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COURSE BROCHURE

# Cooling Tower Operation and Fault Troubleshooting Training Course

15 – 19 March 2027
Singapore

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Registered in the United Kingdom and Saudi Arabia

# Cooling Tower Operation and Fault Troubleshooting Training Course

**Ref:** 1451_53969 **Date:** 15 – 19 March 2027 **Location:** Singapore **Fees:** 9300 GBP

Cooling Tower Operation and Fault Troubleshooting is a 1-week training course for operators and technicians who run induced and forced draught towers, built around a cooling tower fault-finding guide that links each symptom on the control room screen or at the fan deck to its likely causes and corrective actions. When a tower drifts off its design cold water temperature, process units, chillers and turbine condensers feel it within hours. Jupiter Prime Training runs this cooling tower operation and fault troubleshooting course.

## Why Cooling Tower Operation and Fault Troubleshooting Matters Now

Operating crews face three pressures at once: hotter wet-bulb conditions that leave little thermal margin, leaner shift teams who must diagnose faults without a specialist on call, and process owners who expect stable condenser and exchanger inlet temperatures around the clock. Crews that read symptoms correctly restore duty quickly and avoid needless cell shutdowns; crews that guess replace healthy parts and miss the real cause. The course draws on EN 13306 maintenance terminology for failure modes and fault states, and on ISO 55001 thinking about how operating decisions protect asset value.

## Who Gains Most from Cooling Tower Operation and Fault Troubleshooting

- Shift operators who start, stop and balance tower cells against process heat load
- Field technicians who carry out rounds on fans, motors, gearboxes and basins
- Instrument technicians who maintain temperature, level, flow and vibration signals
- Water treatment technicians who respond to scaling, foaming and fouling alarms
- Senior operators who sign off fault reports and hand over between shifts

A shift crew gains most when operators and field technicians from the same rotation attend together and adopt one shared symptom-to-cause language.

## Cooling Tower Operation and Fault Troubleshooting Capabilities

Participants move from reacting to a high cold water alarm to tracing it through airflow, water loading and heat load in a disciplined sequence.

- Calculate approach, range and heat load from field readings — informing the shift decision to add or drop a cell
- Test airflow and water distribution for bypass, dry spots and recirculation — guiding corrective work requests
- Apply a symptom-to-cause fault tree to high cold water temperature — supporting the senior operator on duty
- Assess fan vibration, gearbox noise and motor current trends — informing whether to keep a fan running
- Specify the response to scaling, foaming, algae and basin water loss — protecting process heat exchangers
- Communicate fault findings in a clear shift handover entry — serving the next crew and planners

## Key Cooling Tower Operation and Fault Troubleshooting Terms

- Wet-bulb temperature — the lowest temperature water can reach by evaporation in the prevailing air, setting the limit for tower cooling.
- Recirculation — warm, moist exhaust air drawn back into the tower inlet, raising the effective wet-bulb and cold water temperature.
- Liquid-to-gas ratio — the mass flow of water divided by the mass flow of air through the tower.
- Dry spot — an area of fill receiving little or no water, letting air bypass without cooling anything.
- Fan pitch — the blade angle setting that determines airflow and motor load at a given speed.
- Basin makeup — water added to replace losses from evaporation, drift, leaks and blowdown.

## Cooling Tower Operation and Fault Troubleshooting Day by Day

## Day 1: Tower Operating Envelope

- Psychrometrics and Wet-Bulb Readings — Judging Achievable Cold Water Temperature
- Approach, Range and Heat Load Calculations — Deciding How Many Cells to Run
- Induced and Forced Draught Tower Layouts — Locating Typical Failure Points
- EN 13306 Failure and Fault States — Recording Symptoms Consistently
- Start-Up, Shutdown and Cell Isolation Sequences — Protecting Fans and Pumps

## Day 2: Airflow and Water Distribution Faults

- Fan Pitch, Speed and Motor Current Checks — Restoring Design Airflow
- Recirculation and Interference Diagnosis — Changing Cell Operating Patterns
- Spray Nozzle and Distribution Basin Blockage — Clearing Uneven Water Loading
- Dry Spot and Channelling Detection in Fill — Requesting Fill Cleaning
- Louvre and Windwall Condition Checks — Reducing Splash-Out and Icing

## Day 3: Mechanical and Vibration Faults

- Fan Vibration Signatures and Trip Settings — Deciding to Run or Stop
- Gearbox Oil Level, Temperature and Noise Checks — Escalating Gear Damage
- Drive Shaft Alignment and Coupling Wear — Preventing Repeat Shaft Failures
- Circulating Water Pump Cavitation Symptoms — Correcting Basin Level and Suction
- Motor Insulation and Overcurrent Alarms — Coordinating with Electrical Technicians

## Day 4: Water Side Upsets and Losses

- Scaling and Fouling Indicators at Exchangers — Triggering Treatment Adjustments
- Foaming, Algae and Slime Responses — Selecting Immediate Operator Actions
- Water Balance of Evaporation, Drift and Blowdown — Locating Unexplained Losses
- Basin Level Control and Makeup Valve Faults — Avoiding Pump Trips
- Conductivity and pH Alarm Response — Escalating to Treatment Specialists

## Day 5: Practising the Cooling Tower Fault-Finding Guide

- High Cold Water Temperature Case Using the Fault Tree — Isolating Root Cause
- Fan Trip Scenario with Vibration and Gearbox Data — Choosing Restart Conditions
- Basin Water Loss Case Using the Water Balance — Confirming Leak Location
- Shift Handover Entries for Each Scenario — Testing Clarity with Peers
- Cooling Tower Fault-Finding Guide — Completing the Symptom, Cause and Action Table

## Applying Cooling Tower Operation and Fault Troubleshooting After the Course

- Lead a field round that records approach, range, fan current and basin level for every cell, and compare the results with design values.
- Run a short drill with the shift crew on the high cold water temperature fault tree, using last month's alarm log as the scenario.

## Cooling Tower Operation and Fault Troubleshooting Questions FAQ

### What is cooling tower operation and fault troubleshooting and why does it matter now?

It is the skill of running towers to their thermal duty and tracing abnormal symptoms to their causes. Hotter conditions and leaner shifts mean crews must diagnose faults quickly to keep process temperatures stable.

### Which roles gain most from cooling tower operation and fault troubleshooting training?

Shift operators, field and instrument technicians, water treatment technicians and senior operators gain most. You benefit if you respond to tower alarms or carry out tower rounds.

## How does cooling tower operation and fault troubleshooting differ from a cooling tower asset management course?

It works at the fan deck and control room: reading symptoms, running cells and fixing faults during a shift. An asset management course sets inspection intervals, treatment regimes and renewal budgets over the tower's life.

## What do you bring back from cooling tower operation and fault troubleshooting training?

You bring back a cooling tower fault-finding guide covering thermal, airflow, mechanical and water side symptoms, with causes, checks and actions your crew can use on the next shift.

## Cooling Tower Operation and Fault Troubleshooting: The Way Forward

The cooling tower fault-finding guide first informs how the shift responds to the next high cold water temperature alarm. Operators, field technicians and senior operators use it during rounds and handovers. After its first real fault, revisit the guide to add the symptoms and causes the crew actually met, so it reflects the towers on site.