

Syllabus: Introduction to API 570 Piping Inspector (API).

Part 1: Course Overview.

Description:

This course will provide a comprehensive understanding of the design, inspection and maintenance of process piping based on API 570 standards. It aims to provide the oil, gas and petrochemical industries with the assurance that piping inspectors have been trained under this internationally recognized program to have the required knowledge and experience for inspection of in-service process piping.

This course is designed to meet over a period of 2 weeks, 5 meeting per week, 3 hours per lecture, and 2 hours per lab.

Prerequisites:

No Prerequisites.

Course Material:

All Student manuals, handouts, and textbooks will be provided which will become the property of the student.

Classroom hours:

Unless otherwise notified classes will be conducted from 16:00 - 19:30 daily.

Attendance:

Student will be required to attend 75% of the course to be eligible to complete the testing and advancement.

Certificate:

American Piping Inspector certificates will be issued upon successful completion of the course, written and practical exams,

and demonstration of the requisite practical experience. These will be issued by KIT according to AWS.

Part 2: Course Learning Outcomes.

General Objectives:

The Training provides participants with:

1. Knowledge of API publications and other international standards that include:
 - ASME B31.3 - Process Piping.
 - ASME B16.5 - Pipe Flanges and Flanged Fittings.
 - ASME Sect V - Nondestructive Examination.
 - API 570 - Piping Inspection Code.
 - API RP 571 - Damage Mechanisms Affecting Fixed Equipment in the Refinery Industry.
 - API RP 574 - Inspection Practices for Piping System Components.
 - API RP 577 -Welding Inspection & Metallurgy.
 - API RP 578 - Material Verification Program for New and Existing Alloy Piping.
2. Knowledge and expertise required for maintenance, rating, inspection, repair and alteration of in-service process piping system;
3. Information of API Individual Certification Program and API 570 Inspector certification process;
4. Practical tests simulating the API 570 ICP exam;
5. Competence and confidence to finally achieve API 570 ICP qualification.



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Part 3: Course Content.

- Introduction, Publications, Course Outline & Body of Knowledge.
- API 570, Piping Inspection Code.
 - Scope and Definitions.
 - Inspection, Examination and Pressure Testing Practices.
 - Frequency and Extent of Inspection.
 - Data Evaluation, Analysis and Recording.
 - Repair, Alterations and Rerating.
 - Inspection of Buried Piping.
- API RP 574, Inspection Practices for Piping System Components
 - Piping Components: Piping, Tubing, Valves, Fittings and Flanges.
 - Pipe Joining Methods.
 - Inspection Planning.
 - Inspection Procedures and Practices.
 - Determination of Minimum Required Thickness.
 - Recording.
- API RP 578 Material Verification Program for New and Existing Alloy Piping.
 - Scope and Definitions.
 - Extent of Verification – New Construction Existing.
 - Piping System and Maintenance Systems.
 - Test Methods.
 - Evaluation of Test Results.
 - Marking and Record Keeping.
- API RP 571, Damage Mechanisms (related to process piping, in general).
 - Erosion/Erosion-Corrosion.
 - Mechanical Fatigue.
 - Galvanic Corrosion.
 - Atmospheric Corrosion.
 - Corrosion under Insulation (CUI).
 - Boiler Water Condensate Corrosion.
 - Microbiologically Induced Corrosion (MIC).
 - Soil Corrosion.
 - Caustic Corrosion.
 - Sulfidation.
 - Chloride Stress Corrosion Cracking (Cl-SCC).
 - Caustic Stress Corrosion Cracking (Caustic Embrittlement).
 - Hydrochloric Acid (HCl) Corrosion.
 - Sour Water Corrosion (Acidic).
 - Amine Stress Corrosion Cracking.

- ASME V Nondestructive Examination.
 - Article 1, General Requirements.
 - Article 2, Radiographic Examination.
 - Article 6, Liquid Penetrant Examination.
 - Article 7, Magnetic Particle Examination.
 - Article 9, Visual Examination.
 - Article 10, Leak Testing.
 - Article 23, Section SE-797, Ultrasonic Standards.
- ASME IX Welding and Brazing Qualifications
 - Article 1, Welding General Requirements.
 - Article 2, Welding Procedure Qualifications.
 - Article 3, Welding Performance Qualifications.
 - Article 4, Welding Data.
- ASME B31.3 Process Piping.
 - Introduction to ASME, scope and definitions.
 - Design requirements and sample calculations.
 - Materials specifications and limitations.
 - Fabrication, assembly and erection requirements.
 - Inspection, examination and testing.
 - Test Methods for Establishing Pressure-Temperature Ratings.
- ASME B16.5 Pipe Flanges and Flanged Fittings.
 - Scope.
 - Pressure Temperature Ratings.
 - Markings, Materials and Dimensions.
- API RP 577, Welding Inspection and Metallurgy.
 - Definitions.
 - Welding Inspection, Processes and Procedure.
 - Materials.
 - Welder Qualifications.
 - Non-destructive Examination.
 - Metallurgy.
 - Refinery and Petrochemical Plant Welding Issues.

Part 4: Course Topics and Roadmap.

The following roadmap is recommended for instructors:

Days	Course Title	Lecture Topic		Duration (Hours)
1	API 570	<ul style="list-style-type: none"> • Introduction, Publications, Course Outline & Body of Knowledge • API 570, Piping Inspection Code 	Lecture	3
2		<ul style="list-style-type: none"> • Documents Governing Welding Inspection and Qualification 	Lecture	3
3		<ul style="list-style-type: none"> • API RP 574, Inspection Practices for Piping System Components 	Lecture	3
4		<ul style="list-style-type: none"> • API RP 578 Material Verification Program for New and Existing Alloy Piping 	Lecture	3
5		<ul style="list-style-type: none"> • ASME B31.3 Process Piping 	Lecture	3
6		<ul style="list-style-type: none"> • ASME B16.5 Pipe Flanges and Flanged fittings 	Lecture	3
7		<ul style="list-style-type: none"> • API RP 571, Damage Mechanisms (related to process piping, in general) 	Lecture	3
8		<ul style="list-style-type: none"> • ASME V Nondestructive Examination 	Lecture	3
9		<ul style="list-style-type: none"> • ASME IX Welding and Brazing Qualifications 	Lecture	3
10		<ul style="list-style-type: none"> • ASME IX Welding and Brazing Qualifications (Cont'd) 	Lecture	3
11		<ul style="list-style-type: none"> • API RP 577, Welding Inspection and Metallurgy 	Lecture	3
12				Exam
				Total
				34

Part 5: Grading and Assessment.

Graded Assignments:

Students will perform graded lab experiments on welded samples. Lab reports are submitted for grading. At the instructor's discretion, quizzes and tests may also be used.

Proposed Grading Schedule:

- Lab Reports (5) 50%.
- Final Exam (5) 50%.

Part 6: Notes to Program Administrators

Instructor Qualification

Most of our instructors have more than 5 years of experience in the international oil and gas (onshore and offshore), marine, shipbuilding and repair industries providing engineering consultancy, asset integrity, materials/corrosion expertise, welding and failure investigations.

Qualifying fields:

- Metallurgical Engineering
- Mechanical Engineering
- Mining & Petroleum Engineering
- Quality Assurance/Quality Control Technology
- Chemical & Materials Engineering



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