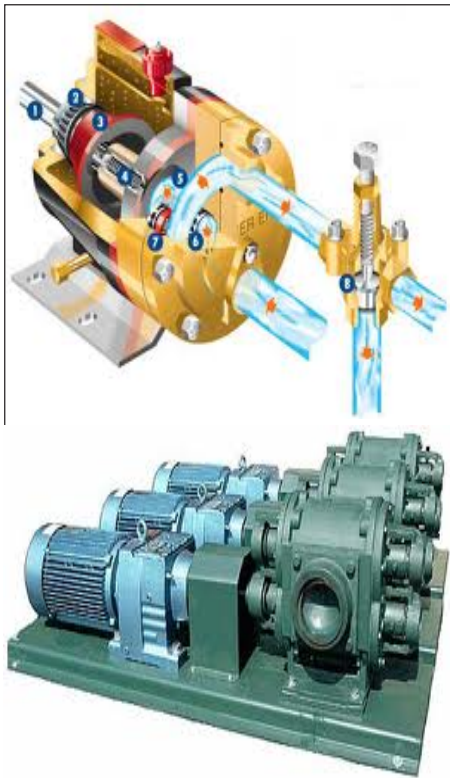


PRACTICAL PUMPS - DESIGN, OPERATION AND MAINTENANCE FOR CENTRIFUGAL AND POSITIVE DISPLACEMENT PUMPS



YOU WILL LEARN HOW TO:

- Identify the various types of centrifugal pumps
- To use relevant pump terminology and understand their key applications
- Understand pump characteristics and interpret pump curves
- Perform a number of pump calculations
- Describe ancillary equipment associated with pumping circuits
- Draw up the correct operation, controls and procedures for operating pump systems
- Understand more about safety with pump systems and the management of risk
- Define pump reliability in terms of availability, criticality and wear characteristics
- Understand pump efficiency in terms of capital costs, maintenance costs and life cycle costs
- Understand the elements considered in selecting the right pump for a specific application
- Tackle issues relating to mechanical shaft seals failures
- Understand about pump drive options, alignment and pump drive sources
- Confidently test and commission pump sets
- Understand about condition monitoring of pumps and to optimise pump performance

WHO SHOULD ATTEND:

- Plant operations and maintenance personnel
- Plant engineers, managers and supervisors
- Process control engineers and supervisors
- Consulting engineers
- Maintenance engineers and technicians
- Pump sales and applications personnel
- Pump users
- Pump service contractors

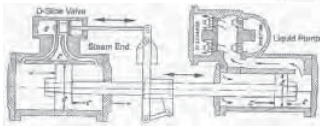
The Workshop

This is a comprehensive, highly practical and interactive two-day workshop. You will have an opportunity to discuss pump construction, design applications, operations and maintenance issues and be provided with the most up-to-date information and best practice in dealing with the subject. You will develop the skills and ability to recognise and solve pump problems in a structured and confident manner.

Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

To gain full value from this workshop, please bring your laptop/notebook computer.



The Program

INTRODUCTION

- Terminology
- Pump definition and types
- Pump materials and components
- What constitutes a good centrifugal pump?
- Overview of statutory requirements

Practical tutorial

INTRODUCTION TO MECHANICAL SEALS

- Single and dual seal types
- Design considerations to address specific applications
- Troubleshooting failed mechanical seals

PUMPABLE FLUID CHARACTERISTICS

- Impact of:
 - Head
 - Density
 - Viscosity
 - Temperature
 - Corrosiveness
 - Erosion

Practical tutorial

THE PUMP AFFINITY LAWS

- The interaction between:
 - Head
 - Flow
 - Power draw
 - Implications of performance changes
 - System resistance

HYDRAULIC FORCES

- Axial forces
- Radial forces
- Effect of forces on component life

A TYPICAL PUMP CIRCUIT

- Effects on pumping
- Head
- Velocity
- Resistance
- Forces
- Expansion, contraction and vibration
- Environment

Practical tutorial

TYPES OF PUMPS AND MATERIAL SELECTION

- Design considerations to address specific applications
- Material selection based on process fluid specifications: hazardous, density, viscosity, temperature, corrosiveness, erosion

Practical tutorial

PUMP DRIVES

- Pump drives:
 - Close coupled
 - Direct driven
 - Belt driven
 - Variable speed drives
 - Canned
 - Couplings
 - Alignment
 - Power sources

Practical tutorial

CONTROLS/SELECTION AND INSTALLATION

- Pump controls and instruments: safety and volume controls
- Pump selection:
 - Performance data
 - System flow resistance
 - Stability
- Pump installation issues:
 - Foundations and bases
 - Pipe connections
 - Vibration and force isolation
 - Environmental protection

Practical tutorial

COMMISSIONING AND PERFORMANCE MEASUREMENT

- Testing and commissioning
- Condition monitoring
- Optimising performance:
 - Inspection
 - Performance measurements

Practical tutorial

SUMMARY, OPEN FORUM AND CLOSING

