



# **MU102: Mechanical Seals Applications for Rotating Machinery**

## Training Description:

All Rotating Equipment Machinery require controlling of the pumped fluids or compressed air desire to exit through the area where the Machine Shaft enters fluid end. A mechanical seal will virtually eliminate the release of the Media (Liquid/Gas/Air) to atmosphere and the entrance of air when under vacuum.

This five-day course is programmed to give end-users of rotating equipment a thorough insight into the theory and practice of mechanical seals. The course provides an opportunity for Maintenance Engineers, Fitters, Plant Operators, absolutely anybody who is concerned about, responsible for Safe and Reliable Plant Operation or improving Mean Time between Repair of mechanical shaft seals and how to maximize seal life and thus derive measurable financial savings from your knowledge of seals.

The course includes practical content demonstrations and examples of Seal Selections. We encourage bringing along any sealing problems that you may be experiencing or any failed seals to look at during our trouble shooting session. The course commences with a solid review of the fundamentals, basic principles and looks at seal classification and seal design. Special seal types are examined and the materials used to construct seals ranging from elastomeric materials to be cemented carbides are examined. Through this 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

## Training Objectives:

**By the end of the training, participants will be able to:**

- ✓ Have a better understanding of different Types of Mechanical Seals and the purpose for that
- ✓ Learn about Selection, Operation, and Maintenance Strategies should be applied to avoid any failure it will affect Machine
- ✓ Troubleshoot the problems for Mechanical Seals and analyze the Failure Causes to avoid reoccurrence again.
- ✓ Demonstrate a sound understanding of the seal election methods such as definition of zero leakage, mechanics of sealing, purpose of sealing, etc.
- ✓ Introduce and perform seal design and classification which includes identifying seal components and their and their function, primary sealing components-seal head, seal seat, springs for face loading, metals below, etc.
- ✓ Identify and recognize special seal types such as bellows, bushing, labrynth, diaphragm, gas, dry gas, motion, slurry, carbon seals, etc.
- ✓ Get familiar on materials for seal construction such as general considerations, properties of elastomers, elastomeric materials, plastic polymers, etc.

## Training Designed for:

This course is intended for Supervisors, Team Leaders in Maintenance, Engineering and Production (Operation) Departments. Also benefit for anyone who wishes to update themselves on Maintenance

Engineering Technologies, judge the suitability of these Technologies for their needs, and learn how to implement them for the benefit of their Organizations.

## Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

## Training Program:

### DAY ONE:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ **Module (01): Basic Concepts of Fluid Sealing**
  - Purpose of Sealing
  - Speed and Pressure
  - Basic Fluid Mechanics
  - Reynolds Equation
  - Lubrication Solutions
  - Seal Components and their Function
  - Seal Friction Seal Components
  - Sealing Applications
- ❖ **Module (02): Mechanical Seals Fundamentals**
  - Theoretical Aspects and Design
  - Factors Affecting Design
  - Materials of Construction
  - Mechanical Seal Selection
  - Data Requirements for Selection
  - Seal Type Selection
  - Selection of the Primary Seals
  - Selection of the Seal Arrangement

### DAY TWO:

- ❖ **Module (03): Mechanical Seals Configurations**
  - Seals Classification
  - Wet Mechanical Seal
  - Dry Mechanical Seal
  - Balanced and Unbalanced Mechanical Seals
  - Mechanical Seals for Pump Considerations
  - Mechanical Seals for Compressor Considerations
  - Mechanical Seals for Fans & Blowers
- ❖ **Module (04): Mechanical Seal Categories**
  - Seal Balance Criterion
  - Balance Ratio
  - Pressure Distribution

- General Arrangement
- Single-Cartridge
- Split
- Stationary
- Duplex-Tandem
- Back– to—Back

### DAY THREE:

#### ❖ Module (05): Selection of Seal Materials

- General Considerations
- Properties of Elastomers
- Elastomeric Materials
- Cemented Carbides
- Miscellaneous Sealing Materials
- Materials Compatibility
- Bushing, Labyrinth & Diaphragm
- Carbon Seals
- Liquid Ring, Liquid Barrier Seals

#### ❖ Module (06): Auxiliary Equipment

- Cyclone Separators
- Filters and Strainers
- Air-Coolers and Heat Exchangers
- Flow Controllers
- Leakage Detectors

### DAY FOUR:

#### ❖ Module (07): Seals Failure Analysis & Troubleshooting

- Factors Influencing Seal Life
- Factors Affecting Seal Performance
- Seal Malfunction and Probable Causes
- Eccentric Contact Pattern
- Gland Bolt Distortion
- Erosion of Seal Parts
- Chemical Attack
- Friction and Wear
- Adhesion & Abrasion
- Corrosion and Surface Fatigue

### DAY FIVE:

#### ❖ Module (08): Mechanical Seals Performance

- Acceptable Performance
- Pre-Installation Machine Checks
- Mechanical Seal Installation
- Mechanical Seal Maintenance
- Seal handling and Inspection

- Testing and Verification of Mechanical Seals
- Mechanical Seals Operating Conditions
- ❖ Course Conclusion
- ❖ POST-ASSESSMENT and EVALUATION

### Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

### Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

### Training Fees:

**TBA as per the course location** - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01<sup>st</sup> of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

### Training Timings:

#### Daily Timings:

|               |                               |
|---------------|-------------------------------|
| 07:45 - 08:00 | Morning Coffee / Tea          |
| 08:00 - 10:00 | First Session                 |
| 10:00 - 10:20 | Recess (Coffee/Tea/Snacks)    |
| 10:20 - 12:20 | Second Session                |
| 12:20 - 13:00 | Recess (Prayer Break & Lunch) |
| 13:00 - 14:00 | Last Session                  |

#### For training registrations or in-house enquiries, please contact:

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