

# MECHANICAL SEAL & SELECTION PROCEDURE - API-682 GUIDED SEAL SELECTION TOOL & A TROUBLESHOOTING GUIDE

*"Master Mechanical Seal Design, Selection, API 682 Compliance, and Failure Prevention through Diagnostic and Predictive Practices"*

## Schedule

Date	Venue	Fees (Face-to-Face)
16 - 20 Feb 2026	Dubai, UAE	USD 3495 per delegate

## Introduction

Mechanical seals are critical to the safe, reliable, and leak-free operation of rotating equipment across industrial environments. However, incorrect selection, poor installation, and misunderstanding of application-specific requirements often lead to premature failures and high maintenance costs.

This intensive course offers a comprehensive understanding of mechanical seal types, configurations, and API 682 selection procedures. Participants will explore seal operation, failure diagnostics, system design, and troubleshooting using real-world case studies, performance criteria, and hands-on application of the API 682 Seal Selection Tool.

## Objectives

By the end of this course, participants will be able to:

- Understand the principles, classifications, and performance of mechanical seals
- Apply the API 682 seal selection matrix and guided tool for optimal decision-making
- Identify seal failures, diagnose root causes, and recommend corrective actions
- Design and specify appropriate seal support systems per ISO/API standards
- Improve maintenance practices and extend seal service life
- Communicate effectively with vendors and technical teams regarding seal applications

## Why Attend

- Gain mastery of mechanical seal types, applications, and limitations
- Reduce seal failures and equipment downtime
- Learn to select seals based on pressure, fluid type, temperature, and operating environment
- Diagnose leaks, face wear, and O-ring degradation with real case studies
- Improve seal reliability through predictive maintenance and inspection

## Target Audience

This program is designed for:

- Mechanical, maintenance, and reliability engineers
- Rotating equipment and asset integrity specialists
- Process and design engineers
- Seal application engineers and technical support teams
- Supervisors and technicians handling pumps and rotating equipment

## Individual Benefits

Key competencies that will be developed include:

- Hands-on ability to use the API 682 guided selection methodology
- Technical understanding of seal configurations and operating limits
- Skills in failure diagnosis and maintenance optimization
- Familiarity with seal piping plans and environmental control systems
- Greater confidence in managing vendor selection and seal specifications

## Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Lower seal-related maintenance and inventory costs
- Higher mean time between failure (MTBF) for seals
- Reduced leakage, emissions, and compliance risks
- Better technical collaboration with OEMs and third-party suppliers
- Enhanced team capability in rotating equipment reliability programs

## Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings - Seal construction, performance factors, and API 682 standard overview
- Case Studies - Examples of seal failure modes and troubleshooting solutions
- Workshops - Guided seal selection exercises and configuration mapping
- Peer Exchange - Sharing seal operation challenges and maintenance strategies
- Tools - API 682 seal selection matrix, troubleshooting checklists, and system design templates

## MAWA EVENTS

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## Course Outline

### DETAILED 5-DAY COURSE OUTLINE

**Training Hours: 7:30 AM - 3:30 PM** Daily Format: 3-4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 - 02:00

#### Day 1: Introduction to Mechanical Seals and Seal System Design

- Module 1: Fundamentals of Mechanical Seals (07:30 - 09:30) • Seal operating principles and functions • Key components: faces, springs, elastomers, gland plates • Comparison with packing and other sealing methods
- Module 2: Types of Mechanical Seals (09:45 - 11:15) • Balanced vs. unbalanced, pusher vs. non-pusher • Single, dual, tandem, and double arrangements • Applications across different process industries
- Module 3: Seal Failure Mechanisms (11:30 - 01:00) • Face wear, dry running, extrusion, chemical attack • Leakage paths and visual fault indicators • Environmental and process-related failure triggers
- Module 4: Case Study - Seal Failure Investigation (02:00 - 03:30) • Group analysis of actual failure data and diagnostics

#### Day 2: API 682 Standards and Seal Classification

- Module 1: API 682 Standard Overview (07:30 - 09:30) • Purpose and scope of API 682 (4th Edition) • Categories, Arrangements, and Types (AAT classification) • Equipment and process conditions applicability
- Module 2: Seal Piping Plans (09:45 - 11:15) • Plan 11, Plan 23, Plan 52, Plan 53A/B/C overview • Selection based on temperature, pressure, and fluid type • API 682 compliance with piping plan design
- Module 3: Seal Material Selection and Compatibility (11:30 - 01:00) • Seal face materials: carbon, tungsten, silicon carbide • Elastomer and metal compatibility with fluids • API-recommended material combinations
- Module 4: Workshop - Seal Code Interpretation (02:00 - 03:30) • Practice interpreting API 682 classification codes • Exercises on reading datasheets and vendor specs

#### Day 3: Seal Selection Using API 682 Guided Tool

- Module 1: Seal Selection Criteria (07:30 - 09:30) • Operating parameters: pressure, speed, fluid properties • Application criticality and environmental considerations • Compatibility with rotating equipment types
- Module 2: Using the API 682 Guided Selection Tool (09:45 - 11:15) • Step-by-step walkthrough of the selection process • Matching seal arrangement to system requirements • Typical selection scenarios from refineries and petrochemical plants
- Module 3: Seal System Sizing and Layout (11:30 - 01:00) • Reservoir capacity, pressure rating, heat dissipation • Layout integration into pump skid and utility systems
- Module 4: Workshop - Guided Selection Simulation (02:00 - 03:30) • Participants select seals for given plant scenarios

#### Day 4: Installation, Operation, and Troubleshooting

- Module 1: Seal Installation Procedures (07:30 - 09:30) • Best practices and installation tools • Alignment, torque, and setting parameters • Typical installation mistakes and their consequences
- Module 2: Seal Operation and Monitoring (09:45 - 11:15) • Monitoring seal performance indicators (leakage, temperature) • Operation during startup, shutdown, and transients • Use of sensors and diagnostics for live data tracking
- Module 3: Troubleshooting Tools and Techniques (11:30 - 01:00) • Root cause analysis of common failures • Vibration and thermal diagnostics • Interpretation of inspection findings
- Module 4: Case Study - Operational Failure & Corrective Action (02:00 - 03:30) • Interactive group case on unplanned shutdown due to seal failure

#### Day 5: Reliability Management and Program Optimization

- Module 1: Maintenance and Repair Strategies (07:30 - 09:30) • Rebuilding seals, vendor services, and spare parts planning • Lifecycle cost vs. one-time replacement decisions • Reusability and storage best practices
- Module 2: Seal Reliability Program (09:45 - 11:15) • KPIs for seal reliability, MTBF tracking • Developing seal improvement action plans • Continuous improvement models
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Module 3: Final Practical Review and Consolidation (11:30 – 01:00) • Recap of seal types, selection logic, and failure modes • Review quiz and knowledge application

- Module 4: Course Wrap-Up and Certification (02:00 – 03:30) • Participant action plans • Final Q/A and feedback session

### Certification

Participants will receive a Certificate of Completion in Mechanical Seal & Selection Procedure – API 682, confirming their technical proficiency in applying seal selection tools, diagnosing faults, and managing seal systems in line with API 682 best practices.

### Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
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