



Elastomer Technology and Seal Design for Critical Sealing Applications

A one day professional development course

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Beach Ballroom, The Esplanade, Aberdeen, AB24 5NR

A member of the

group of companies

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Elastomer Technology and Seal Design for critical Sealing applications

INTRODUCTION

Seals are often neglected at the design stage but are frequently identified as being responsible for failure in critical sealing applications.

The use of cost effective, high performance sealing components is crucial to the optimal functioning of sealing systems. Improved sealing performance advanced sealing designs, optimal material selection and extended service intervals, can all combine to offer a lower cost of ownership.

COURSE AIM

This course will focus on real-life applications. Its aim is to ensure all participants acquire a fundamental understanding of elastomer sealing technology and performance relating to critical sealing applications. The course will include case studies with practical suggestions on implementing improvements to the delegates own applications.

COURSE OBJECTIVES

At the end of the training session, delegates will be able to:

- Explain how O-ring seals are manufactured.
- Define the range of elastomers available and understand their inherent strengths and weaknesses.
- Ask appropriate questions of elastomer manufacturers in order to compare and evaluate the suitability of elastomer materials.
- Specify the optimum elastomer material for any given application.
- Calculate optimum O-ring and seal sizes to fit existing hardware.
- Design optimum new hardware for critical seal applications.
- Combine the latest materials technology with modern design techniques to design a more competitive product.
- Identify and diagnose potential sealing problems early thereby reducing any possible downtime.
- Specify the causes of seal failure and take appropriate action to eliminate future occurrences and potential warranty claims.
- Extend preventative maintenance (PM) cycles.
- Estimate how differences in service environment may affect seal performance.
- Understand how to achieve cost savings by informed seal material selection, avoiding over-specification.
- Write a robust sealing specification.

WHO SHOULD ATTEND?

This seminar is designed for;

- Service and Maintenance Engineers
- Design Engineers involved in seal design or seal specification
- Quality Managers and Engineers
- Technical Managers
- Technical Purchasing
- Material Engineers
- Engineering Apprentices/Trainees/Graduates

PERSONAL IMPACT

Attendance at the workshop will result in individuals developing their knowledge, understanding and skills in various aspects of elastomer technology, seal design and how this impacts on applications they are involved with. They will be able to take this knowledge and apply it in their day-to-day activities to achieve cost savings, more robust designs and display to their own customers a greater depth of knowledge.

ORGANISATIONAL IMPACT

Organisations sending delegates to this workshop will benefit from having employees who will be more knowledgeable in aspects of seal design and technology that directly impact on your business. They will be able to select materials with greater confidence and utilise them to greater effect, improving organisational efficiency, product quality and reducing cost.

TRAINING METHODOLOGY

The seminar is based on a combination of interactive activities - group and individual exercises, case studies, hands-on problem solving tasks and discussions - along with formal technical inputs.

The environment will be supportive to individuals with varying degrees of experience who will be encouraged to share the approaches they currently use, as well as try out new ones that they encounter on the course. The course trainers will be on-hand to answer any questions you may have and will act as facilitators for building and applying new approaches.

We aim for this to be an enjoyable learning experience and feel that the mix of style and learning techniques will prove valuable to those that attend.

WHAT DOES IT COST?

The course is free or charge to oil and gas personnel who work in engineering and supply chain involving seals.

SEMINAR OUTLINE

(1 day professional development course)

Welcome

Introductions and expectations.

WHAT IS RUBBER AND WHY DO WE USE IT?

- History of rubber
- Overview of available sealing materials
- Introduction to the chemistry and manufacturing of elastomers

THE CHEMISTRY OF ELASTOMERS & MATERIAL SELECTION

- A review of elastomers commonly used in critical sealing applications
- The process of material selection and temperature considerations
- Chemical compatibilities

HOW ARE O-RINGS MADE?

- Explanation of the seal manufacturing process
- Limitations on seal design due to manufacturing restrictions

SEAL DESIGN & INSTALLATION

- Types of groove
- Effects of Squeeze & Stretch
- The effect of pressure on O-rings
- Gland fill & thermal extrusion
- Seal installation recommendations

FAILURE ANALYSIS

- Typical failure modes seen in critical sealing applications
- Material testing capabilities
- The use of seals as diagnostic tools
- Cost factors, life-cycle evaluation

CASE STUDY

Writing a robust specification

Trainer Profile



John Kerwin BSc, MSc, FIM, CEng

John is the Materials Technology Manager at Precision Polymer Engineering. An experienced material scientist, in particular, with elastomers used in critical sealing applications, John has worked in the field of polymer technology for the past 35 years.

Having obtained a prize winning First Class Degree in Polymer Technology at Manchester Metropolitan University, John continued his studies and gained a prize winning Masters Degree in Polymer Engineering at Loughborough University. John's current area of experience and interest includes fluoroelastomers and their compatibility with aggressive environments.



John is the author of a number of technical papers and articles published in various leading trade journals. He was elected Fellow of the Institute of Materials and gained Chartered Engineer status after pioneering work on high speed moulding processes and the development of novel sealing and bearing materials

In the course of his career, John has been Chief Chemist at a large UK seal manufacturing company and a Director of a business developing and selling novel sealing and bearing materials for many global industrial applications.

John has been at Precision Polymer Engineering since 2004 where he is responsible for a team of highly qualified and experienced technologists engaged in compound development, focussing on some of the most aggressive and difficult sealing requirements within the chemical processing, pharmaceutical and oilfield sectors.

Trainer Profile



Mick Holland C.Eng, M.Eng

Mick is a Master of Engineering with seven years experience in high performance elastomer sealing. Taking a multidisciplinary approach to sealing system design, Mick specialises in the application of elastomer and thermoplastic materials in the most demanding Semiconductor, Aerospace and Oilfield industries.

As the Global Products Manager at Precision Polymer Engineering Limited, Mick regularly delivers training to customers from around the globe.

Since joining Precision Polymer Engineering in 2003 Mick has spearheaded the introduction of the latest Computer Aided Design (CAD) and non-linear Finite Elements Analysis (FEA) toolsets, used to design and evaluate custom components.

Since graduating from Durham University in 1998, Mick has built up an in-depth knowledge of perfluoroelastomer organic chemistry and its implications upon the physical properties of the elastomer compounds, by working hands-on in this specialist field.

Mick offers a wealth of design knowledge, drawing from vast experience in the design of low pressure Pharmaceutical and Semiconductor Capital Equipment sealing systems. Having also serviced both the aerospace and oilfield markets, Mick can offer expertise in the design and specification of high pressure and dynamic applications. His product support team works closely with the OEM to optimise equipment design, but can also work with end-users to upgrade equipment and minimise cost of ownership. As a member of the Institute of Engineering Technology (IET) Mick is able to better appreciate the applications in which the seals must operate ensuring seal designs that are suitable for the application.

