



**KASA Redberg**

*Engineers & Technical Trainers*

# **Water/Wastewater Pumping & Piping Fundamentals**

***A practical and interactive***

***2 or 3 day course***

***or***

***4 x 4 hour online/live streamed course***

***(run over 4 days within a 2-week period)***

***or***

***6 x 4 hour online/live streamed course***

***(run over 6 days within a 2-week period)***

# Water/Wastewater Pumping/Piping Fundamentals

## Introduction

This two day course is a distillation of material from our “Pump Fundamentals” and “Liquid Piping Systems Fundamentals” training courses that is relevant to those who work in the water industry and are required to know about pumping and piping equipment found in treatment plants and pump stations.

## Who Should Attend

Engineers and technicians who work in the water industry and would like to know how to size, select, troubleshoot, test, install, operate and maintain pumps, piping and ancillary equipment found in treatment plants and pump stations.

## Delegate Pre-Requisites

It is a requirement that each delegate has an understanding of mechanical components. A basic understanding (trade level or higher) engineering maths would also be a necessity. Ideally, each delegate should have a degree or diploma in a relevant technical field or a higher level mechanical trade qualification.

## Seminar Objectives

At the completion of this seminar, each delegate should be able to:

- Identify common pump types and their components
- Understand pump, associated component, hydraulics and terminology
- Select the most appropriate pump type, make and model for an application
- Be competent in reading and using pump performance curves
- Understand cavitation and how to prevent it from occurring
- Specify the correct installation configuration for a particular pump type
- Install, commission, operate and maintain common pump types
- Troubleshoot pump problems
- Select the most appropriate pipe material, type and end connection for a particular application
- Determine the correct pipe wall thickness for an application
- Select the most appropriate valve type for an application.
- Be aware of pipe pigging
- Understand the operating principles of typical piping instrumentation relating to flow and pressure

## Training Seminar Materials

All delegates receive:

- The **“The Water/Wastewater Pumping & Piping” Training Manual** – a reference manual comprising theory, worked example problems, tables, charts and illustrations etc based on the seminar outline. This manual has been designed to be a valuable future resource for the office or plant.
- **Certificate of Attendance** – which states the number of hours of training and serves as documentary proof of attendance.

## In-House (Customised) Training

This training course is only delivered as an in-house course. We have delivered this course to various water agencies and design consultancies around Australia since 2008.

The content of the course can be customised to suit the specific equipment makes/models that you use at your facilities. Additional material can also be included or non-relevant material can be excluded. In this way, this course can be completely customised to suit your needs.

As this is an in-house course, please contact us via phone or email to arrange a detailed proposal.

## Three-Day Version of this Course

Please be aware that some water authorities as well as design consultancies who operate in the urban and rural water sector of industry prefer to book a three day version of this course. The third day allows for the following additional topics to be presented:

- Sewage pumping stations
- Rising mains
- Water pumping stations
- Additional valve and instrument types
- Positive displacement pumps – Rotary types
- Positive displacement pumps – Reciprocating types



# Water/Wastewater Pumping/Piping Fundamentals

## Seminar Synopsis

### Day 1

#### BACKGROUND INFORMATION

- Terms and Definitions
- Fluid Properties (Viscosity, Density, Temperature etc)
- Pressure-Head Relationships
- Cavitation
- Basic Hydraulics Theory and Calculations
- Friction Losses in Pipes and Fittings
- Water Hammer
- Air Entrapment
- Worked Example Problems

#### CENTRIFUGAL PUMPS

- Components, Types and Examples
- Affinity Laws and Characteristic Curves
- Matching the System to the Pump
- System Curve Calculations
- Parallel and Series Pumping Circuits
- Troubleshooting
- Installation and Operation
- Worked Example Problems

#### PIPE SIZING

- The Present Value Method
- The Allowable Velocity Method
- The Head Loss Available Method

#### SELECTING PIPE AND FITTINGS

- Common materials
- End Connections, Joints and Fittings
- Calculating Safe Working Pressures
- Determining Stresses in Pipes

*Note: Should the online / instructor-led version of this training course be chosen, each day as nominated here would be split into 2 x 4 hour online / live-streamed sessions run in the same week.*

### Day 2

#### VALVES

- A detailed Analysis of Common Valve Types
- Materials of Construction
- Valve Actuators
- Valve Selection & Sizing Guidelines
- Control Valve Selection and Sizing
- Valve Maintenance and Troubleshooting
- Worked Example Problems

#### INSTRUMENTS

- Typical Instruments for Flow and Pressure
- Selection Guidelines

#### MISCELLANEOUS TOPICS

- Guidelines for Economic Spool Design
- Guidelines for Safety, Operations and Maintenance
- An Introduction to Piping Design Loads
- Pipeline Pigging

#### PUMP STATION ISSUES

- Typical Submersible Pump Stations
- Variable Speed Drives – Operational Issues
- Common Design Problems
- Recommended Design Details
- Wet-Well Versus Dry-Well Comparison

### Day 3 (if selected as an option)

#### PUMPING STATIONS & RISING MAINS

- Sewage Pumping Stations
- Rising Mains
- Water Pumping Stations
- Design and Sizing Tips
- Operations, Maintenance and Safety Considerations

#### POSITIVE DISPLACEMENT PUMPS

- Rotary PD pumps
- Reciprocating PD pumps



## About KASA Redberg

KASA Redberg is a technical training and engineering consulting group.

We have core competencies in pumping systems, piping systems, pipelines, pressure vessels and slurry handling systems. We also act as independent HAZOP workshop facilitators and Safety-in-Design workshop facilitators.

Our portfolio of services includes:

- Tank and vessel design.
- Chemicals plant design.
- Water treatment plant design.
- Pumping and piping systems design.
- Pump station and pipeline design
- Mine dewatering and water supply systems design.
- Pipe stress analysis
- Pipeline hydraulic modelling
- Water hammer analysis
- Slurry piping systems design and slurry pump selection.
- On-site troubleshooting of pumps and piping systems.
- Operator training courses
- HAZOP workshop facilitation
- Safety-in-Design workshop facilitation

## Contact Details

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