Pipe Fabrication Quality Control and Inspection

21 March – 1 April 2027
Cairo (Egypt)

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Pipe Fabrication Quality Control and Inspection

Ref: 15831_329724 **Date:** 21 March – 1 April 2027 **Location:** Cairo (Egypt) **Fees:** 6500 Euro

Pipe Fabrication Quality Control and Inspection for Industrial Plants is a 2-week course for inspectors, QC engineers and supervisors who accept or reject piping spools in the shop and on site. You work through material checks, fit-up and weld examination, NDT, pressure testing and turnover records, and leave with a Piping Inspection and Test Plan for your own project. Mercury Training Center delivers this pipe fabrication quality control course.

About This Course

Spools reach site with wrong material, poor fit-up or missing records, and defects surface only at hydrotest or start-up. You should already read isometric drawings and work around welding or erection crews. You practice on isometrics, mill certificates, weld maps, radiographs and test packs taken from water, power, petrochemical and building projects.

Who It Is For

- Accepting or rejecting spools, welds and supports at shop and site hold points.
- Preparing and approving inspection and test plans, weld maps and quality records for piping packages.
- Supervising fitters and welders and answering for the quality of their output.
- Witnessing pressure tests, flushing and reinstatement before handover to operations.
- Auditing fabrication subcontractors on behalf of an owner or main contractor.

This course is not for readers new to piping, who are better served by an introductory course on piping materials and drawings, or for welders seeking hands-on welding skill, who need a practical welding course.

Competencies You Will Build

- Material Traceability: matching heat numbers, mill certificates and markings to every spool.
- Dimensional Checking: verifying spool length, orientation, flange alignment and tolerances against the isometric.
- Weld Examination: inspecting fit-up, preheat and finished welds against code acceptance criteria.
- NDT Selection: choosing visual, radiographic, ultrasonic, penetrant or magnetic particle methods and extent.
- Test Witnessing: preparing and accepting hydrostatic, pneumatic and leak tests.
- Record Control: assembling test packs that let a reviewer trace each weld.

What You Will Be Able to Do

By the end of the course you will be able to:

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- Given an isometric and a line list, build a weld map with joint numbers, welders and NDT extent.
- From a mill certificate and a material requisition, accept or reject a delivery and record the reason.
- Using radiographic and ultrasonic reports, classify indications and decide repair or acceptance.
- From a project specification, draft the inspection and test plan with hold and witness points.
- Given a completed test pack, check it for gaps before a hydrostatic test is released.
- Using a punch list, prioritize open items for mechanical completion and handover.

Course Content

Day 1: Piping Quality Basics Across Sectors

- Role of QA and QC in Water, Power, Petrochemical and Building Projects
- Choosing Between ASME B31.1 Power Piping and ASME B31.3 Process Piping
- Pipe Sizes, Schedules and Pressure Ratings Read from a Line List
- Carbon Steel, Stainless, Alloy and Plastic Piping Selection by Service
- Shop Versus Site Fabrication Planning and Its Effect on Quality

Day 2: Materials, Fittings and Traceability

- ASTM Material Specifications and Mill Certificate Review on Receipt
- Elbows, Tees, Reducers, Caps and Couplings to ASME B16.9 and B16.11
- Flanges, Gaskets and Valves Checked Against ASME B16.5
- Heat Number Transfer and Color Coding in the Fabrication Shop
- Positive Material Identification for Alloy Spools

Day 3: Drawings and Dimensional Control

- Isometric and Orthographic Drawing Symbols and Bill of Materials
- Spool Breakdown and Field Weld Allocation on an Isometric
- Dimensional Tolerances, Flange Face Alignment and Bolt Hole Orientation
- Routing Checks for Stress, Vibration and Thermal Expansion Allowances
- Pipe Support and Hanger Verification During Erection

Day 4: Cutting, Bending and Joint Preparation

- Cutting, Beveling and Bending Methods with Their Inspection Checks
- Threaded, Flanged, Grooved and Mechanical Joints and Where Each Fits
- Fit-Up Gap, Root Face and Hi-Lo Checks Before Welding
- Shop Tools, Cutters, Benders and Measuring Gauges for QC Staff
- Avoiding Distortion and Misalignment in Spool Assembly

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Day 5: Welding Control

- SMAW, GTAW and GMAW Processes for Piping Joints
- Welding Procedure Specifications and Welder Qualification to ASME Section IX
- Preheat, Interpass Temperature and Post-Weld Heat Treatment Records
- Welding Symbols and Weld Map Preparation
- Welder Performance Tracking and Repair Rate Monitoring

Day 6: Visual Examination and Weld Defects

- Visual Weld Examination with Gauges Against ASME B31.3 Acceptance Criteria
- Cracks, Porosity, Undercut, Lack of Fusion and Misalignment Identification
- Weld Quality Levels Under ISO 5817 for Non-Code Work
- Defect Root Cause and Repair Procedure Approval
- Nonconformance Reports and Corrective Action Closure

Day 7: Nondestructive Testing

- Radiographic Testing and Film or Digital Image Interpretation
- Ultrasonic and Phased Array Examination of Butt Welds
- Liquid Penetrant and Magnetic Particle Testing of Branch and Fillet Welds
- NDT Extent, Random Selection and Progressive Examination Rules
- NDT Personnel Qualification Under ASNT SNT-TC-1A

Day 8: Pressure Testing and Commissioning

- Hydrostatic, Pneumatic and Sensitive Leak Test Selection
- Test Pack Preparation, Test Limits and Blind and Vent Lists
- Flushing, Blowing and Cleanliness Acceptance Before Start-Up
- Reinstatement Checks and Bolt Tightening Records
- Commissioning Turnover of Large Industrial Piping Packages

Day 9: Records, Site Planning and Work Hazards

- Inspection and Test Plans with Hold, Witness and Review Points
- Quality Dossiers and Manufacturer Data Reports for Handover
- Erection Sequencing, Manpower and Site Logistics for Piping Crews
- Hot Work, Pressure Test and Confined Space Hazards and PPE
- Maintenance Considerations Built Into Routing and Access

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Day 10: Practice on a Live Piping Package

- Weld Map Exercise on a Cooling Water Isometric
- Radiograph Review Exercise on a Steam Line Weld Set
- Test Pack Audit Exercise Before a Hydrostatic Test
- Mechanical Completion Punch List Exercise
- Completing Your Piping Inspection and Test Plan

Case Studies and Exercises

The items below are suggested activities.

- Case study: a desalination plant spool fails hydrotest at a field weld; you trace the cause and decide repair and retest steps.
- Case study: a power station receives alloy spools with mixed-up heat numbers; you decide which to quarantine and how to verify them.
- Exercise: a petrochemical expansion project subcontractor submits incomplete test packs; you produce a gap list and release conditions.
- Exercise: a hospital building services contractor needs a plan for stainless steel water lines; you draft hold and witness points.

What You Take Back

The Piping Inspection and Test Plan sets out every check from receipt to handover for one piping package. In your first month back you use it to agree hold points with the contractor, brief inspectors and set up the weld and test records before the next spool arrives.

- A receiving and traceability checklist.
- A weld map template with NDT extent.
- Hold, witness and review points by activity.
- A test pack and handover checklist.

Quick Answers FAQ

What should I know before a pipe fabrication quality control course?

You should read isometric drawings and know basic piping components and welding terms. Experience in a shop, on site or in a quality role helps, since the exercises use real-style records rather than theory.

How does pipe fabrication quality control and inspection differ from a general piping fabrication course?

It is written for the people who accept the work, not those who build it. The focus is acceptance criteria, NDT, test packs and records across several sectors, rather than cutting, fitting and erection methods for one sector.

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What is a piping test pack and why does it matter?

A test pack is the set of isometrics, weld records, NDT reports and test limits for one pressure test boundary. It matters because a missing record can stop a test, delay handover or hide a weld that was never examined.

What do I take back from pipe fabrication quality control training?

You take back a Piping Inspection and Test Plan for one of your own packages, with receiving checks, a weld map template, hold and witness points and a test pack checklist ready for use with your contractor.

For Your Manager

After the course, the team member will be able to check spool material and dimensions, judge welds and NDT results against code criteria and accept pressure tests on firm records. They return with a Piping Inspection and Test Plan, first used to agree hold points with the fabrication contractor on the next piping package.

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