



# **Elastomer Technology and Seal Design for Critical Sealing Applications**

*A one day professional development course*

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# Elastomer Technology and Seal Design for critical Sealing applications

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## 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 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.

## SEMINAR OUTLINE



*(1 day professional development course)*

8.45 Welcome

9.00 Introductions and expectations.

### 9.20 **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
- Why an O-ring seals

11.00 Refreshment Break

### 11.15 **SEAL DESIGN & INSTALLATION**

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

12.30 Lunch

### 13.15 **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

### 14.15 **HOW ARE O-RINGS MADE?**

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

15.00 Refreshment Break

### 15.15 **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

### 16.00 **CASE STUDY**

- Writing a robust specification

17.00 Finish

*Timings and the order of sessions are subject to change*