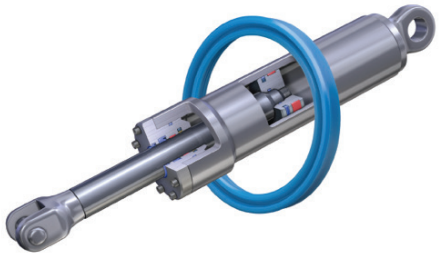
THE PERFECT CYLINDER PROGRAM FOR HYDRAULIC SEALS



The Freudenberg-NOK PERFECT CYLINDER program for hydraulic seals optimizes sealing technology to help customers reduce their costs and improve the performance of their machinery.

The PERFECT CYLINDER program:

- Uses a unique "seal first" approach to reduce material and component costs by as much as 40%
- Changes the way standard cylinders are designed and manufactured to accommodate specific application requirements
- Incorporates three world-class materials as the pillars of its success

Three pillars of success

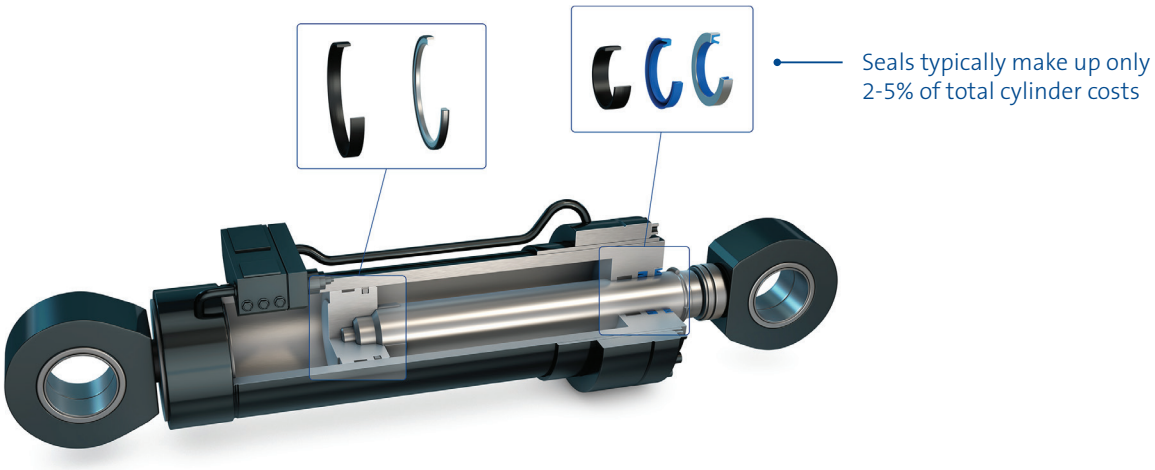
Scientists at Freudenberg-NOK have developed some of the most advanced materials and processes in existence to meet ever increasing customer performance requirements. The PERFECT CYLINDER program relies on three innovative products to deliver results:

1. HDP330 Nylon Piston Seal
2. 94AU30000 Polyurethane
3. ISG Guivex® Guidebands

VALUE FOR THE CUSTOMER

- Leading-edge materials allow manufacturers to use non-honed, rougher surface finishes that eliminate steps in the machining process
- The number of seals and components required in a system is reduced while performance is maximized
- Larger extrusion gaps up to twice normal design standards are tolerated, thus reducing manufacturing time
- Reduced gland width saves space and material
- Freudenberg experts evaluate and collaborate with customers' engineering teams to optimize cylinder design while maintaining maximum application performance

What really drives costs down



FREUDENBERG-NOK
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The PERFECT CYLINDER program for hydraulic seals

3 pillars of the PERFECT CYLINDER program

HDP330 Nylon Piston Seal

Features

- Extreme high extrusion resistance
- Good sealing function drift resistance
- Dynamic sealing function similar to or better than PTFE
- Allows for running across ports
- High abrasion resistance with low friction design

Benefits

- High pressure
- Use in no drift applications and average pressures
- High efficiency and improved cylinder performance
- Use in a wide ranging applications (including telescoping cylinders and overhead applications)
- Use in burnished or cold drawn tubes, with Ra > 15 micro inch
- High abrasion resistance with low friction design

94AU30000 Polyurethane

Features

- Extreme high extrusion resistance
- Broad Chemical resistance
- Wide temperature range (-40°C to +120°C)
- Hydrolysis resistance
- Strong compression set performance

Benefits

- Larger extrusion gaps or pressure limit increase by 25%
- For use in wide range of oils (mineral and synthetic) and additives
- Use in biodegradable oils for environmentally sensitive applications
- Optimum design for low friction performance (no energizers needed)
- Elimination of buffers in some applications

ISG Guivex® Guidebands

Features

- Higher radial load capacity (40%)
- Quieter operation
- Excellent for short stroke applications (inadequate lubrication)
- Broad temperature range and use in mineral and synthetic oils

Benefits

- Improve side load performance or allow a 40-45% reduction in guide-band width in standard applications
- Reduced gland and piston widths for material savings
- Reduced equipment noise (db)

The information contained herein is believed to be reliable, but no representation, guarantees or warranties of any kind are made to its accuracy or suitability for any purpose. The information presented herein is based on laboratory testing and does not necessarily indicate end product performance. Full scale testing and end product performance are the responsibility of the user.

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