



شركة ميرك العربية السعودية
MEIRC Saudi Arabia

Mechanical Seals

Duration 5 Days

Introduction

The course commences with a solid review of the fundamentals, basic principles and looks at seal classification and design. Through this course, you will understand the basic needs of mechanical seals, and by applying what you learn, you will positively impact on the real costs of seal ownership to your company.

Who Should Attend

Electrical, Mechanical and Chemical Engineers or Technicians.

Course Objectives

At the end of this workshop participants will be able to:

- Demonstrate a sound understanding of the fundamentals of seal selection
- Understand environmental considerations related to seals
- See how the experts repair and rebuild seals for outstanding performance
- Troubleshoot seals
- Maximize mechanical seal life
- Classify various seals, including special seal types
- Explain considerations related to the materials used in seal construction

Course Outlines:

- **Sealing Methods**
 - Stuffing box packing
 - Condensate injection sealing
 - Floating seal rings
 - Labyrinth (breakdown) bushings
 - Windback scroll or windback seal
 - Lipseals
 - The mechanical seals
 - Differences between packing & mechanical seals
- **Seal selection Considerations**
 - Operational requirements
 - Performance expectations
 - Special requirements
 - Considerations of duty
 - Envelope
 - Pressure
 - Speed
 - Temperature
 - Sealed Fluid



- Chemical properties
 - Abrasion
 - Volatility
 - Flammability
- Life
- Leakage
- **Seal type selection**
 - Internally mounted vs. externally mounted
 - Rotating vs stationary floating seals
 - Balanced vs unbalanced seal
 - Non-metal bellows vs pusher seal
 - Single spring vs multiple-spring seal
 - Advantages & disadvantages
- **Material of construction**
 - Secondary sealing materials
 - Elastomers
 - Non-Elastomers
 - Seal face materials
 - Carbon graphite resin impregnated
 - Carbon graphite Antimony filled
 - PTFE 25% glass
 - Ni-Resist
 - Al-oxide
 - Tungsten carbide co-binder
 - Tungsten carbide Ni binder
 - Silicon carbide reaction banded
 - Silicon carbide sintered
- **Choice for sealing centrifugal compressors shafts**
- **A. Seals**
 - Labyrinth seals
 - Carbon rings
 - Brushing seals
 - Contact seals
 - Leakage comparison
- **B. Sealing Systems**
 - Evaluation systems
 - Injection system
 - Combination of contact seal & a brushing seal
 - Carbon face contact seal
 - Double brushing seal
 - High-air side differential - pressure face and brushing seal
 - Ejector sealing system
 - Sealing system using an injected medium between compressor gas & atmospheric seal



- **C. Typical case studies**
 - Single labyrinth gland packing
 - Multi-chamber labyrinth system with one or two buffer & drains or a combination of these
 - Floating ring seal
 - Mechanical contact seal
 - And stand seal in conjunction with one of these systems
 - Self acting gas seals
- **Seals Failure**
 - External symptoms of seal failure
 - Checks before dismantling
 - Checks during dismantling
 - Visual seal examination
- **Causes of seal failures**
 - Mishandling prior to installation
 - Faulty installation
 - Excessive run out
 - Excessive bearing play, axial and/or radial
 - Misalignment
 - Incorrect choice of materials
 - Changed conditions
 - Lack of auxiliaries (venting, injection, etc.)
 - Vibration
 - Cavitation
 - Freezing of faces on the atmospheric side of the seal
 - Excessive temperature
 - Excessive pressure
 - Excessive shaft speeds.
- **Lubrication systems**
 - Oil reservoirs
 - Pumps & drivers
 - Coolers & filters
 - Transfer valves
 - Accumulators
 - Overhead tanks
 - Oil conditioners
 - Seal-oil drain taps
 - Degassing drum
 - Piping