

Cooling Tower Performance, Maintenance and Troubleshooting Training Course

5 – 9 April 2027
Singapore

AGILE LEADERS
Training Center

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Ref: 1812_236012 **Date:** 5 – 9 April 2027 **Location:** Singapore **Fees:** 6500 Euro

Overview

Cooling Tower Performance, Maintenance and Troubleshooting Training Course is a one-week advanced course for cooling-tower engineers, maintenance teams, utility operators, reliability professionals, water-treatment specialists, and facilities engineers who leave with a Cooling Tower Reliability Decision Pack. The course connects cooling tower thermal performance, airflow and water distribution, mechanical condition monitoring, cooling tower water treatment, fault diagnosis, seasonal operation, and lifecycle maintenance. Agile Leaders Training Center delivers this course on cooling tower performance and reliability.

Who Should Attend

- Teams responsible for cooling-tower operation, heat rejection, and performance records
- Functions responsible for fans, gearboxes, motors, pumps, basins, and mechanical reliability
- Teams responsible for circulating-water chemistry, blowdown, makeup, and biological control
- Functions responsible for inspection, vibration evidence, fault diagnosis, and work planning
- Teams responsible for seasonal readiness, contractor control, safety interfaces, and lifecycle decisions

The course assumes participants already work with cooling-water systems, operating trends, inspection records, or maintenance plans and leaves out introductory refrigeration cycles, chiller selection, chemical-handling authorization, and live intrusive work.

Departments and Industries

The course supports cooling-tower decisions across process plants, utilities, and large water-cooled facilities.

- Mechanical maintenance, reliability, utilities, and condition monitoring
- Water treatment, chemistry, environmental operations, and industrial hygiene
- Power generation, petrochemical, refining, manufacturing, and district cooling
- Commercial property, healthcare, hospitality, data centers, and institutional facilities
- Engineering services, specialist contractors, technical assurance, and asset management

Learning Objectives

By the end of this course, participants will be able to:

- Analyze cooling-tower heat and mass transfer performance.
- Diagnose airflow, water-distribution, and thermal faults.
- Evaluate fan, drive, pump, fill, basin, and structural condition.
- Apply water-management controls for scale, corrosion, and biofouling.
- Build a risk-based maintenance and troubleshooting plan.
- Prioritize restoration, replacement, and lifecycle actions.

Course Agenda

Day 1: Establish Tower Performance

- Open-Circuit, Closed-Circuit, Crossflow, Counterflow, and Draft Configuration Map
- Heat Load, Water Flow, Airflow, Wet-Bulb, Range, and Approach Data Sheet
- Thermal Performance Baseline, Measurement Quality, and Operating Context Register
- Evaporation, Drift, Blowdown, Makeup, and Water-Balance Calculation Method
- Performance Deviation, Capacity Loss, Energy Effect, and Escalation Matrix

Day 2: Inspect Mechanical and Structural Systems

- Fan Blade, Hub, Pitch, Gearbox, Coupling, Motor, and Drive Inspection Checklist
- Vibration, Temperature, Lubrication, Current, Noise, and Alignment Trend Sheet
- Pump, Strainer, Valve, Piping, Basin, Level Control, and Leak Condition Record
- Fill, Louver, Drift Eliminator, Nozzle, Header, and Distribution Inspection Grid
- FRP, Timber, Concrete, Steel, Fastener, Access, and Support Condition Matrix

Day 3: Control Water and Fouling

- Makeup Quality, Conductivity, Cycles of Concentration, and Blowdown Control Chart
- Scale, Corrosion, Deposition, Sediment, and Material Compatibility Risk Map
- Biofouling, Algae, Slime, Aerosol, Cleaning, and Biological-Control Plan
- Chemical Feed, Side-Stream Filtration, Sampling, Monitoring, and Response Log
- Water-System Hazard, Control Measure, Verification, and Contingency Register

Day 4: Diagnose Faults and Plan Maintenance

- High Approach, Low Range, Capacity Loss, and Unstable Temperature Fault Tree
- Uneven Distribution, Clogged Nozzle, Damaged Fill, Recirculation, and Drift Diagnosis
- Fan Imbalance, Gearbox Distress, Motor Overload, Pump Cavitation, and Vibration Matrix
- Preventive Task, Condition Trigger, Work Scope, Spare, Resource, and Outage Plan
- Clean, Repair, Restore, Replace, Lay Up, or Return-to-Service Decision Gate

Day 5: Practice Cooling Tower Decisions

- Exercise: Build the Tower Configuration, Water Balance, and Performance Baseline
- Exercise: Assess Fan, Drive, Pump, Fill, Distribution, and Structural Evidence
- Exercise: Diagnose Scale, Corrosion, Biofouling, Drift, and Water-Control Symptoms
- Exercise: Prioritize Faults, Maintenance Scope, Seasonal Readiness, and Acceptance Checks
- Capstone Exercise: Build the Cooling Tower Reliability Decision Pack

Practical Exercises

The course uses suggested activities to connect operating evidence with controlled maintenance decisions.

- Suggested activity: calculate range, approach, water balance, cycles of concentration, and performance deviation.
- Suggested activity: review vibration, temperature, current, lubrication, water-quality, and inspection trends.
- Suggested activity: trace thermal, mechanical, distribution, scaling, corrosion, and biological fault paths.
- Suggested activity: develop a seasonal maintenance scope with controls, resources, spares, contingencies, and acceptance evidence.

FAQs

Who should attend cooling tower performance, maintenance and troubleshooting training?

Cooling tower training suits experienced operations, mechanical, reliability, water-treatment, utilities, and facilities teams and assumes familiarity with cooling-water systems, operating readings, inspection evidence, or maintenance plans.

How does cooling tower training differ from general HVAC maintenance training?

Cooling tower training focuses on evaporative heat rejection, range and approach, airflow, water distribution, fans, drives, fill, drift, water chemistry, biofouling, and tower-specific lifecycle decisions, while general HVAC maintenance addresses wider building systems.

How is cooling tower thermal performance evaluated?

Cooling tower thermal performance is evaluated by confirming measurement quality and operating context, then comparing heat load, water flow, wet-bulb temperature, range, approach, airflow, water distribution, and baseline behavior.

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What causes a cooling tower to lose capacity?

Cooling tower capacity loss can result from reduced airflow, recirculation, uneven water distribution, clogged nozzles, fouled or damaged fill, fan or drive problems, incorrect flow, scaling, biofouling, or changed ambient and load conditions.

How does cooling tower water treatment affect maintenance?

Cooling tower water treatment affects maintenance by controlling concentration, scale, corrosion, deposits, and biological growth while supporting clean heat-transfer surfaces, reliable distribution, planned cleaning, and traceable operating limits.

Conclusion

Participants take back a Cooling Tower Reliability Decision Pack. The pack connects configuration, thermal performance, water balance, mechanical and structural condition, chemistry, fouling, fault paths, seasonal readiness, maintenance scope, and acceptance evidence. It changes separate tower readings and inspection findings into a traceable basis for troubleshooting and lifecycle action.