Instrumentation Quality Control and Inspection Techniques

Online -

14-06-2026

Instrumentation Quality Control and Inspection Techniques

Course code: PQ414 From: 14-06-2026 Venue: Online - Course Fees: 1400 £

Introduction

Industrial instrumentation systems are essential for the safe, reliable, and efficient operation of modern industrial facilities. The quality of instrumentation installations, testing, calibration, and control systems directly affects plant performance, safety, and regulatory compliance.

This course provides participants with a practical understanding of quality control and inspection activities associated with instrumentation systems throughout project execution and commissioning phases. It covers inspection requirements for field instruments, cabling and tubing installations, control systems, safety systems, calibration activities, testing procedures, and quality documentation. Participants will also gain knowledge of industry standards, best practices, and quality assurance techniques used to ensure compliance and operational reliability.

By the end of the course, participants will be equipped with the knowledge required to perform effective instrumentation inspection activities, verify compliance with project specifications and standards, and contribute to the successful delivery of industrial projects.

Course Objective

Upon completion of this course, participants will be able to:

- Understand the principles of instrumentation quality control and inspection.
- Apply quality assurance and quality control practices to instrumentation projects.
- Inspect instrumentation installations, cabling, tubing, and associated systems.
- Verify calibration, testing, and commissioning activities.
- Inspect control systems, emergency shutdown systems (ESD), and fire and gas systems.
- Review pressure relief valve (PRV/PSV/PZV) inspection and testing requirements.
- Interpret inspection documentation and quality records.
- Ensure compliance with project specifications, industry standards, and best practices.

Target Audience

- Instrumentation Quality Control Inspectors
- QCI Assistant Instrument Personnel
- Instrument Technicians and Supervisors
- QA/QC Engineers and Inspectors
- Commissioning and Start-up Engineers
- Maintenance Engineers and Technicians
- Project Engineers involved in Instrumentation Works
- Construction and Installation Supervisors
- Technical Personnel working in Oil & Gas, Petrochemical, Power Generation, Manufacturing, and Process Industries

Course Outline

Day 1
Instrumentation Quality Control Fundamentals

- Introduction to Industrial Instrumentation Systems
- Types of Field Instruments and Applications
- QA/QC Principles and Responsibilities
- Inspection and Test Plans (ITPs)
- Quality Documentation and Traceability
- Applicable Codes, Standards, and Specifications

Day 2
Instrumentation Installation Inspection

- Instrument Installation Requirements
- Inspection of Pressure, Temperature, Flow, and Level Instruments
- Raceway Systems for Cabling and Tubing
- Impulse and Hydraulic Tubing Installation Requirements
- Tubing Leak Testing and Flushing Activities
- Material Verification and Inspection Reporting

Day 3
Calibration and Testing

- Calibration Fundamentals and Standards
- Calibration of Pressure, Temperature, Flow, and Level Instruments
- Calibration Documentation and Traceability
- Functional Testing Requirements
- Quality Control of Calibration Activities

Day 4
Control and Safety Systems Inspection

- Instrument Wiring and Cabling Inspection
- Junction Boxes, Grounding, and Terminations
- Loop Checking and Signal Verification
- Control Valve Inspection and Testing
- Emergency Shutdown Systems (ESD)
- Fire and Gas Detection Systems
- Pressure Relief Valves (PRVs/PSVs/PZVs) Receiving, Testing, and Installation Requirements

Day 5
Commissioning, Auditing, and Quality Improvement

- Pre-Commissioning and Commissioning Activities
- Documentation Verification and System Handover
- Non-Conformance Reporting and Corrective Actions
- Instrumentation Quality Auditing
- Reliability and Performance Assessment
- Troubleshooting Common Instrumentation Issues
- Best Practices and Emerging Trends in Instrumentation Quality Management