BHR Group
EXPERTS IN FLUID ENGINEERING

# KRISTAL: Improving Tribology by Applying Nano-Coatings to Rubber-like Materials

Integrating nano-technology and nano-coatings to tailor and extend the performance and functionality of rubber-like materials in sliding/sealing systems

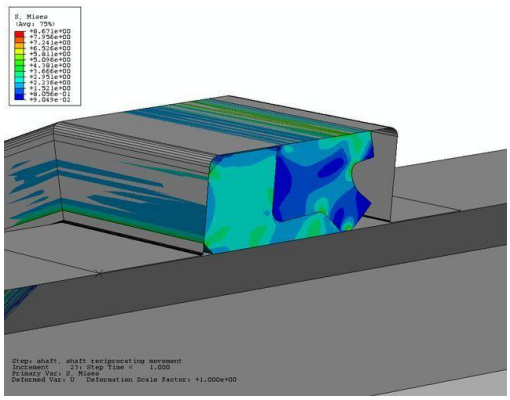
## The Challenge

The Kristal project is financially supported through the European Commission NMP programme of FP6 with the goal of improving the performance and functionality of sliding and sealing systems of rubber-like surfaces. The industrial requirements for the work are to:

- Develop quick and cost-effective design methods of sliding / sealing systems by considering component and system tribological aspects
- Control friction during the life of the component by tailored surface engineering
- Minimise the environmental impact of sliding / sealing systems by improving tribology
- Obtain self-lubricating and long-lasting sliding components

The end-user partners include TRW (automotive braking systems), Leibherr (aircraft landing gear), Camozzi (pneumatic cylinders) and Catelsa Hutchinson (elevators) who will apply the tools that are developed

## The Approach



KRISTAL integrates nano-technology and nano-coatings to tailor and extend the performance and functionality of rubber-like materials in sliding / sealing systems. To do this the work:

- Integrates fundamental understanding of tribological phenomena
- Applies research focused on modelling of tribological behaviour of rubber-like materials
- Develops nano-coating / texturing techniques with tailored tribological functions
- Provides technology transfer to industrial partners
- and validates at industrial scale the components developed for the end-users.

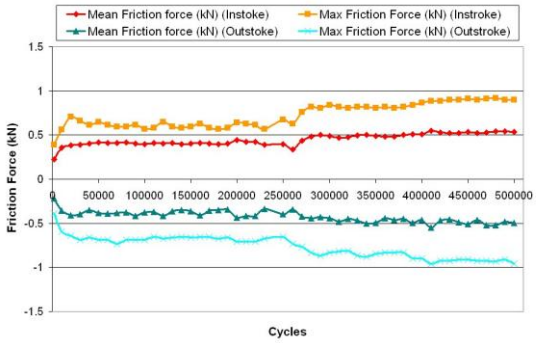
## The Work Programme

1. Establish a fundamental comprehension of tribological phenomena of rubber-like materials from nano to macro-scale:

- Development of common test methodologies
- Characterisation of materials properties from nano to macro-scale
- Study the impact of operating environments on the materials
- Analysis of surfaces from the physical and chemical point of view.

2. Develop models, virtual simulation, physical simulation of tribological behaviours of rubber-like materials from nano to industrial scale:

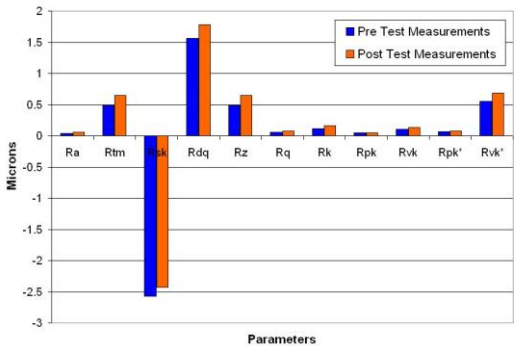
- Failure analysis by modelling & simulation of material behaviour
- Modelling of friction & wear process of surface coatings / texturing
- Modelling of fluid-structure interactions and noise and vibration




## BHR Group's Roles

In collaboration with other technical, academic and industrial partners BHR is:

- Developing models for lubrication, friction and wear to help predict the reliability and life of elastomeric sliding components on metal counterfaces
- Integrating models in design tools such as FEA to accelerate design and testing programme
- Performing qualification and type testing of tribological pairs under lubricated sliding conditions
- Determining the effect of nanocoatings on elastomer or counterface on component design and performance
- Conducting on-line wear contamination monitoring of hydraulic systems as evidence of seal performance
- Developing best practices in tribo-testing and surface measurement where nano-coatings have been employed
- Assessing the impact of standards and regulations on uptake and implementation of the products and services that the Kristal project delivers.





Office contact information: FS24

Telephone: +44 (0) 1234 750 422
Facsimile: +44 (0) 1234 750 074
Email: info@bhrgroup.com
Website: www.bhrgroup.com

The Fluid Engineering Centre
Cranfield, Bedfordshire
MK43 0AJ
United Kingdom


Global Experts in Fluid Engineering