



# Piping System Webinar Series

## TRAINING SERIES OUTLINE

### DAY 1

---

#### Introduction

What is a Piping System?  
Value of a Clear Picture of a Piping System  
Understanding the Total Piping System

#### Terminology, Units, and Physical Laws

Fluid Properties  
Flow Rate, Pressure, Head, and Head Loss  
Physical Laws that Govern Fluid Flow

### DAY 2

---

#### Centrifugal Pumps

Major Pump Parts  
Theory of Operation  
Understanding the Pump Curve  
Pump Power & Cost of Operation  
Net Positive Suction Head and Cavitation  
Pump Affinity Laws  
Parallel and Series Pump Operation  
Fluid Considerations  
Pump Selection  
Operating Pumps Properly

### DAY 3

---

#### Tanks and Vessels

Types of Tanks and Vessels  
Key Hydraulic Measurements  
Measuring and Controlling Tank Level, Pressure, and Temperature  
Common and Abnormal Tank Operations

#### Piping System Processes and Process Equipment

Types of Processes  
Process Equipment  
Hydraulic Performance of Equipment

### DAY 4

---

#### Pipelines

Pipeline Terminology  
Head Loss Calculations  
Head Loss for Series and Parallel Piping  
Factors Affecting Head Loss  
Pipe Sizing and Selection

#### Valves and Fittings

Purpose of Valves and Fittings  
Valve and Fitting Losses  
Hydraulic Performance of Valves and Fittings  
Valve Applications  
Cost of Valve Head Loss

### DAY 5

---

#### Control Valves

Types of Control Valves  
Control Valve Operation  
Characteristic Curves  
Control Valve Applications  
ASME Ratings and ANSI Valve Classes  
Cavitation, Choking, and Flashing  
Sizing and Selecting Control Valves  
Control Valve Equations

#### Process Measurement and Controls

Instruments Used to Measure Processes  
The Typical Process Control Loop  
The PID Controller and Controller Tuning  
Control Schemes

### DAY 6

---

#### The Total System

Types of Piping Systems  
Key Concepts to Understand the System  
Calculating Flow Between Two Pressure Sources  
Series Piping, Parallel Piping & Branching Piping  
The Siphon Effect  
System Static and Dynamic Head  
Visualizing Energy Addition and Losses  
Troubleshooting Piping Systems