

General Electric LM2500 Gas Turbine

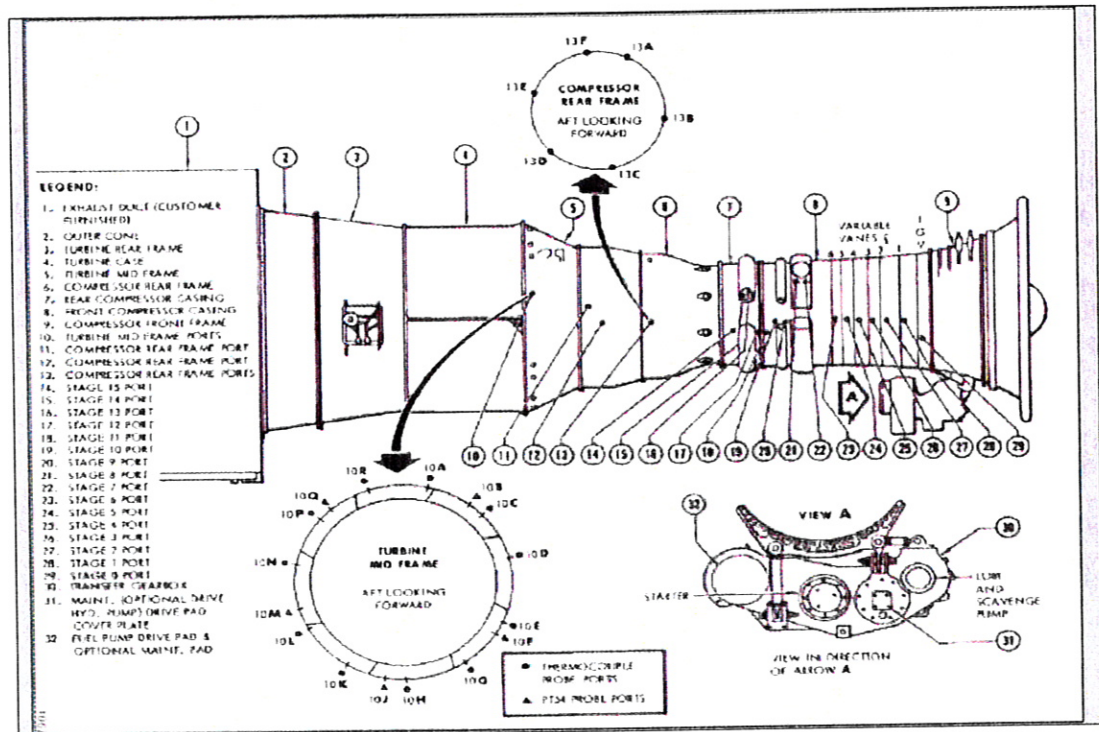
LM2500 SAC Borescope Inspection UNIT TM42

CUST – DOWANS

ENGINE SERIAL NUMBER:
481-757

TCT SALES ORDER NUMBER:
UK9000087

LM2500 SAC BORESCOPE REPORT	
Location:	Dar ES Salaam, Tanzania
Purchase order:	TBC, W/O UK80000157
Date of visit:	13-18 May 2008
Purpose:	Borescope inspection in accordance with GEK 97310, Vol. 1, Table 5-4 to Table 5-11
Purpose:	Lube and Scavenge Pump Inlet Screens Inspection and Cleaning in accordance with GEK 97310, Vol. 1, Table 5-3.18
Written by:	Mark Devine
Engine hours:	1281.28
Starts:	N/K
Fuel type:	Dual
Overview:	Engine is acceptable for further operation.



BORESCOPE ACCESS PORT LOCATIONS.

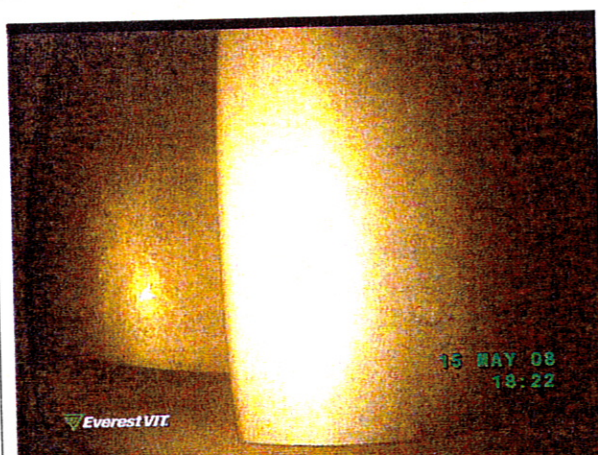
Volume 1, Tbl 5-4 – Tbl 5-11	LM2500 SAC Borescope inspection
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COMPRESSOR:

Component	Condition
Stages 1 through 9 Blades	<ul style="list-style-type: none"> Stage 3 blades, no damage found. Stage 4 blades, no damage found. Stage 9 blades, no damage found. Acceptable in accordance with GEK 97310 Vol. 1 table 5-4.

Stages 10 through 16 Blades	<ul style="list-style-type: none"> • Stage 10 blades, no damage found. • Stage 15 blades, no damage found. • Stage 16 blades, no defects found. • Acceptable in accordance with GEK 97310 Vol. 1 table 5-4.
Tip clanging contact stages 3-6	<ul style="list-style-type: none"> • No defects found. • Acceptable.
Stator Vanes (all)	<ul style="list-style-type: none"> • No defects found. • Acceptable.
All VSV Vanes	<ul style="list-style-type: none"> • No defects found. • Acceptable.
HPC Rotor and Stator Airflow Path Surfaces	<ul style="list-style-type: none"> • Normal levels of dirt/corrosion present. • Acceptable.

Reference Photographs - HPC Blades and Vanes



Stg 10 blade condition.



Stg 16 blade condition.

Inspection References: GEK 97310 Vol. 1, Table 5-4 Compressor Blades and Vanes, paragraph 5-3.6 and figures 5-8, 5-9 and 5-10.

COMBUSTOR and FUEL NOZZLES:

Component	Condition
All Combustor Surfaces	<ul style="list-style-type: none"> General condition good.
Dome Band/Dome Plate	<ul style="list-style-type: none"> Very minor thermal barrier coating loss/degradation-acceptable
Riveted Joints	<ul style="list-style-type: none"> No defects found
Trumpet and swirler cups	<ul style="list-style-type: none"> Very minor thermal barrier coating loss/degradation-acceptable.
Dome Assembly	<ul style="list-style-type: none"> No defects found
Igniter Ferrule	<ul style="list-style-type: none"> No defects found
Combustor Cowl	<ul style="list-style-type: none"> No defects found
Inner and Outer Liner	<ul style="list-style-type: none"> No defects found
Fuel nozzle	<ul style="list-style-type: none"> 3 fuel nozzles were removed from engine for inspection. #10 pos S/N PHCHN973, #11 pos S/N PHCHN846, #21 pos S/N PHCHN846. Condition satisfactory

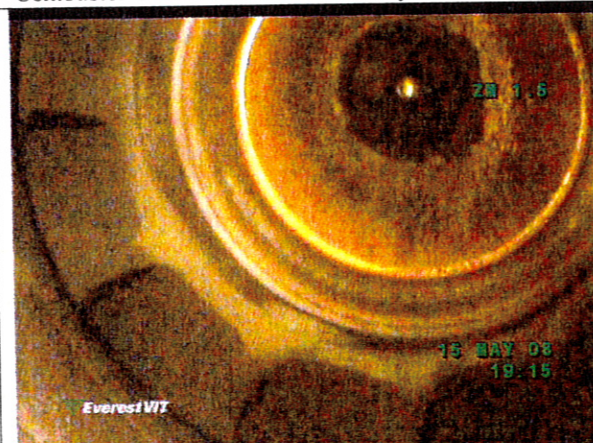
Reference Photographs – Combustor, Pre-mixers



Combustor TBC condition satisfactory.



Swirler/nozzle condition.

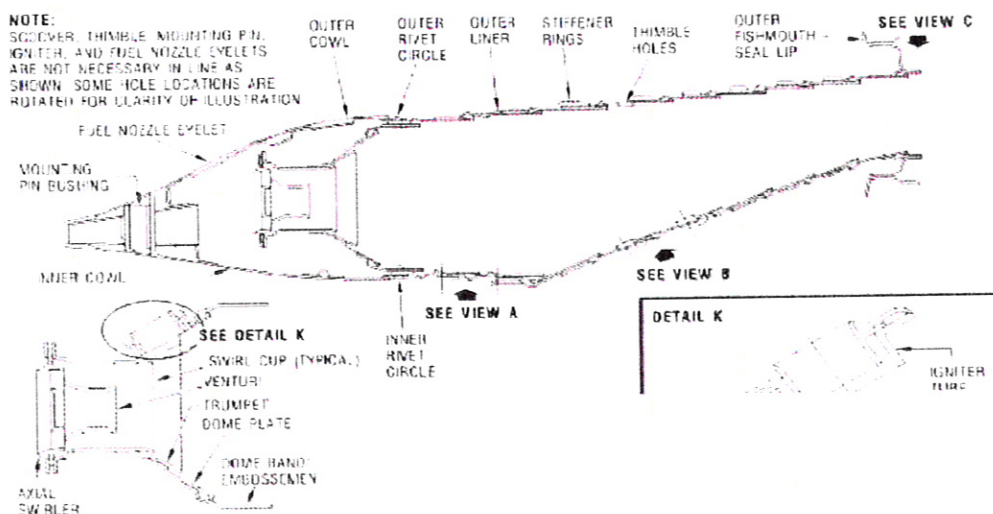
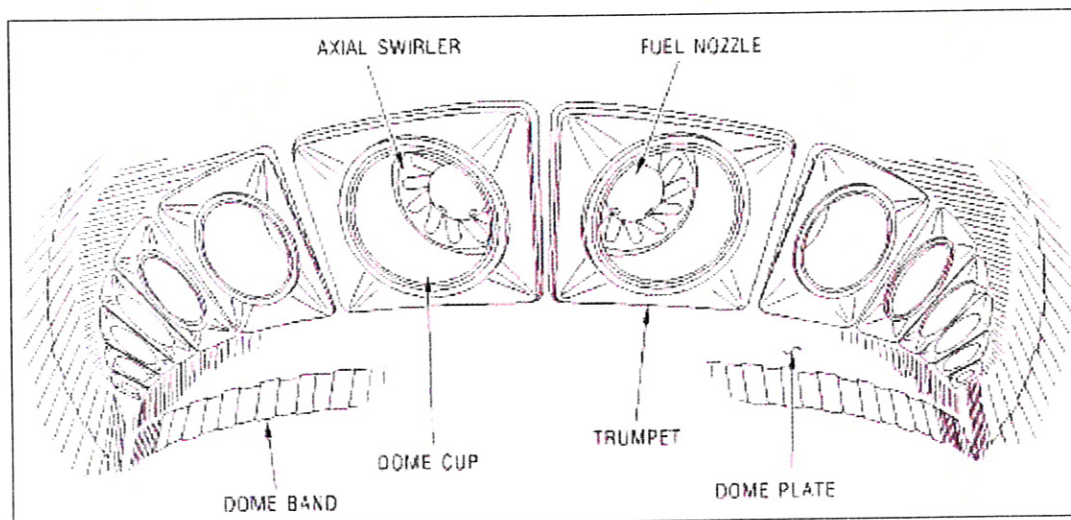


Swirler/nozzle condition.



Fuel nozzle condition.

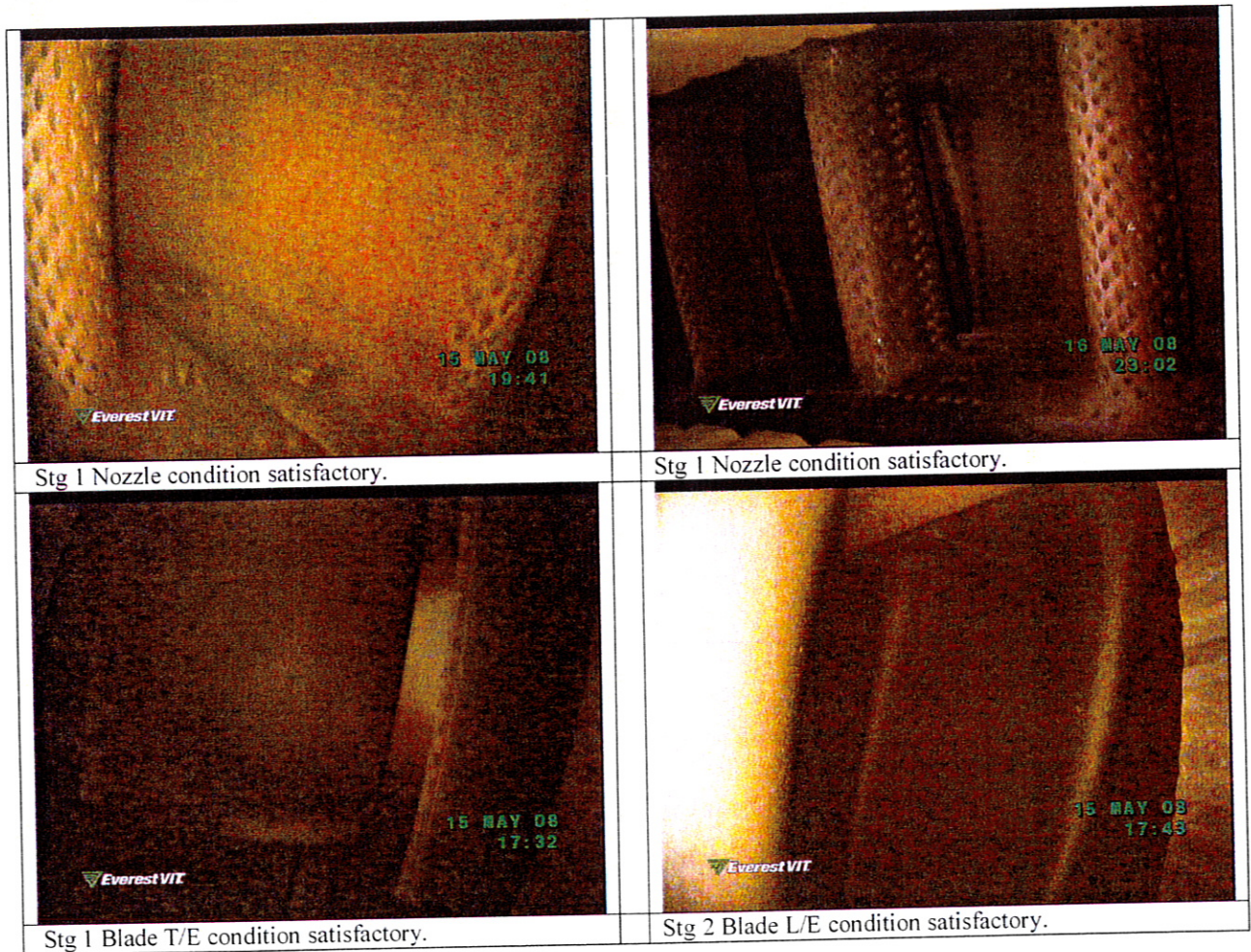
GEK 937310 Inspection References:



HPT ASSEMBLY:

Component	Condition		
HPT Stage 1 Nozzle Assembly	Defect	Location	Findings/GEK limits
	Nozzle airfoil		
	N/A	N/A	No defects found in areas inspected
	Inner and Outer Platform		
	N/A	N/A	No defects found in areas inspected
	General remarks		Condition satisfactory for continued use.
HPT Rotor Blade-Stage 1	Defect	Location	Findings/GEK limits
	HPT Rotor Blades-Leading Edge Area A		
	N/A	N/A	No defects found
	HPT Rotor Blades-Leading Edge Area B		
	N/A	N/A	No defects found
	HPT Rotor Blade Tips		
	N/A	N/A	No defects found
	HPT Rotor Blade-Trailing Edge Area A		
	N/A	N/A	No defects found
	HPT Rotor Blade-Trailing Edge Area B		
	N/A	N/A	No defects found
	HPT Rotor Blade-Concave Surface Area A		
HPT Stages 1 and 2 Nozzle Shroud	N/A	N/A	No defects found
	General remarks		Condition satisfactory for continued use
	Defect	Location	Findings/GEK limits
	N/A	N/A	No defects found in areas inspected
HPT Stage 2 Nozzle Assembly	General remarks		Condition satisfactory for continued use
	Defect	Location	Findings/GEK limits
	N/A	N/A	No defects found in areas inspected
	General remarks		Condition satisfactory for continued use
HPT Rotor Blade-Stage 2	Defect	Location	Findings/GEK limits
	HPT Rotor Blades-Leading Edge Area A		
	N/A	N/A	No defects found
	HPT Rotor Blades-Leading Edge Area B		
	N/A	N/A	No defects found
	HPT Rotor Blade Tips		
	N/A	N/A	No defects found
	HPT Rotor Blade-Trailing Edge Area A		
	N/A	N/A	No defects found
	HPT Rotor Blade-Trailing Edge Area B		
	N/A	N/A	No defects found
	HPT Rotor Blade-Concave Surface Area A		
HPT Stage 2 Nozzle Shroud	N/A	N/A	No defects found
	General remarks		Condition satisfactory for continued use.
	Defect	Location	Findings/GEK limits
	N/A	N/A	No defects found in areas inspected
	General remarks		Condition satisfactory for continued use

Reference Photographs – HPT assembly

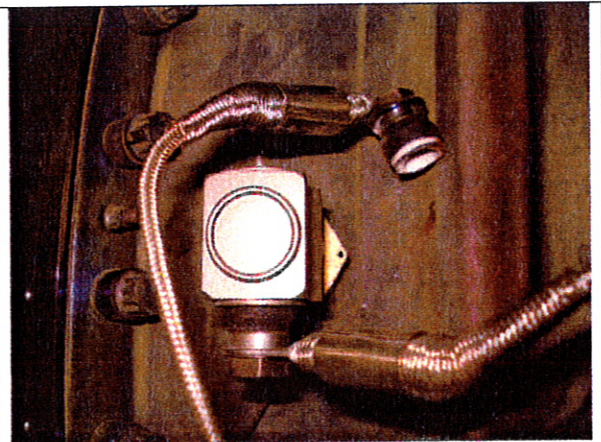


PACKAGE INSPECTION RECORD:

Component	Condition
Lube and Scavenge Pump Inlet Screens Inspection.	<ul style="list-style-type: none"> B sump screen, minor contamination not metallic. AGB screen, minor contamination x 1 metallic shard. Acceptable
Gas Turbine External Inspection.	<ul style="list-style-type: none"> Stud loose x 2 on power turbine stator case. Unable to tighten without risk of damage/shearing stud. Monitor for continued security, acceptable for continued use. Thermocouple found U/S at position 10R. PT54 probe port plug found U/S at position 10M.



U/S PT54 probe port plug.



U/S thermocouple.

Recommendations	Borescope inspection
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- Engine condition satisfactory for continued use
- Replace U/S plug, P/N 9103M46P01, Ref GEK50336 Fig 51 item 5 (quote to follow)
- Dowans to replace U/S thermocouple with own stock.
- Lubricate the loose LPTS locks in hopes to tighten in situ, if not find suitable application to retain assembly to minimize case damage.
- Customer has reported a higher heat rate/low power compared to the other units. The following steps are recommended
 - Inlet inspection
 - Inspection of filtration system (to include differential pressure reading and ensure instrumentation is calibrated) – Air inlet temperature (TE-1482) is high
 - Perform device inspection and calibration as required
 - Inspect for on engine pipe leaks
 - Perform VSV system inspection checks in accordance GEK 97310 Vol. 2 WP118 00 and WP 206 00 – recommend full system (VIGV – HP6)
 - Compare Customer trend data – has this issue increased since installation?

Questions to be answered by customer

- Last time all devices have been calibrated
- Last time fuel metering valve was inspected calibrated
- Has there been a gradual increase to heat rate?

Parts used during outage:

Parts used			
Part #	Component Description	Source	Issued
C10-218	SAFETY-CABLE W/FERRULE	NEW	25
4058T39P01	GASKET	NEW	3
M83248/1-121	PREFORMED PACKING	NEW	1
J221P910	PREFORMED PACKING	NEW	2
J221P912	PREFORMED PACKING	NEW	3
J221P905	PREFORMED PACKING	NEW	5