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COURSE BROCHURE

Process Equipment and Piping Integrity Inspection Training Course

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Registered in the United Kingdom and Saudi Arabia

Process Equipment and Piping Integrity Inspection Training Course

Process Equipment and Piping Integrity Inspection is a 1-week training course for mechanical, integrity and maintenance engineers who decide how pressure vessels, heat exchangers and process piping are examined, and it ends with a participant-built Integrity Inspection Plan for one unit. Ageing plant, longer run lengths and tighter shutdown windows make every inspection choice carry more consequence than before. Jupiter Prime Training delivers this course for engineers who own equipment condition decisions.

Why Process Equipment and Piping Integrity Inspection Matters Now

Three pressures shape this field today. Plants run longer between turnarounds, so degradation must be forecast rather than discovered. Experienced inspectors are retiring, leaving younger engineers to interpret wall-thickness trends and crack indications. Insurers and operations leaders also expect evidence that inspection effort follows risk. An organisation that handles this well avoids leaks, unplanned outages and wasted scaffolding; one that handles it badly finds thinning only after a release. The course rests on Risk-Based Inspection RBI, Fitness-for-Service FFS assessment and Integrity Operating Windows IOW, each applied to vessels, exchangers and piping circuits.

Who Gains Most from Process Equipment and Piping Integrity Inspection

- Engineers responsible for assigning damage mechanisms to vessels and piping circuits
- Engineers who set inspection intervals, techniques and coverage for shutdown scopes
- Specialists who interpret thickness readings, corrosion coupons and probe trends
- Engineers who decide whether flawed equipment can stay in service, be repaired or be replaced
- Maintenance planners who turn inspection findings into work orders and turnaround packages

Refinery, gas processing and petrochemical site teams gain most when an inspection engineer, a corrosion specialist and a maintenance planner attend together and leave with one shared view of equipment condition.

Process Equipment and Piping Integrity Inspection Capabilities

Participants move from naming how metal degrades to choosing where, how and when to look for it, and what to do with the result.

- Assess which damage mechanisms threaten each vessel, exchanger and piping circuit — corrosion loop definition
- Calculate corrosion rates and remaining life from thickness data — next inspection date
- Design a risk-ranked inspection scope with suitable techniques — turnaround budget holders
- Specify corrosion monitoring locations and limits — process operations supervisors
- Weigh run, repair or replace options with fitness-for-service logic — plant managers
- Communicate equipment condition and residual risk in plain terms — operations and maintenance leaders

Key Process Equipment and Piping Integrity Inspection Terms

- Damage Mechanism — a physical or chemical process, such as erosion, fatigue or sulphide cracking, that degrades equipment material over time.
- Corrosion Loop — a group of equipment and piping sharing the same material, process stream and expected damage mechanisms.
- Remaining Life — the time before measured wall thickness reaches the minimum required thickness at the current corrosion rate.
- Condition Monitoring Location — a fixed point on piping or a vessel where thickness is measured repeatedly to trend wall loss.
- Probability of Failure — the estimated likelihood that equipment loses containment, combining damage rate, inspection effectiveness and age.
- Fitness-for-Service — an engineering assessment showing whether equipment with a flaw or thinning can operate safely until the next inspection.

Process Equipment and Piping Integrity Inspection Day by Day

Day 1: Equipment Condition in Its Operating Context

- Asset Register Review — Which Vessels, Exchangers and Piping Matter Most
- Process Stream Characterisation — Linking Fluids and Temperatures to Degradation
- Corrosion Loop Mapping — Grouping Equipment by Shared Threats
- Materials of Construction Records — Spotting Gaps Before Inspection Planning
- Failure History Analysis — Lessons Drawn From Past Leaks and Ruptures

Day 2: Damage Mechanisms and Their Signatures

- General and Localised Corrosion — Selecting Thickness Survey Coverage
- Erosion and Flow-Accelerated Corrosion — Locating Elbows, Tees and Reducers at Risk
- Environmental Cracking Mechanisms — Choosing Crack Detection Over Thickness Checks
- High-Temperature Damage and Creep — Setting Limits for Furnace and Reactor Equipment
- Corrosion Under Insulation — Prioritising Insulation Removal and Access

Day 3: Inspection Techniques and Monitoring Methods

- Ultrasonic Thickness and Scanning Methods — Matching Technique to Expected Wall Loss
- Radiography and Phased Array Testing — Detecting Pitting and Weld Defects
- Corrosion Coupons and Electrical Resistance Probes — Trending Online Degradation
- Inspection Effectiveness Grading — Judging How Much Confidence Data Gives
- Heat Exchanger Tube Testing — Deciding Plugging, Retubing or Bundle Replacement

Day 4: Risk Ranking and Fitness-for-Service Decisions

- Risk-Based Inspection Matrix — Ranking Equipment by Probability and Consequence
- Remaining Life and Interval Calculation — Setting the Next Inspection Date
- Fitness-for-Service Levels — Choosing Run, Repair or Replace for Flawed Items
- Integrity Operating Window Limits — Alerting Operators Before Damage Accelerates
- Repair and Rerating Options — Weighing Sleeves, Clamps and Pressure Derating

Day 5: Practising the Integrity Inspection Plan

- Corrosion Loop Case Study — Applying Mechanism Screening to a Real Unit
- Thickness Data Exercise — Calculating Rates and Remaining Life From Readings
- Turnaround Scope Selection — Ranking Items for the Next Shutdown
- Findings Presentation — Reporting Condition and Residual Risk to Leaders
- Integrity Inspection Plan — Completing Intervals, Techniques and Monitoring Points

Applying Process Equipment and Piping Integrity Inspection After the Course

- Lead a corrosion loop review for one process unit, confirming damage mechanisms and condition monitoring locations with operations and maintenance staff.
- Recalculate remaining life for the ten highest-risk piping circuits from existing thickness records and adjust their inspection intervals.

Process Equipment and Piping Integrity Inspection Questions FAQ

What is process equipment and piping integrity inspection and why does it matter now?

It is the discipline of predicting how vessels, exchangers and piping degrade and planning inspection to catch it in time. Longer run lengths and an ageing asset base mean late detection now costs more in outages, repairs and safety exposure.

Which roles gain most from process equipment and piping integrity inspection training?

Inspection, corrosion and mechanical engineers gain most, together with maintenance planners who build shutdown scopes. Anyone who signs off inspection intervals or decides whether thinned equipment stays in service will use the methods directly.

How does process equipment and piping integrity inspection differ from a general process engineering course?

It focuses on the condition of metal rather than on process design or flanged joint assembly. You work with damage mechanisms, thickness data, risk ranking and fitness-for-service decisions instead of flowsheets, sizing or bolting procedures.

What do you bring back from process equipment and piping integrity inspection training?

You bring back a working inspection plan for one unit, with corrosion loops, techniques, intervals and monitoring points. You also gain a repeatable method for calculating remaining life and explaining residual risk to plant leaders.

Process Equipment and Piping Integrity Inspection: The Way Forward

The Integrity Inspection Plan first informs which items enter the next turnaround scope and which can safely wait. Inspection engineers, maintenance planners and operations supervisors use it to align access, techniques and monitoring. After its first use, revisit the corrosion rate assumptions against new readings, because measured data often shifts the ranking of piping circuits more than expected.