Safety Valve Maintenance: PSV Overhaul, Test Bench Setting and Recertification

1 – 5 February 2027
London - Central London four-star



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Introduction:

Safety valve maintenance decides whether a pressure safety valve lifts at its set pressure and reseats tightly, yet many workshops still pop valves on uncalibrated benches, lap seats by feel, skip the as-found pop and send units back with incomplete tags. This Core Concept course takes technicians, engineers and inspectors through PSV construction, safe removal, strip-down, seat and disc reconditioning, spring checks, set-pressure and seat tightness testing on the test bench, and recertification records, drawing on API 576 and API 527. Participants produce a PSV Maintenance and Test Procedure with a record sheet for a case valve.

Course Objectives:

- Identify conventional spring-loaded, balanced bellows and pilot-operated PSV components and explain how each opens, lifts and reseats
- Plan safe isolation, depressurising, removal and transport of a PSV and choose between in-situ and bench testing
- Strip, clean and inspect nozzles, discs, guides, springs and bellows and recondition seating faces by lapping or machining
- Carry out as-found and as-left set-pressure tests using cold differential test pressure corrections on a calibrated test bench
- Perform seat tightness, back-pressure and bellows integrity tests and judge results against API 527 acceptance criteria
- Set inspection and test intervals from as-found results and service history, and complete recertification tags, seals and records

Target Audience:

- Valve workshop technicians who dismantle, recondition, reassemble and pop test relief devices
- Mechanical and static equipment engineers responsible for relief device registers and repair scopes
- Inspection staff who witness bench tests, review as-found data and approve valves for return to service
- Maintenance planners who schedule PSV removals, spare valves and turnaround test campaigns
- Operations staff who isolate, depressurise and hand over relief valves for maintenance

Course Outline:

Day 1: PSV Construction, Terminology and the Workshop Current State

- Conventional Spring-Loaded, Balanced Bellows and Pilot-Operated PSV Construction
- Nozzle, Disc Holder, Guide, Spring, Adjusting Ring and Cap Component Functions
- Set Pressure, Overpressure, Accumulation, Simmer and Blowdown Definitions
- Cold Differential Test Pressure and Back-Pressure Correction Factors
- PSV Register, Nameplate Data and Workshop Capability Review

Day 2: API 576 Inspection Practice, API 527 Tightness Criteria and Removal Planning

- API 576 Inspection and Repair Scope for Pressure-Relieving Devices
- API 527 Seat Tightness Methods and Bubble Count Acceptance Tables
- ASME Section I and Section VIII Set Pressure Tolerance and Lift Requirements
- Permit, Isolation Valve Locking and Depressurising Before PSV Removal
- In-Situ Lift Assist Testing Versus Workshop Bench Testing Selection

Day 3: Strip-Down, Parts Inspection, Seat Lapping and Reassembly

- Pre-Pop As-Found Test and Visual Condition Photography on Receipt
- Strip-Down Sequence, Part Tagging and Cleaning Methods
- Disc and Nozzle Seat Inspection With Flatness Checks and Optical Flats
- Lapping Plates, Lapping Compounds and Seat Machining Limits
- Spring Free Length, Squareness and Load Checks and Reassembly Torque

Day 4: Test Bench Operation, Special Tests and Common PSV Failures

- Gas and Liquid Test Bench Set-Up, Gauges, Accumulators and Calibration Records
- Set-Pressure Pop Test, Blowdown Ring Adjustment and Repeatability Checks
- Back-Pressure Test on Bellows Valves and Bellows Leak Integrity Check
- Pilot Valve Function Test, Field Test Connector and Dome Pressure Check
- Chatter, Simmer, Seat Erosion, Corrosion, Galling and Spring Relaxation Diagnosis

Day 5: Case Valve Walkthrough: PSV Maintenance and Test Procedure

- Case Valve Inspection Walkthrough From As-Found Data to Repair Scope
- Risk-Based Test Interval Setting From As-Found Pop History
- Recertification Tag, Lead Seal and Cap Lockwire Application Steps
- As-Found and As-Left Record Sheet Build With Defect Codes
- PSV Maintenance and Test Procedure Presentation and Peer Challenge

Skills You Will Gain:

- PSV Component Identification
- Relief Valve Removal Planning
- Seat Lapping Technique
- Spring Condition Assessment
- Test Bench Operation
- Seat Leak Rate Measurement
- Test Interval Adjustment
- Relief Device Recordkeeping

Why Attend This Course:

- Return with a PSV Maintenance and Test Procedure and record sheet built on a case valve
- Stop returning valves to service on an unrecorded as-left pop by linking every repair step to a test result
- Explain to planners and inspectors why a test interval should be shortened or extended, using as-found evidence
- Compare workshop practice with technicians and inspectors from refining, gas processing, petrochemicals and power

Conclusion:

A pressure safety valve is only trusted when its workshop history shows how it was found, what was repaired and how it tested before release. The course moves from PSV construction and test terminology, through API 576 and API 527 practice and safe removal, to strip-down, lapping, spring checks and reassembly, then to bench operation, special tests and failure diagnosis. The final day applies this to a case valve and produces a PSV Maintenance and Test Procedure with an as-found and as-left record sheet.