AMERICAN GLOBAL INSTITUTE
FOR PRIVATE TRAINING

External Training Course

Professional Inspection, Testing, and Maintenance of Piping, Flowlines, and Headers in the Oil & Gas Industry

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From 02 Jun. To 06 Jun. 2025
From 04 Aug. To 08 Aug. 2025
From 06 Oct. To 10 Oct. 2025
From 08 Dec. To 12 Dec. 2025

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External Training Course:

Professional Inspection, Testing, and Maintenance of Piping, Flowlines, and Headers in the Oil & Gas Industry

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Course Introduction:

Piping systems, flowlines, and headers are vital components in oil and gas operations, ensuring the safe and efficient transport of hydrocarbons. Their failure can lead to catastrophic consequences including safety hazards, environmental damage, and financial losses. This 5-day course is designed to equip engineers, inspectors, and maintenance personnel with in-depth knowledge and practical skills related to the inspection, testing, and preventive maintenance of these critical systems. Participants will gain familiarity with industry standards such as API 570, ASME B31.3, and API RP 574, and learn how to apply risk-based inspection techniques, assess integrity using non-destructive testing (NDT), and implement proactive maintenance strategies to extend equipment life and reduce unplanned downtime.

Course Overview:

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

- Understand the classification and functions of piping, flowlines, and headers in oil & gas facilities.
- Apply international codes and standards related to inspection and maintenance.
- Identify and evaluate common degradation mechanisms such as corrosion, erosion, and fatigue.
- Plan and execute inspection and testing programs using NDT methods.
- Implement preventive and predictive maintenance strategies.
- Interpret inspection reports and make recommendations for repair or replacement.

Course Features:

Real-world case studies and failure analysis.
Hands-on training with inspection tools (where applicable)
Course material aligned with API, ASME, and ISO standards
Certificate of Completion issued upon successful participation

Training Methodology:

This course uses a hands-on, learner-centered approach to ensure knowledge transfer and practical skill development:

- Lectures & Visual Presentations – Aligned with international standards and real-world applications.
- Group Discussions & Peer Learning – To encourage experience sharing from diverse field backgrounds.
- Real Case Studies – Analysis of real inspection failures and successes from oil & gas facilities.
- Interactive Workshops – Hands-on activities including inspection plan development and NDT result interpretation.
- Quizzes & Knowledge Checks – To reinforce learning and encourage retention.
- Participant Manual & Reference Materials – Provided digitally or in print.

Course Outline:

Day 1: Fundamentals of Piping, Flowlines, and Headers

- Classification and types of piping systems in upstream & downstream facilities.
- Function of flowlines, headers, manifolds, and interconnecting pipework.
- Common materials used and selection criteria (carbon steel, stainless, duplex).
- Overview of design standards: ASME B31.3, API 5L, API 6A.
- Overview of typical failure modes: fatigue, corrosion, erosion, creep, vibration.
- Documentation and drawings: P&IDs, isometric drawings, and line lists.

Day 2: Inspection Planning and Standards Compliance

- Introduction to inspection codes: API 570, API RP 574, ASME B31.3.
- Inspection intervals and classifications (visual, external, internal, on-stream).
- How to create a piping inspection plan.
- Understanding piping class ratings and pressure-temperature ratings.
- Wall thickness calculations and corrosion rate analysis.
- Compliance reporting, tagging, and tracking.

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Day 3: Non-Destructive Testing (NDT) and Condition Assessment

- Principles and applications of:
  - Visual Inspection (VT).
  - Ultrasonic Testing (UT) – thickness and flaw detection.
  - Magnetic Particle Testing (MT) – surface/subsurface crack detection.
  - Radiographic Testing (RT) – weld quality assessment.
  - Liquid Penetrant Testing (PT) – surface discontinuities.
  - Phased Array and TOFD – advanced weld inspection.
- Evaluation of test results and defect categorization.
- Acceptance criteria and case-based interpretation.
- NDT documentation and reporting.

Day 4: Maintenance Strategies and Integrity Assurance

- Integrity Management Framework for piping systems.
- Preventive vs Predictive vs Condition-Based Maintenance (CBM).
- Corrosion under insulation (CUI) and external corrosion mitigation.
- Flowline pigging and cleaning procedures.
- Use of corrosion inhibitors, chemical treatments.
- Leak testing methods: hydrostatic and pneumatic testing.
- Emergency repair techniques: clamps, composite wraps, hot taps.

Day 5: Practical Workshop, Troubleshooting, and Case Studies

- Practical review of inspection and maintenance records.
- Sample case studies: pipeline rupture, header weld failure, erosion breakthrough.
- Root cause analysis (RCA) techniques and failure investigation steps.
- Group exercise: develop a full inspection & maintenance plan for a given scenario.
- Open Q&A with instructor – field challenges and troubleshooting tips.
- Knowledge assessment and final wrap-up.