Industrial Valves: Isolation Valve Selection, Pressure Testing and Maintenance

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Amsterdam - Zuidas business district hotel



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Introduction:

Industrial valves isolate pipelines, pump stations and process units, yet many sites buy gate, ball and check valves from incomplete datasheets, receive them without proper shell and seat test records, store them unprotected and discover passing seats only when an isolation fails. This Core Concept course gives engineers a practical method to choose valve type, pressure class, end connection and seat and trim materials, specify testing to API 598 and API 6D, and plan installation, preservation and repair. Participants produce a Valve Selection Datasheet and Maintenance Strategy for a case pipeline and plant unit.

Course Objectives:

- Select gate, globe, ball, plug, butterfly, check and double block and bleed valves to suit isolation duty, fluid, pressure and piggability
- Specify pressure class, end connection and body, trim and seat materials using ASME B16.34 ratings and sour service material requirements
- Choose manual, gear, pneumatic, hydraulic or electric operation and define emergency shutdown valve duties for isolation points
- Apply pipeline block valve spacing principles to locate mainline, station and branch isolation valves
- Define factory acceptance and field hydrostatic and pneumatic test requirements with seat leakage acceptance criteria under API 598 and API 6D
- Plan valve installation, preservation, sealant injection, repair and failure troubleshooting within a maintenance strategy

Target Audience:

- Mechanical and piping engineers who write valve datasheets and review vendor offers for projects and modifications
- Pipeline engineers who lay out mainline block valves, station isolation and pig trap valving
- Maintenance engineers who plan valve servicing, overhaul and repair during shutdowns
- Operations engineers who isolate equipment, verify tight shut-off and report passing valves
- Materials and corrosion engineers who approve body, trim and seat materials for corrosive and sour fluids
- Inspection and quality engineers who witness valve pressure tests and review test certificates

Course Outline:

Day 1: Isolation Valve Functions, Families and Plant Duties

- Valve Function Map: Isolation, Non-Return, Diversion and Double Isolation Duties
- Gate Valve Construction: Wedge, Parallel Slide, Rising and Non-Rising Stem Designs
- Globe, Plug and Butterfly Valve Construction and Duty Limits
- Floating Ball Versus Trunnion-Mounted Ball Valve Arrangements
- Swing, Lift, Dual-Plate and Piston Check Valve Behaviour and Slam Risk

Day 2: Valve Design Standards, Pressure Classes and Materials

- API 6D Scope for Pipeline and Piping Valves: Full Bore, Piggability and Double Block and Bleed
- API 600 Bolted Bonnet Steel Gate Valve Requirements and Trim Numbers
- ASME B16.34 Pressure-Temperature Ratings, Class 150 to 4500 and End Connections
- Body, Stem and Trim Material Selection for Carbon, Stainless and Sour Service
- Soft Seat Polymers Versus Metal Seats: PTFE, PEEK, PCTFE and Hard-Faced Seats

Day 3: Valve Specification, Actuation and Pipeline Isolation Layout

- Valve Datasheet Build: Service Conditions, Bore, Class, Ends and Operator Type
- Handwheel, Gearbox, Pneumatic, Hydraulic and Electric Operator Torque Selection
- Emergency Shutdown Valve Duties: Fail-Safe Position, Closure Time and Partial Stroke
- Pipeline Block Valve Spacing by Location Class, Crossings and Station Boundaries
- Valve Bypass, Blowdown, Body Vent and Drain Arrangement on Mainline Valves

Day 4: Pressure Testing, Leakage Criteria and Valve Failure Cases

- API 598 Shell, Backseat and Low-Pressure Seat Test Sequence
- API 6D Hydrostatic and Gas Seat Tests and Double Block and Bleed Verification
- Seat Leakage Rate Acceptance Criteria and Test Certificate Review
- Passing Seats, Stem Leaks, Seized Balls and Stuck Gates: Root Cause Patterns
- Sealant Injection, Seat Flushing and Emergency Stem Packing Repair Limits

Day 5: Case Pipeline and Plant Unit Valve Selection Workshop

- Case Brief: Crude Pipeline Mainline Valves and Gas Plant Unit Isolation Points
- Valve Type and Material Selection Matrix for Each Isolation Point
- Receipt Inspection, Storage Preservation and Installation Checklist
- Valve Criticality Ranking and Preventive Maintenance Task Plan
- Valve Selection Datasheet and Maintenance Strategy Presentation and Peer Challenge

Skills You Will Gain:

- Isolation Valve Type Selection
- Pressure Class Determination
- Valve Material and Seat Specification
- Valve Operator Sizing
- Block Valve Spacing Layout
- Valve Pressure Test Witnessing
- Passing Valve Diagnosis
- Valve Maintenance Planning

Why Attend This Course:

- Return with a Valve Selection Datasheet and Maintenance Strategy built on a case pipeline and plant unit
- Challenge vendor offers and test certificates with clear checks on class, materials and seat tightness
- Reduce failed isolations and passing seats by linking field symptoms to design, storage and installation causes
- Compare valve practice with peers from oil and gas, petrochemical, water and power operations

Conclusion:

An isolation point is only as dependable as the valve chosen, tested, installed and maintained for it. The course moves from valve families and their duties, through API 6D, API 600, API 598 and ASME B16.34 requirements and materials, to datasheets, operators, emergency shutdown duty and pipeline block valve layout, then to pressure testing, leakage criteria and failure cases. The final day applies these methods to a case pipeline and plant unit and produces a Valve Selection Datasheet and Maintenance Strategy.