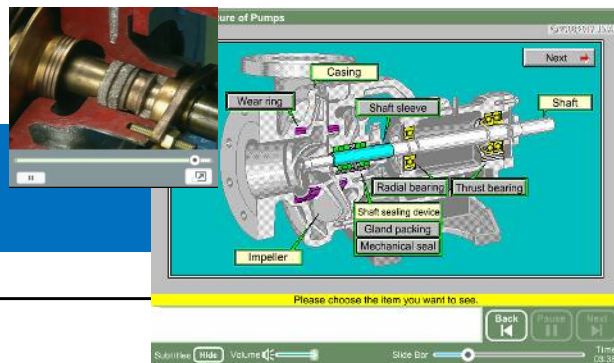


Pump Basics Course I



Purpose

To acquire basic knowledge regarding pumps, including the structure and principles of pumps, performance management, and operation management.

Characteristics

- ★ Using cut section models of various pumps and a variety of videos of experiments related to operating theory, we're going to learn the basics of pump mechanisms, theory, performance, and operation.
- ★ Combining animated computer graphics, narration, and real video imagery, the explanations are given a sense of presence and realism.
- ★ With interactive content interspersed in various places, students can progress through the materials at their own pace.

Curriculum

Before You Start Studying

Chapter 1 Structure of Pumps

Chapter 2 Essential Capabilities of Pumps

Chapter 3 Principles of the Pump

Chapter 4 Pump Performance Curves

Chapter 5 Performance and Operating Conditions

Chapter 6 Cavitation

Who should take this course

Novice and mid-level employees responsible for maintenance work; operators and engineers on production-sites (plants); and workers, supervisors and administrators in the field

Course material outline

- ◆ Expected learning time : 8hours
- ◆ Shortest duration : 214 minutes
- ◆ Number of tests : 2

Supervised by

Idemitsu Kosan Co.,Ltd. Technical Training Center

Curriculum

Chapter 1

Structure of Pumps

- 101 Purposes and Roles of Pumps
- 102 Types of Pumps
- 103 Flow of Liquids
- 104 Structure of Pumps

Chapter 2

Essential Capabilities of Pumps

- 201 Energy and Head of Liquids
- 202 Bernoulli's Principle
- 203 Actual Head
- 204 Total Head
- 205 Steps to Calculate the Total Head
- 206 Calculating the Total Head (1) Straight Pipe Section Friction Head Loss
- 207 Calculating the Total Head (2) Valve/Joint Head Loss
- 208 Calculating the Total Head (3) Pipe Resistance Curves

Chapter 3

Principles of the Pump

- 301 Pump Theory
- 302 Flow of Liquid in the Impeller
- 303 Energy Imparted by the Impeller
- 304 Euler's Equations
- 305 Theoretical Head and the Impeller (1)
- 306 Theoretical Head and the Impeller (2)

Chapter 4

Pump Performance Curves

- 401 Theoretical Head
- 402 Pump Head and Loss
- 403 Pump Characteristics and Surging
- 404 Operating Point and Flow Regulation
- 405 Shaft Horse Power
- 406 Pump Efficiency
- 407 Performance Curves

Chapter 5

Performance and Operating Conditions

- 501 Characteristics of Liquids and Performance of Pumps
- 502 Rotational Speed and Pump Performance
- 503 Impeller Cutting and Pump Performance
- 504 Calculating Energy Savings Due to Impeller Cutting
- 505 Performance during Parallel Operation

Chapter 6 Cavitation

- 601 How Cavitation Occurs
- 602 Problems Caused by Cavitation
- 603 Cavitation and NPSH
- 604 Calculating NPSH
- 605 Changes in Discharge Flowrate and NPSH
- 606 Cavitation Countermeasures