

GE Frame 7FA Turbine

This five-day course begins with a review of gas turbine theory. Next, the major components of the GE Frame 7FA turbine are described before reviewing the air inlet/filtration system, compressor, combustion system, turbine section, support systems, operations and controls, operator commands, control system, and protection system. Finally, we review common turbine failures and how to troubleshoot various turbine problems

I. Gas Turbine Theory

II. General Characteristics

- Basic Gas Turbine Cycle
- Comparison to Four-Cycle Engine
- Simple Open-Cycle Gas-Turbine Engine
- Actual Simple Open-Cycle Performance
- Gas Path

III. Major Components

- Air Inlet System
- Compressor
- Combustion Section
- Turbine
- Exhaust System
- Support Systems
- Base and Supports

IV. Air Inlet and Filtration System

- Inlet Compartment
- Inlet Ducting And Silencing

V. Compressor Section

- Rotor
- Stator
- Blading

VI. Combustion System

- Outer Combustion Chambers and Flow Sleeves
- Crossfire Tubes
- Fuel Nozzle End Covers
- Cap and Liner Assemblies
- DLN 2.6 Gas Fuel System Differences
- Spark Plugs
- Ultraviolet Flame Detectors

VII. Turbine Section

- Turbine Rotor
- Cooling
- Turbine Stator
- Bearings
- Load Coupling

VIII. Support Systems

- Cooling and Sealing Air System
- Inlet Bleed Heat System
- DLN-2.6 Gas Fuel Control System
- Liquid Fuel System
- Water Injection System
- Atomizing Air System
- Purge Air and Control System
- Lube Oil System
- Combined Hydraulic and Lift Oil System
- Seal Oil System
- Hydrogen and CO2 Gas Control System

- Fire Protection System
- Cooling Water System
- Water Wash System
- Ventillationand Heating System
- Hazardous Gas Detection System

IX. Generator

- Basic Theory of Operation
- Construction of AC Generators
- Major Generator Parts
- Starting System
- Generator System
- Generator Ventilation

X. Plant Operations and Controls

- Operating Procedures
- Turbine Control Panel (TCP)
- Definition of Terms
- Generator Control Panel (Typical)
- Motor Control Center
- Supervisory Remote Equipment
- Annunciator System

XI. Gas Turbine Operator Commands

- Operating Mode Commands
- Cooldown Cycle Commands
- Gas Turbine Unit Commands
- Gas Turbine Load Commands
- Governor Commands
- Fuel Commands

XII. Control System

- Startup/Shutdown Sequence and Control
- Startup Control
- Speed Control
- Acceleration Control
- Temperature Control

XIII. Protection Systems

- Trip Oil
- Overspeed Protection

- Overtemperature Protection
- Flame Detection and Protection System
- Vibration Protection
- Combustion Monitoring

XIV. Common Turbine Failures

- Turbine Blade Distress (Erosion/ Corrosion/Impact Damage)
- Compressor Fouling
- Combustor Distress and Plugged Fuel Nozzles
- Foreign/Domestic Object Damage
- Worn Air/Oil Seals
- Fuel Control Problems

XV. Compressor Troubleshooting

- Maintenance Checklist
- Check Mechanical Operating Data
- Compressor Inspect

XVI. Gas Turbine Maintenance

- Borescope Inspections
- Maintenance Inspections
- Combustion Inspection
- Hot Gas Path Inspection
- Major Inspection