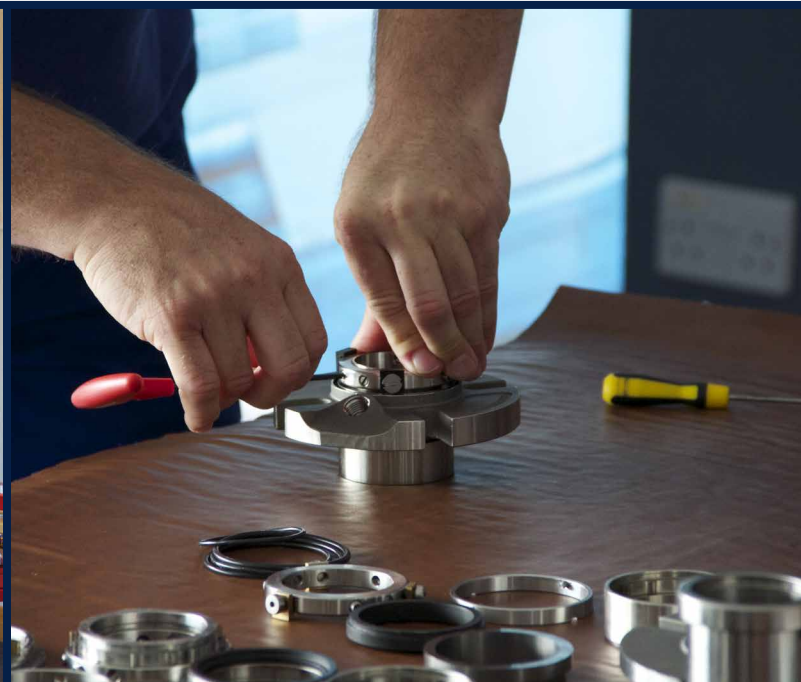
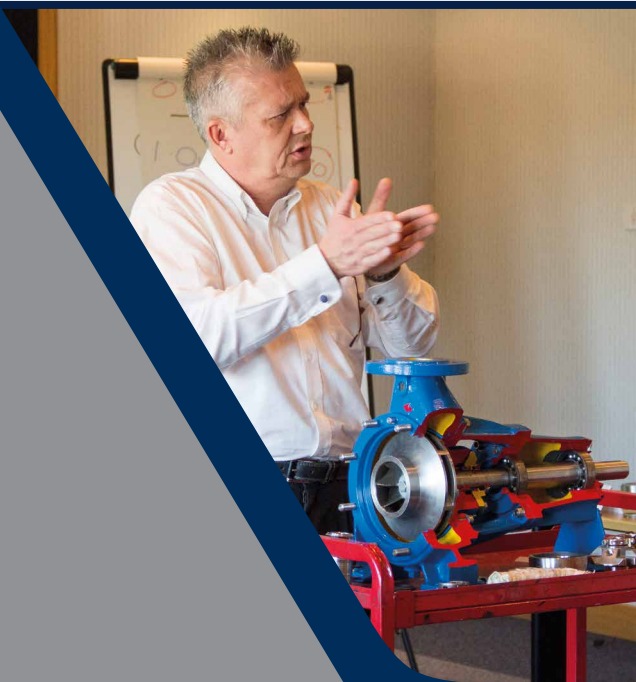




EXPERIENCE THE EXCEPTIONAL



## Equipment Reliability Courses

- Increase mean time between failure / mean time between repair
- Maximize rotating equipment reliability
- Reduce maintenance costs



## Developing Your Team's Skills

To operate industrial plants both safely and efficiently, you need highly skilled and well-trained personnel.

With the introduction of new technology, production processes and the need for increased plant availability, it is important to ensure that these skills are kept up-to-date.

AESSEAL® provides specialist training courses that are specifically designed to help your staff develop their knowledge and understanding of mechanical seals, centrifugal pumps and bearings.

**These courses are designed for companies that are aiming to:**

- Increase mean time between failure / mean time between repair
- Maximize rotating equipment reliability
- Reduce maintenance costs

## Specialist Training

Chris Dean is the Group Technical Training Officer for AESSEAL and has been involved in mechanical engineering for over 35 years.

In these years, Chris has developed a vast array of skills and experience regarding pump and seal installation and maintenance.

Having worked in a variety of industries from Pulp and Paper to Chemical and Nuclear Reprocessing to Power, there isn't much Chris hasn't seen in relation to pump and seal maintenance. Having this experience over an extended period of time has enabled Chris to develop relationships with distributors, end users and pump repair houses throughout the world.

Chris regularly conducts rotating equipment reliability training both at AESSEAL and at customer premises throughout the world. The primary objective of this training is to increase mean time between failure to reduce operational costs and increase profitability. Chris's relaxed, but professional approach to the training sessions ensures all attendees leave with the knowledge and skills that can be instantly applied in the workplace.



“ Investing in our employees is the key success at Chemoxy International and we have repeatedly sent delegates to AESSEAL for over 3 years. AESSEAL offer a fantastic training package which enhances the quality of our work force and has intern improved the efficiently and reliability of our operations.”

Training & Development Manager, Chemoxy International

## Courses Details

### Costs

- Two days training with two nights accommodation  
**£800/ €950\*** per delegate (recommended)
- Two days training with one night accommodation  
**£750/ €890\*** per delegate

\*Subject to change without notification

Please note: 1-2 nights accommodation includes team-building exercises, evening meal(s), buffet lunch on both days and reference material.

Both courses are held at our Corporate Headquarters; AESSEAL plc, Global Technology Centre, Mill Close Bradmarsh Business Park, Rotherham, S60 1BZ., England. Spaces are allocated on a first-come first-served basis, so please book early to secure your place and avoid disappointment.

To book, please contact:

[training@aes seal.com](mailto:training@aes seal.com) or go to [www.aes seal.com/customer-training](http://www.aes seal.com/customer-training)

### Fuse in the System

- 20th / 21st October 2015
- 1st / 2nd December 2015
- 9th / 10th February 2016
- 26th / 27th April 2016
- 14th / 15th June 2016
- 4th / 5th October 2016
- 6th / 7th December 2016

### Advanced Pump

- 3rd / 4th November 2015
- 17th / 18th May 2016
- 29th / 30th November 2016

## Tailored Training

Customized for your requirements and delivered at your convenience.

In addition to our standard courses we can also offer customized programmes designed around your needs. These can be delivered either at one of our Training Centres, or at your site.

Our modular programme can be configured so that it is suitable for all levels in your organization from plant managers to maintenance operatives.

To enquire about tailored training for your company, providing you have a minimum of 8 delegates, please contact us at least 12 weeks in advance.





# Mechanical Seals - The Fuse in the System

## Specialist Training to develop your workforce

AESSEAL® provides specialist training courses that are positioned to help your staff develop their knowledge and understanding of mechanical seals, centrifugal pumps and protection of bearings.

### Course overview

This course is designed to give delegates an introduction to correct mechanical seal operation and an insight into root-cause and pump failure modes, accompanied by easy to implement troubleshooting techniques.

### Who should attend

Whether new to this field or a seasoned professional looking to refresh their knowledge, this course is designed to give a practical insight into improved plant reliability. The course is suitable for plant operators, maintenance personnel, purchasing personnel and engineers.

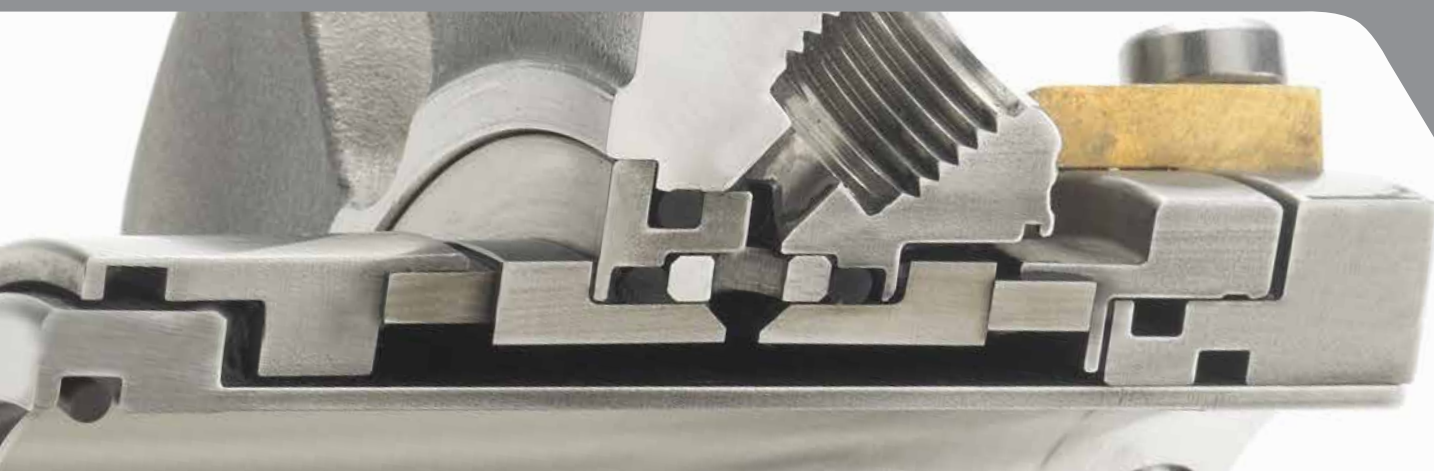
### Key learning outcomes

- The principles behind good mechanical seal life and how to achieve it
- How to improve your margin for operational error
- The importance of correct rotating equipment operation
- The relationship between equipment reliability and stop-start operation
- The need for correct seal and seal support system selection and application
- Bearing life and the changes required for improvement
- The importance of the mechanical seal materials selection process and the properties of materials
- Simple troubleshooting techniques to improve equipment availability
- The operational importance of implementing mechanical seal standards



“Training provided by AESSEAL gave me the required amount of knowledge which enabled me to analyse faults and select the appropriate mechanical seal. The trainer was able to support on specific plant issues giving suggestions on how we could operate in a more reliable manner.”

Mechanical Engineer, Cargill



## Course Content

The course introduces to delegates the correct mechanical seal operation, how to extend your mechanical seal life, as well as easy to implement troubleshooting techniques.

### What is a Mechanical Seal?

- How seals work.
- What is good seal life and am I getting it?
- Why use mechanical seals?
- Seal types and configurations.
- Rotary v Stationary designs.
- Hydraulic balanced and unbalanced seals.
- Single / Dual seals.

### Centrifugal Pumps - What is a Pump?

- How pump design affects seal and bearing life.
- Alignment and its effect on reliability.
- Shaft deflection.
- Understanding pump curves.
- The relationship between head and pressure.
- The consequences of using an over-sized pump.
- Cavitation; types, causes, symptoms and cures.
- Piping systems and their effects on equipment reliability.

### Bearing Failure & Protection

- What is 'good' bearing life?
- Primary causes of failure.
- Moisture; its effect on bearing life.
- Effects of temperature and contamination on lubrication.
- Sealing methods.

### Seal Failure Analysis

- Why is failure analysis necessary?
- Examination procedures.
- Seal face damage; causes & solutions.
- Metallurgy damage; causes and solutions.
- Secondary seal failure; causes and solutions.
- Case history review.

### Dual Seals and Support Systems

- Why we use dual seals.
- Protecting the fuse in your system.
- The difference between barrier and buffer systems, and their application.
- Thermosyphon and forced circulation fluid principles.
- Internal seal pumping scroll benefits.

### Environmental Controls

- Why use environmental controls?
- Improving single and dual seal life.
- Common API / CPI Plans.
- Applications - Why and where?
- Misapplied arrangements.

### Seal Installation / Pump Re-build Procedures

- Pre-install dimensional checks.
- Correct seal installation checks.
- Importance of correct impeller clearance.
- Importance of correct bearing installation.
- Importance of roto-dynamic balance.

If you have any questions or want to know more information please contact us.

**Tel: 01709 369966 Email: [training@esseal.com](mailto:training@esseal.com)**

AESSEAL plc, Global Technology Centre, Mill Close, Bradmarsh Business Park, Rotherham, S60 1BZ.

## Advanced Pump Training

For industries that seek increased Mean Time Between Failure, improved process availability and reduced unplanned outages whilst reducing maintenance and purchasing costs.

After the success of the Advanced Pump Training introduced last year AESSEAL are repeating the course in 2016. This training course gives an in-depth understanding of all aspects of rotating equipment and helps operators to effectively troubleshoot costly equipment reliability issues.

### Course overview

The course is designed to give delegates an understanding of all aspects of rotating equipment and help them effectively troubleshoot costly equipment reliability issues. It also gives an in-depth understanding of the links between mechanical seal, bearing and pump failures.

### Who should attend

The course is suitable for plant supervisors, pump repairers and senior engineering staff involved in maintenance, design, reliability, production and operations, etc.

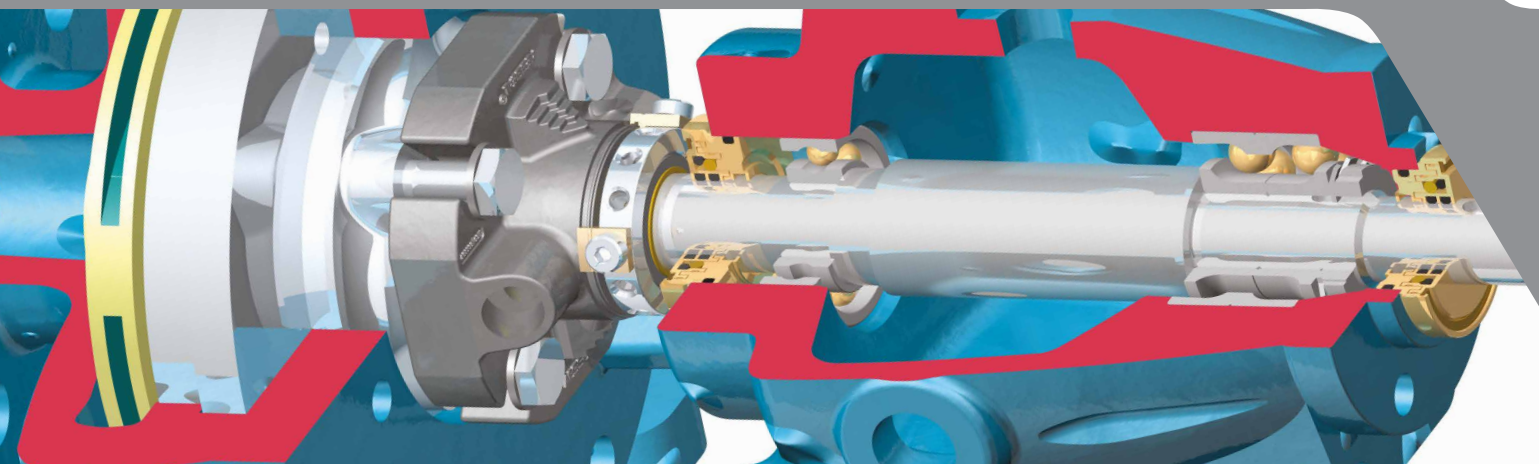
### Key learning outcomes

- The importance of correct equipment selection
- On-site operating practices and their effect on mechanical seal and bearing reliability
- Cost effective techniques to improve process availability
- The benefits of creating pump purchasing standards to improve mechanical seal life
- The common objective between production, maintenance and purchasing
- The reasons for selecting particular maintenance strategies
- The value of a specialist troubleshooting team to implement focused improvements

**NORTHUMBRIAN**  
**WATER** *living water*

“Thanks to training from AESSEAL I now have a better understanding of mechanical seals and their function within a pump. The trainer was friendly, experienced and very knowledgeable. I have changed how I operate which has improved my practices and processes.”

Maintenance Engineer, Northumbrian Water



## Course Content

The course helps people improve root cause failure analysis of the complete system, in order to improve equipment reliability, as well as improving troubleshooting techniques through the use of case histories and group discussion.

### Introduction to Pumps

- How long should pumps and seals last?
- What do seals need for good life and why do they fail?
- What is a pump?
- Pump classification.
- Impeller types and specific speed.
- Pump nomenclature.
- Fluid terminology.

### Creating Pump Standards

- Stuffing box and seal chamber designs.
- Estimating stuffing box pressure.
- Problems with low pressure stuffing box designs.
- Impeller clearances and efficiency.
- Single and double volutes.
- Bearing arrangements.

### Importance of Correct Installation

- Motor and shaft alignment.
- System piping problems and their effect.
- Understanding the significance of correct suction piping.
- Pump installation “Rules of Thumb”.

### Head, flow and electrical consumption, The “Affinity Laws”

- Calculating NPSHa.
- Understanding the effects of temperature change.

### Pump Terminology, Understanding Head and Cavitation

- Converting head to pressure.
- Creating simple system diagrams and specifying pumps.
- Understanding pump curves.
- Understanding head and pressure relationships.
- Understanding shaft deflection and stop start pumps.
- What causes hydraulic radial load?
- Understanding cavitation.
- Differentiating cavitation damage marks.
- Avoiding cavitation.

### Understanding Oversized Pumps

- How did we end up with oversized pumps?
- Problems with oversized pumps.
- What are the operating costs of oversized pumps?
- Estimating shut-off head.
- Trouble shooting oversized pumps and the “Three Gauge Method”.
- Problems with using variable speed drives.
- Calculating the “First Critical Speed”.

If you have any questions or want to know more information please contact us.

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[www.aesseal.com/customer-training](http://www.aesseal.com/customer-training)

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