

Course No. 2036

Steam Turbines for Oil & Gas & Petrochemical Industries – API 611 & API 612 Training Course

MECHANICAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Steam Turbines for Oil & Gas & Petrochemical Industries – API 611 & API 612 Training Course provides a specialized technical framework for the selection, specification, design considerations, inspection, operation, maintenance, and reliability of steam turbines used in oil and gas and petrochemical facilities. The programme focuses on the technical requirements and engineering practices associated with API 611 and API 612 and their application to industrial steam turbine installations.

Participants will examine steam turbine configurations, major components, performance requirements, mechanical design considerations, steam conditions, rotors, blades, casings, bearings, seals, couplings, governors, lubrication systems, and auxiliary equipment. The course highlights the differences between general-purpose and special-purpose steam turbine applications and the engineering considerations involved in specifying and evaluating equipment for critical process services.

Particular emphasis is placed on API 611 and API 612 requirements, including equipment design, materials, mechanical integrity, rotor dynamics, vibration considerations, lubrication systems, sealing arrangements, controls, inspection, testing, documentation, and vendor requirements. Participants will develop the ability to review technical specifications and evaluate turbine packages against project and operational requirements.

The programme also addresses common operating and maintenance challenges in refinery and petrochemical environments, including vibration, misalignment, bearing problems, seal leakage, thermal expansion, steam path degradation, overspeed protection, lubrication problems, and performance deterioration. Practical case studies and engineering exercises enable participants to apply API-based principles to equipment selection, inspection, troubleshooting, maintenance, and reliability improvement.

Objectives

- By the end of this training course, participants will be able to:
- Analyze the operating principles and applications of industrial steam turbines.
- Explain the scope and technical intent of API 611 and API 612.

- Distinguish between general-purpose and special-purpose steam turbine applications.
- Evaluate major steam turbine components and their engineering requirements.
- Assess turbine performance requirements for oil and gas and petrochemical services.
- Evaluate rotor, blade, casing, bearing, seal, and coupling requirements.
- Analyze turbine mechanical design and reliability considerations.
- Assess lubrication, sealing, control, and auxiliary systems.
- Interpret relevant API requirements for turbine specification and procurement.
- Evaluate vendor technical documentation and equipment specifications.
- Assess inspection, testing, and quality assurance requirements.
- Identify common turbine operating and maintenance problems.
- Diagnose vibration, bearing, sealing, alignment, and thermal problems.
- Apply API-based principles to maintenance and reliability management.
- Evaluate turbine performance, condition, and lifecycle requirements.
- Develop an integrated strategy for steam turbine specification, operation, maintenance, and reliability.

Who Should Attend

This course is designed for mechanical engineers, rotating equipment engineers, reliability engineers, maintenance engineers, project engineers, equipment engineers, and technical specialists involved in steam turbine systems within oil and gas and petrochemical facilities.

It is also suitable for engineering managers, maintenance managers, inspection engineers, procurement and contracts professionals, project managers, operations engineers, commissioning personnel, quality professionals, and technical personnel responsible for specifying, purchasing, inspecting, commissioning, operating, or maintaining industrial steam turbines.

The programme is particularly relevant to professionals working in oil and gas production, refineries, petrochemical plants, gas processing facilities, LNG facilities, power generation, chemical processing, and other process industries using industrial steam turbines.

Learning Outcomes

- Upon completion of the course, participants will be able to:
- Explain the principles and applications of industrial steam turbines.
- Identify the key technical requirements associated with API 611 and API 612.
- Differentiate general-purpose and special-purpose turbine applications.
- Evaluate turbine configurations and major component designs.
- Assess rotor, blade, casing, bearing, seal, and coupling requirements.
- Review turbine performance and operating requirements.
- Evaluate steam conditions and their effect on turbine performance.
- Assess lubrication, sealing, control, and auxiliary systems.
- Review technical specifications and vendor documentation.
- Evaluate inspection, testing, quality control, and commissioning requirements.
- Identify common mechanical and operational turbine failure mechanisms.
- Diagnose vibration, alignment, bearing, sealing, and thermal expansion problems.
- Apply appropriate maintenance and reliability practices to industrial steam turbines.
- Assess equipment condition and performance using operational and inspection data.
- Identify opportunities for reliability and lifecycle improvement.
- Prepare a comprehensive API-based steam turbine engineering, maintenance, and reliability framework.

Course Outline

DAY 01

Industrial Steam Turbines and API 611 & API 612 Fundamentals

- Industrial steam turbine operating principles
- Steam turbine configurations and applications
- General-purpose and special-purpose steam turbines
- Applications in oil and gas and petrochemical facilities
- Overview of API 611 and API 612
- Scope, terminology, and technical requirements

DAY 01 — CONTINUED

- Steam turbine operating conditions
- Main turbine components and auxiliary systems
- Equipment selection and service requirements

PRACTICAL APPLICATION

Reviewing a steam turbine application and determining applicable engineering requirements

DAY 02

Mechanical Design, Components and Reliability Requirements

- Turbine casings and pressure-containing components
- Rotors and rotor dynamics
- Blades and steam path components
- Bearings and bearing arrangements
- Mechanical and labyrinth sealing systems
- Couplings and shaft connections
- Lubrication and control oil systems
- Governors and control systems
- Overspeed protection and emergency shutdown systems

PRACTICAL APPLICATION

Evaluating the mechanical design of an industrial steam turbine package

DAY 03

Specification, Procurement, Inspection and Testing

- Developing steam turbine technical specifications
- API-based equipment datasheets
- Material and mechanical requirements
- Vendor technical proposals and evaluation
- Procurement and technical clarification

DAY 03 — CONTINUED

- Inspection and quality assurance requirements
- Factory acceptance testing
- Mechanical and performance testing
- Documentation and certification requirements

PRACTICAL APPLICATION

Technical evaluation of a steam turbine vendor package

DAY 04

Operation, Maintenance and Troubleshooting

- Steam turbine operating requirements
- Startup, shutdown, and normal operating practices
- Vibration monitoring and rotor condition
- Bearing temperature and lubrication monitoring
- Shaft alignment and thermal expansion
- Seal leakage and steam path problems
- Blade erosion, corrosion, deposits, and performance deterioration
- Overspeed and control system problems
- Systematic troubleshooting of turbine failures

PRACTICAL APPLICATION

Diagnosing a steam turbine reliability problem in a process facility

DAY 05

Reliability Management, Inspection and Lifecycle Performance

- Preventive and predictive maintenance strategies
- Turbine inspection and overhaul planning
- Root cause analysis of recurring turbine failures
- Reliability and availability improvement

DAY 05 — CONTINUED

- Performance monitoring and efficiency evaluation
- Spare parts and critical component management
- Maintenance cost and lifecycle considerations
- API-based reliability and quality management
- Technical reporting and continuous improvement
- Final Integrated Workshop: Developing an API 611 & API 612-based Steam Turbine Specification, Maintenance & Reliability Strategy for an Oil & Gas or Petrochemical Facility

Register or Request More Information

Course page: <https://quest-training.com/courses/steam-turbines-for-oil-gas-petrochemical-industries-api-611-api-612-training-course>

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