MECHANICAL SEALS: DESIGN, APPLICATION, SELECTION, INSTALLATION, TROUBLESHOOTING AND MAINTENANCE

COURSE OVERVIEW

This comprehensive course is designed to provide in-depth knowledge and hands-on insights into mechanical seal systems used in rotating equipment such as pumps, mixers, and compressors. Participants will explore the full lifecycle of mechanical seals—from design and material selection to troubleshooting and maintenance—focusing on reliability, safety, and cost-effectiveness. Through technical instruction, practical case studies, and structured workshops, attendees will learn how to select the right seal for the job, apply industry standards (e.g., API 682), avoid common installation errors, diagnose seal failures, and implement best practices in maintenance and reliability. Whether you are new to mechanical seals or looking to refine your expertise, this training equips you with the tools to improve operational performance, extend seal life, and reduce downtime.

DATES, VENUES AND FEES

14 – 18 September 2025 – Doha
14 – 18 December 2025 - Dubai
(5 Days)

Fees US$ 4500

Note: Fee is per participant + 5% VAT (if applicable).
Groups from the same company can enjoy a **discounted** price.

WHO SHOULD ATTEND?

This course is appropriate for a wide range of professionals but not limited to:

- Mechanical Engineers
- Maintenance Technicians
- Reliability Engineers
- Plant Operators
- Rotating Equipment Specialists

CONTACT US NOW

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ACCREDITATION

This training course is certified by CPD.

The CPD Certification Service is the leading independent CPD accreditation institution operating across industry sectors to complement the Continuing Professional Development policies of professional institutes and academic bodies. The CPD Certification Service provides support, advice, and recognised independent CPD accreditation compatible with global CPD principles. CPD is the term used to describe the learning activities professionals engage in to develop and enhance their abilities and keep skills and knowledge up to date. CPD Units are only awarded to programmes after each programme is scrutinised to ensure integrity and quality according to CPD standards and benchmarks.

COURSE CERTIFICATE

MSTC certificate will be issued to all attendees completing a minimum of 80% of the total tuition hours of the course.

CPD internationally recognized certificate will be issued for all participants who will meet the course requirements.
CPD certificates will be issued within a month of the successful completion of the course.

TRAINING METHODOLOGY

- Expert instructor lecture, input using numerous visual aids
- Supportive comprehensive course manual enabling practical application and reinforcement
- Participant discussion and involvement regarding their specific projects and challenges
- Real-world case studies and best practices

LEARNING OBJECTIVES

- Understand the role and importance of mechanical seals
- Learn about basic seal designs and components
- Understand how seals prevent leakage and operate under pressure
- Learn where and how seals are applied in pumps, mixers, compressors, etc.
- Understand how process conditions affect seal selection
- Recognize critical factors in seal performance
- Use a systematic approach to selecting mechanical seals
- Understand how to balance cost, performance, and compatibility
- Apply manufacturer datasheets and standards effectively
- Understand correct installation practices to prevent premature failure
- Identify early signs of seal failure
- Implement troubleshooting techniques
- Develop a maintenance plan for mechanical seals
- Apply condition monitoring and predictive maintenance
- Understand continuous improvement and failure prevention strategies

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COURSE OUTLINE

DAY 1

Introduction to Mechanical Seals & Design Principles

- Pre test
- **Introduction to Sealing Technology**
  - Why mechanical seals are critical
  - Comparison with other sealing methods (packing, gaskets)
- **Basic Components of a Mechanical Seal**
  - Primary/secondary seals, springs, gland plates, faces
- **Seal Face Materials and Characteristics**
- **Seal Design Configurations**
  - Balanced vs. unbalanced
  - Pusher vs. non-pusher
  - Single, double, tandem, and cartridge seals
- Case Study

DAY 2

Application of Mechanical Seals in Rotating Equipment

- **Applications in Pumps, Agitators, and Compressors**
- **Operating Parameters Impacting Seal Life**
  - Temperature, pressure, speed, fluid type
- **Seal Environment and Support Systems**
  - API piping plans
  - Barrier/buffer fluids and seal flush systems
- **Standards and Guidelines**
  - API 682, ISO, ANSI standards
- Case study

DAY 3

Selection Criteria for Mechanical Seals

- **Seal Selection Parameters**
  - Media, pressure, temperature, speed, shaft size
- **Material Compatibility & Chemical Resistance**
- **Understanding Manufacturer Selection Tools**
- **Seal Failure Modes Due to Wrong Selection**
- Seal selection case studies

DAY 4

Installation, Startup, and Troubleshooting

- **Installation Best Practices**
  - Alignment, cleanliness, torque, piping plans
  - Factory vs. field assembly
- **Startup and Commissioning Checks**
- **Common Mechanical Seal Failures**
  - Thermal shock, dry running, cavitation, misalignment
- **Troubleshooting Techniques and Root Cause Analysis**
- Case study

DAY 5

Maintenance Strategies, Reliability & Continuous Improvement

- **Seal Maintenance Strategies**
  - Preventive, predictive, and condition-based maintenance
- **Seal Life Extension Techniques**
  - Upgrades, retrofits, seal support system optimization
- **Failure Reporting and Documentation**
- **Reliability-Centered Maintenance (RCM) and Seal Management Programs**
- Post test
- Certificates Ceremony

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