

# € TRAINING

Pump Technology





# Pump Technology

## Introduction:

This training program offers a comprehensive understanding of various pump types, components, and operational principles crucial in industrial settings. Through theoretical instruction, the program equips individuals with the skills needed to optimize pump systems and contribute to efficient fluid handling processes in diverse industries.

## Program Objectives:

At the end of this program, participants will be able to:

- Understand the different types of pumps and their associated terminology.
- Understand the Centrifugal and positive displacement pumps, packing, mechanical seals and sealing systems, bearings, and couplings.
- Understand the different parameters affecting the operation of valves.
- Select the right valve for the particular application and to perform the necessary calculation for valve sizing.
- Perform troubleshooting of systems involving valves.
- Decide on the right maintenance plan concerning different types of valves.

## Targeted Audience:

- Supervisors.
- Team Leaders.
- Technicians.

## Program Outlines:

### Unit 1:

#### Pumping Systems:

- Introduction.
- Pump Types and Terminology.
- Pump Performance Centrifugal and Positive Displacement.

- Understanding Head.
- Types of Head: Friction, Pressure, Static & Velocity.
- Friction in Valves, Piping & Fittings.
- Calculating Actual Head in a System, Cavitation in Pumps and Valves, Net Positive Suction Head NPSH.
- Vapour and Gas Cavitation, Flashing VS Cavitation.

## Unit 2:

### Pump Types:

- Positive Displacement Pumps.
- Reciprocating Pumps.
- Reciprocating Pump Valves.
- Rotary Pumps - scroll and gear types.
- Failure Mechanisms - identification and monitoring.

## Unit 3:

### Centrifugal Pumps:

- Centrifugal Pump Theory.
- Pump Components.
- Matching Pumps with Drivers.
- Performance Analysis.
- Failure Mechanisms.
- Identification and monitoring.

## Unit 4:

### Achieving Pump-Reliability:

- Sealing Systems.
- Conventional Packing Glands, Mechanical Seals & Flush Plans.
- Seal Failure Mechanisms.

- Maintenance and Repair of Mechanical Seals.
- Bearings - failure modes and how to extend life lubrication.
- Plain Bearings, Anti-Friction Bearings.
- Couplings & Alignment, Couplings.
- Alignment & Balancing, Foundations & Bedplates.

## Unit 5:

### Valves Technology:

- Types of Valves globe, gate, ball, plug, check.
- Flow Characteristics.
- Flow-through Valves.
- Valve Flow Characteristics.
- Linear, Quick Opening & Equal.

## Unit 6:

### Valve Sizing:

- Calculating the Correct Cv Value.
- Selecting Valve Size Using Valve Coefficient.
- Calculations for Correct Valve Selection.

## Unit 7:

### Sealing Performance:

- Leakage Classifications.
- Sealing Mechanisms.
- Valve Stem Seals.

## Unit 8:

### Valves Troubleshooting:

- Identifying and addressing high-pressure drop issues in valve systems.
- Understanding pressure recovery characteristics and their impact on valve performance.
- Recognizing flow choking phenomena and mitigating measures.
- Managing high velocities in valve systems to prevent damage and inefficiency.
- Analyzing the causes and solutions for water hammer occurrences in piping systems.

## Unit 9:

### Valves Maintenance:

- Troubleshooting control and isolation valves for optimal performance.
- Reviewing common faults encountered in valve systems and their remedies.
- Developing a comprehensive preventive maintenance plan to ensure long-term reliability.
- Implementing strategies to extend the lifespan of valves and minimize downtime.
- Training personnel on effective valve maintenance practices for enhanced system performance and longevity.

## Unit 10:

### Pump and Valve Safety:

- Understanding safety protocols and regulations related to pump and valve operation.
- Identifying potential hazards associated with pumps and valves in industrial settings.
- Implementing safety measures to prevent accidents and injuries during maintenance and operation.
- Conducting risk assessments and safety audits to ensure compliance with industry standards.
- What are the emergency procedures and response protocols for pump and valve-related incidents.