



KASA Redberg
Engineers & Technical Trainers

Pump Fundamentals

A practical and interactive 2 day course

or

***4 x 4 hour online/live streamed course
(run over 4 days within a 2-week period)***

Pump Fundamentals

Introduction

Pumps are found in all industries and come in all shapes and sizes. Decision makers operating in areas such as water treatment, minerals processing, oil and gas, utilities, metals processing, food and beverage and many more employ billions of dollars worth of pumping equipment to help achieve their objectives.

To ensure that you are achieving maximum performance from your pumping equipment, it is essential that you know the fundamentals. *"Pump Fundamentals"* is an intensive, practical and interactive two day seminar which focuses on the common types of pumps and how to select, install, troubleshoot and maintain them.

Who Should Attend

Process, Design, Project and Consulting Engineers; Line Managers and Supervisors; Maintenance Technicians; Pump Sales Representatives; or anyone who needs to select, specify, commission, install and/or maintain pumping equipment.

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 slurry 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



Training Seminar Materials

All delegates receive:

- The **"Pump Fundamentals" 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, workshop, factory or plant.
- **Certificate of Attendance** – which states the number of hours of training and serves as documentary proof of attendance.

Complementary Training

"Pump Fundamentals" is the first in a series of three pump and piping training seminars pitched at a "fundamentals level". It provides a practical introduction to the world of pumps and their applications.

The two companion seminars to *"Pump Fundamentals"* deal with liquid and gas piping systems.

Plant Engineers, Project Managers and Process Engineers should consider undertaking all three of KASA's "fundamentals level" training seminars to help aid their knowledge of pumping and piping systems.

It is also recommended that *"Pump Fundamentals"* is attended prior to attending KASA's *"Advanced Slurry Pumping & Piping"* training seminar.

Pump Fundamentals

Seminar Synopsis

Day 1 (or Sessions 1 and 2 when delivered online)

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
- Pump Classifications and Examples
- Pump Selection Guidelines
- Worked Example Problems

CENTRIFUGAL PUMPS

- Components, Types and Examples
- Affinity Laws and Characteristic Curves
- Matching the System to the Pump
- System Curve Calculations
- Viscosity Effects
- Parallel and Series Pumping Circuits
- Cavitation – Causes, Remedies and Calculations
- Troubleshooting
- Worked Example Problems

INTRODUCTION TO CENTRIFUGAL SLURRY PUMPS

- Slurry Classifications and Rheology
- Slurry Characteristics – Abrasion, Erosion and Corrosion
- Effects of Slurry Solids Content and Settling Velocities
- Typical Pump Components and Assemblies
- Characteristic Curves
- Pump Selection Criteria
- Worked Example Problems

Day 2 (or Sessions 3 and 4 when delivered online)

POSITIVE DISPLACEMENT (PD) PUMPS

- PD Pump Theory
- Typical System Curves
- Comparison to Centrifugal Pumps
- A Detailed Analysis of Common PD Pumps –
 - (Gear, Lobe, Progressive Cavity, Piston, Diaphragm, Peristaltic)
- Troubleshooting
- Worked Example Problems

EDUCTORS (JET PUMPS)

- Principle of Operation
- Applications

SEALS AND PACKING

- General Overview
- Components and Types
- Applications and Selection
- Installation, Maintenance and Troubleshooting

PUMP DRIVES

- General Overview
- Close Coupled, Direct Driven, Canned and Magnetic Setups
- Belt Drives, Gearboxes, Variators
- Electric Motors and Inverters
- Engines and Hydraulic Motors

INSTALLATION & MAINTENANCE

FOUNDATIONS AND BASES

- Alignment
- Process Connections
- Recommended Piping Configurations
- Condition Monitoring and Preventative Maintenance



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

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