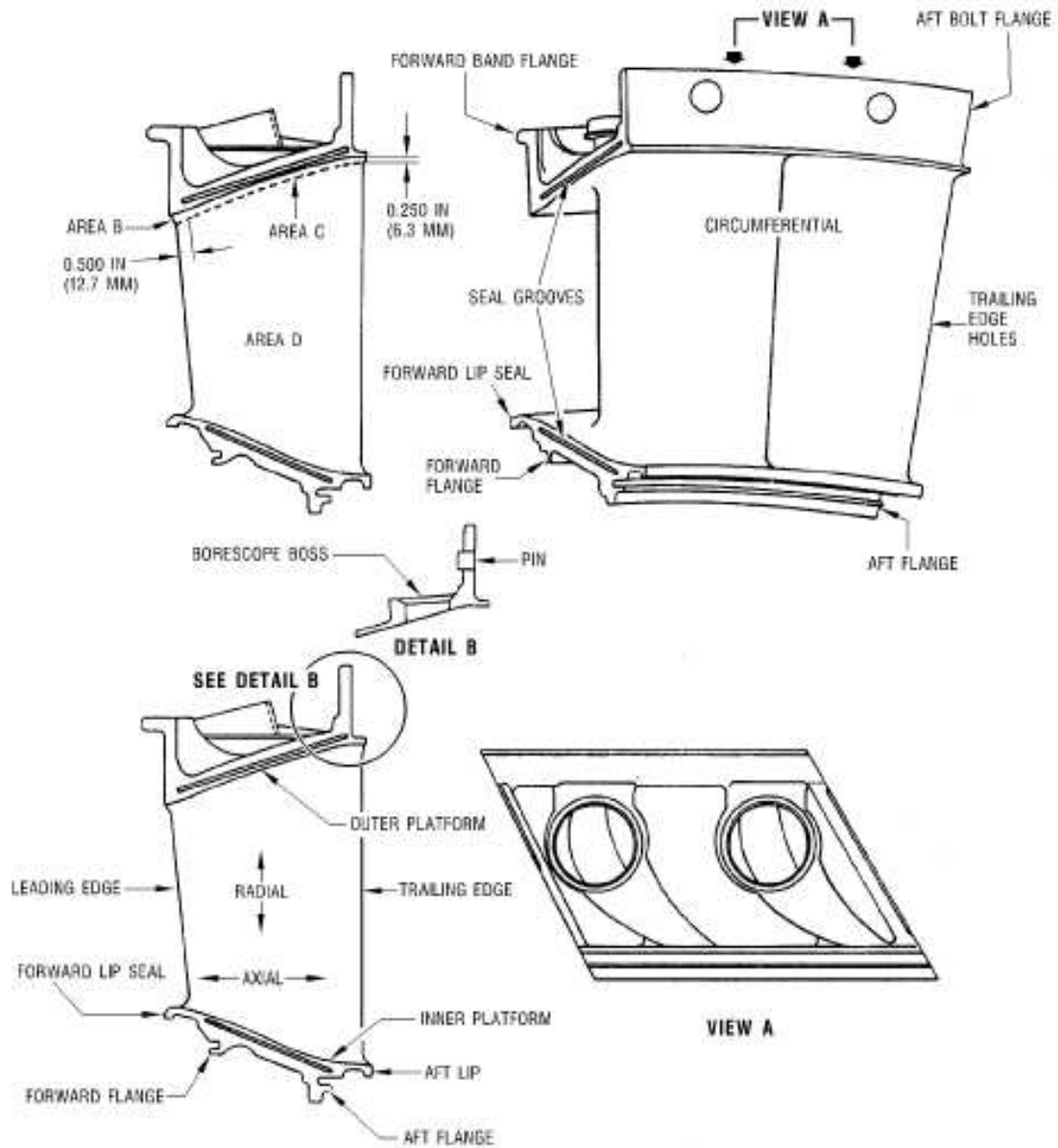
- |                           |                             |   |
|---------------------------|-----------------------------|---|
| 1. IGV BORESCOPE PORT     | 8. STAGE 6 BORESCOPE PORT   | 15. STAGE 13 BORESCOPE PORT                                     |
| 2. STAGE 0 BORESCOPE PORT | 9. STAGE 7 BORESCOPE PORT   | 16. STAGE 14 BORESCOPE PORT                                     |
| 3. STAGE 1 BORESCOPE PORT | 10. STAGE 8 BORESCOPE PORT  | 17. STAGE 15 BORESCOPE PORT                                     |
| 4. STAGE 2 BORESCOPE PORT | 11. STAGE 9 BORESCOPE PORT  | 18. CRF BORESCOPE PORTS   |
| 5. STAGE 3 BORESCOPE PORT | 12. STAGE 10 BORESCOPE PORT | 19. HPT STAGE 1 BORESCOPE PORT                                  |
| 6. STAGE 4 BORESCOPE PORT | 13. STAGE 11 BORESCOPE PORT | 20. HPT STAGE 2 BORESCOPE PORT                                  |
| 7. STAGE 5 BORESCOPE PORT | 14. STAGE 12 BORESCOPE PORT | 21. TMF BORESCOPE PORTS (THERMOCOUPLE AND PRESSURE PROBE PORTS) |

### HPT Stage 1 Nozzle

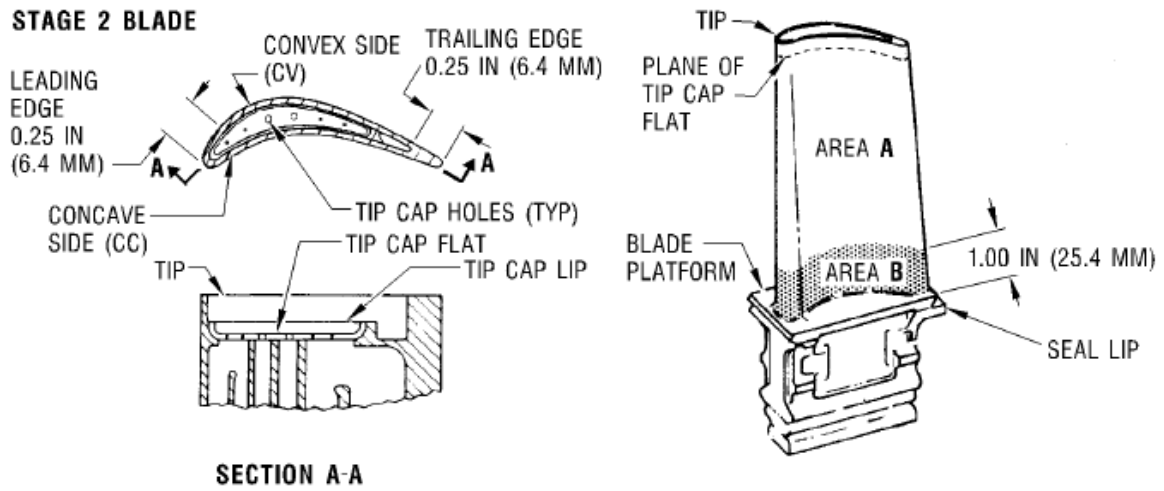








HPT Stage 2 Nozzle



## HPT Stage 2 Rotor Blades