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# Gas Turbine Start-Up, Shutdown and Field Operation Training Course

17 – 21 January 2027
Amman

# Gas Turbine Start-Up, Shutdown and Field Operation Training Course

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Gas Turbine Start-Up, Shutdown and Field Operation is a 1-week training course for operators and for mechanical and maintenance engineers who run gas turbines, and it ends with an operating and inspection checklist for one machine. Much hot section damage traces back to how a unit is sequenced, loaded and watched, so disciplined operation protects availability and parts life. This course is delivered by Jupiter Prime Training.

## Why Gas Turbine Start-Up, Shutdown and Field Operation Matters Now

Three pressures shape turbine operation today. Compression and power generation trains on oil and gas sites now cycle more often and every extra start consumes hot section life. Experienced operators are retiring, leaving crews less familiar with abnormal starts. Fuel gas quality also varies more, affecting flame stability and emissions. Sites that sequence well extend inspection intervals and avoid hung starts; sites that do not face trips, flameouts and costly repairs. The course rests on manufacturer operating manuals and accepted turbomachinery practice, described in general terms.

## Who Gains Most from Gas Turbine Start-Up, Shutdown and Field Operation

- Control room operators who initiate starts, load changes and normal stops
- Field operators who walk the package, enclosure and auxiliaries each shift
- Mechanical engineers who set operating limits and approve restarts after trips
- Maintenance engineers who plan borescope checks and combustion inspections
- Shift supervisors who authorise unit release after maintenance

Operating crews gain most when board and field operators from the same turbine package attend with the engineer who signs off restarts.

## Gas Turbine Start-Up, Shutdown and Field Operation Capabilities

Participants tie every step of a start or stop to what the rotor, combustor and blades experience at that moment.

- Apply purge, crank, light-off and acceleration checks — shift crews releasing a start
- Assess exhaust temperature spread and wheel space readings — combustion health decisions
- Test trip and alarm responses against the protection logic — restart authorisation
- Calculate corrected output and heat rate trends — maintenance planners and asset owners
- Specify field round checks for lube oil, filters and enclosure — daily reliability
- Build an operating and inspection checklist — site operations and maintenance leads

## Key Gas Turbine Start-Up, Shutdown and Field Operation Terms

- Brayton cycle — the compression, combustion and expansion sequence on which every gas turbine runs.
- Purge cycle — airflow through the gas path before ignition to clear unburnt fuel and prevent an explosion.
- Hung start — a start in which the rotor stops accelerating below self-sustaining speed while exhaust temperature climbs.
- Exhaust temperature spread — the difference between the hottest and coldest exhaust thermocouples, a sign of combustor or fuel nozzle faults.
- Cooldown and turning gear — slow rotation after shutdown that keeps the hot rotor from bowing.
- Equivalent operating hours — a count that weighs starts and trips against running time to schedule inspections.

## Gas Turbine Start-Up, Shutdown and Field Operation Day by Day

### Day 1: Cycle, Components and Duty

- Brayton Cycle and Ambient Effects — Why Output Falls on Hot Days
- Compressor, Combustor and Turbine Sections — Where Operating Damage Starts
- Mechanical Drive Versus Generator Duty — Different Start and Load Profiles
- Lube Oil, Fuel Gas and Air Intake Auxiliaries — Readiness Before Every Start
- Package Enclosure and Ventilation — Fire, Gas and Personnel Safety

### Day 2: Start-Up and Shutdown Sequences

- Permissives and Pre-Start Walkdown — Release or Hold of the Start
- Purge, Crank and Light-Off Steps — Avoiding Failed Ignition and Explosions
- Acceleration and Self-Sustaining Speed — Recognising Hung and Hot Starts
- Loading Ramps and Thermal Soak — Hot Section Life Consumption
- Normal Stop, Cooldown and Turning Gear — Rotor Bow Prevention

### Day 3: Control, Protection and Combustion

- Speed, Temperature and Fuel Control Loops — Stable Response to Load Swings
- Overspeed, Vibration and Flame Detection Trips — Restart After a Shutdown
- Exhaust Thermocouple Spread Reading — Combustor and Nozzle Fault Signals
- Low-Emission Combustion and Fuel Gas Quality — Flame Stability Limits
- Alarm Rationalisation for Turbine Packages — Operator Response Priorities

### Day 4: Performance and Inspection-Based Maintenance

- Corrected Output and Heat Rate Trending — Compressor Washing Decisions
- Inlet Filter Differential Pressure — Filter Change Timing and Output Loss
- Hot Section Borescope Inspection — Coating Loss, Cracks and Burn Marks
- Equivalent Operating Hours and Start Counting — Inspection Interval Setting
- Combustion and Major Inspection Scopes — Spares and Outage Readiness

## Day 5: Practising the Operating and Inspection Checklist

- Pre-Start Readiness Section — Applying Day 1 Auxiliary Checks
- Start and Stop Hold Points — Applying Day 2 Sequence Limits
- Trip Response and Restart Section — Applying Day 3 Protection Logic
- Field Round and Borescope Section — Applying Day 4 Inspection Triggers
- Operating and Inspection Checklist — Sign-Off Route for One Machine

## Applying Gas Turbine Start-Up, Shutdown and Field Operation After the Course

- Walk the next planned start with the crew using the new hold points.
- Trend exhaust temperature spread for a month and request a borescope check if it widens.

## Gas Turbine Start-Up, Shutdown and Field Operation Questions FAQ

### What is gas turbine start-up, shutdown and field operation, and why does it matter now?

It is the disciplined sequencing, loading, stopping and daily watching of a gas turbine. It matters now because units cycle more often and crews are less experienced, so every start must protect hot section life.

### Which roles gain most from gas turbine start-up, shutdown and field operation training?

Board and field operators gain most, along with mechanical and maintenance engineers who approve restarts and plan inspections, whether on compressor stations, offshore platforms or site power plants.

### How does a gas turbine start-up, shutdown and field operation course differ from a turbomachinery overhaul course?

It centres on how the machine is run each shift rather than on dismantling and rebuilding it. Repair and rebuild techniques belong to a maintenance-led course.

### What do you bring back from gas turbine start-up, shutdown and field operation training?

You bring back a checklist for one machine covering readiness, start and stop hold points, trip response and field inspection triggers.

## Gas Turbine Start-Up, Shutdown and Field Operation: The Way Forward

The operating and inspection checklist first informs whether the next start may proceed. Shift supervisors, operators and maintenance engineers use it to share one set of hold points and triggers. After its first use, revisit the checklist after any trip or inspection finding, because each event shows which step deserves a tighter limit.