

Training Title

CONTROL & SAFETY RELIEF VALVES

Training Duration

5 days

Training Venue and Dates

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| Control & Safety Relief Valves | 5 | 03-07 February, 2025 | \$5,500 | Dubai, UAE |
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Trainings will be conducted in any of the 4 or 5 star hotels.

Training Fees

- *5,500 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch.*

Training Certificate

Prolific Consultants FZE Certificate of Course Completion will be issued to all attendees.

COURSE OVERVIEW

COURSE INTRODUCTION & DESCRIPTION

Power Plant and other petrochemical industries do deal with different types of valves. All piping systems are fitted with valves for controlling purposes or safety requirements. Understanding the function of each valve type will have an important reflection on the process quality, equipment and plant reliability, and the economics of the whole activity. Different application needs to select the appropriate valve type of particular flow characteristics. Operation of the valve also affects the system and the process. Understanding the problems associated with valves is essential for diagnosis and troubleshooting and the needed maintenance for the particular type of valves.

Valves can be classified as manual or control valves. When a manual valve is operated via an actuator it becomes a control valve. Valves in general do control the rate of flow in a piping system, the direction of the flow, or act as a relieving device to protect the system from overpressurization. Valves like check valves would prevent the flow from reversing, thus protecting equipment from reverse flow. Such valves operated automatically without need for any type of actuation. Stop and close valves used mainly to isolate a system in situation of maintenance and/or putting the standby equipment in services. The function of a valve is what determines its design. The right selection of a valve in terms of its type and size, and its pressure class is what affect most the stability and reliability of the system. The nature of the fluid, the type of the process, the level of temperature and pressures are parameters affecting the valve selection.

The flow through a valve will experience different effects, like cavitation, flashing, and noise. Water hammer is one of the effects that a check valve may cause. Such phenomenon might lead to different kind of problems, some would affect directly the valve itself and other might upset the process as a whole or result in system erosion or corrosion. Vibration and instrumentation false function could also be a result of faulty valve. Some of these problems can be avoided in the stage of selection and sizing of the valve. Others could be eliminated in the process of writing the specifications and through good communications with manufacturer or vendor. Understanding these different types of problems will help troubleshooting the valves and the systems and help curing the problems. Wrong installations could be the reason behind many of valves problem too.

COURSE OBJECTIVES

- *To introduce the participant to different type of Control Valves and Safety Relief Valves.*
- *To familiarize the participant with the valve characteristics including the valve tightness class and the flow characteristics*
- *To upgrade the participants understanding of the application, operation and design of different types of valves*
- *To provide skills, knowledge and understanding of the principles and practices of the related Codes and Standards related to Control Valves and Safety Relief Valves*
- *To learn the methods for valve selection, specifications and sizing that suit a particular application*
- *To learn methods of valve testing, inspection and troubleshooting based on the industrial and manufacturer codes and standards*

SUITABLE FOR:

Engineers and Technicians of mechanical, electrical and chemical engineering background will benefit largely from this workshop. Maintenance, Operation, people in workshop and R and D personnel are recommended to attend this course.

TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.

COURSE OUTLINE

The following topics including the valve technology, valve tightness and flow characteristics, control valves and safety relief valves types, operation and troubleshooting

will be cover during the five day duration of the course.

Basics of Valve Technology

Ch 1 Valves Technology

Types of Valves

Valves characteristics

Sealing performance

Leakage Criterion

Leakage Classifications

Sealing Mechanisms

Valve stem seals

Flow characteristics

Flow through valves

Valve Characterizing Coefficients

Valve flow characteristics

Linear & equal %

Control Valves

Ch 2 Control Valves

Functions of manual valves

Methods of regulation

Types of control valves

Gate Valves

Plug Valves

Ball Valves

Butterfly Valves

Pinch Valves

Diaphragm Valves

Ch 3 Control Valves & Actuators

Control Valves Types

Linear Valve Features

Rotary Valve Features

Control Valve Flow Characteristics

Quick Opening Characteristics

Linear & Equal %

Actuation systems

Types of actuators

Pneumatic Piston Actuator

Electric motors

Electro-hydraulic Actuators

Actuator Performance

Valve Positioner
Operation of Positioners
Positioner calibration

Self Operated Valves

Ch 4 Check Valves

Applications
Types of Check Valves
Lift check valves
Swing check valves
Tilting-disc check valves
Diaphragm check valves
Check Valves Operation
Water Hammer
Selection of Check Valves

Ch 5 Relief and Safety Valves

Relief Valves Types
Pressure-relieving devices
Automatically operated valves
Direct-acting & piloted pressure relief valves
Modulating, full-lift, and ordinary pressure relief valves
Valve Loading
Safety Valves
Operation of Direct-acting pressure relief valves
Blowdown
Relief valves problems

Ch 6 Rupture Valves

Applications of Rupture Discs
Rupture discs vs. Pressure relief valves
Rupture discs in gases and liquid service
Temperature and bursting pressure relationship
Pressure tolerances
Design and performance of ductile metal rupture discs
Types of Rupture discs:
Prebulged rupture discs
Reverse buckling discs
Vent panels
Graphite rupture discs
Double disc assemblies
Rupture disc and pressure relief valve combinations

*Selection of rupture discs
Operation of Rupture Discs*

Ch 7 Valve Sizing & Selection

*Valve-sizing criteria for manual valves
Valve-sizing criteria for check valves
Valve-sizing criteria for throttling valves
Incipient and advanced cavitation
Terminal pressure drop ratio
Percent of Flashing
Pressure Recovery Coefficient
Valve Sizing & Selection Procedure
Selecting a valve type
Different valve characteristics
Examples*

Ch 8 Valves Problems and Troubleshooting

*High Pressure Drop
 Pressure Recovery Characteristics
Cavitation in Valves
 Incipient and choked cavitation
 Flow curve cavitation index
 Cavitation-elimination devices
Flashing versus Cavitation
Flow Choking
High Velocities
Water Hammer
 What causes water hammer?
 Water Hammer Calculations
 Solutions for water hammer
Surge Protection
Check valve slamming
Noise problems
Clean air standards
Life loading
Packing for fugitive-emission control
 Troubleshooting the Control Valves*

Case Studies, Discussions, Last Day Review & Assessments will be carried out.

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P r o l i f i c
C O N S U L T A N T S F Z E
