Low Friction Sealing for Long Life Hydraulic Cylinder Applications

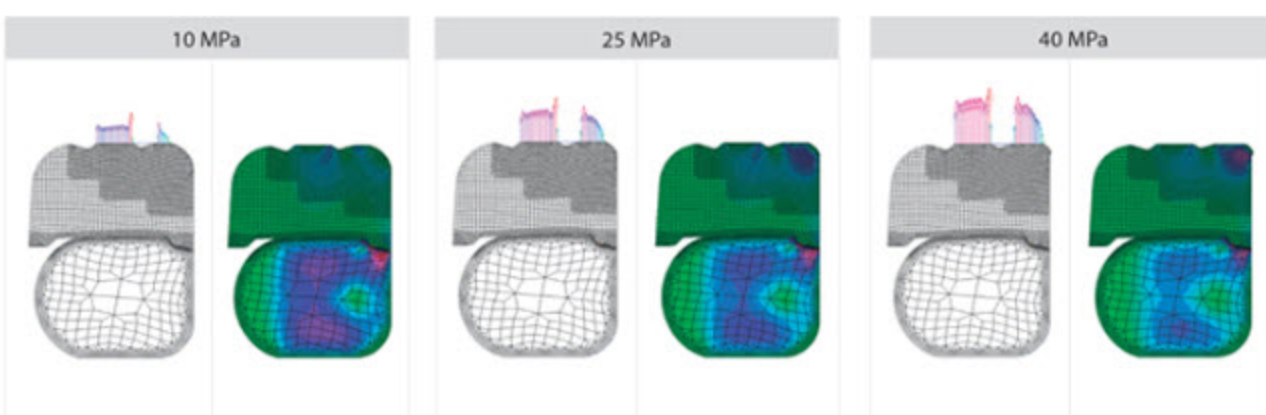
Modern machinery, equipment and motors fitted with hydraulic cylinders are becoming more powerful, which means that the hydraulic systems therein are increasingly subject to higher operating pressures and temperatures.

A new seal design in a completely new material by Trelleborg Sealing Solutions provides a solution to these demanding requirements in the form of the Zurcon®Glyd Ring®D.

Manufactured from Zurcon®Z13 polyurethane material, the Glyd Ring®D offers an excellent combination of wear, extrusion and hydrolysis resistance, giving unrivalled durability. With its innovative profile, Glyd Ring®D is able to operate at high pressure without any risk of blow-by effect.

Reliability and Long Service Life

Zurcon®Glyd Ring®D has been engineered to give the prime combination of sealing performance and service life, through optimized contact pressure, with minimized heat generated from friction. To achieve this, Finite Element Analysis (FEA) has been used to develop a multifaceted seal contact footprint, incorporating two special grooves in the D-shaped profile of the seal to sustain an oil film for adequate lubrication of the seal against its counter surface.



Static Contact Force and Equivalent Stress of Glyd Ring®D in Zurcon®Z13

Excellent Seal Performance and Outstanding Extrusion Resistance

With increasing system pressure, the O-Ring and seal body of the Zurcon®Glyd Ring®D transmit pressure along the sealing surface to ensure sealing efficiency at all pressure levels. As pressure rises, the contact force against the mating surface increases, ensuring seal integrity.

When Zurcon®Glyd Ring®D is pressure loaded: the seal body rotates, improving the contact pressure on the sealing edges. When the system pressure changes direction, the seal returns to its original position, avoiding any risk of blow-by effect. Under higher pressure the lubricated groove traps an oil reservoir, providing lower friction during movement, while the rounded lip profile provides extra space in the groove to avoid extrusion issues, which can be a problem with traditional piston seals.

Glyd Ring® D in Zurcon® Z13

Zurcon® Z13: Technical Data

Zurcon®Glyd Ring®D is manufactured from Zurcon®Z13 polyurethane material. The compound is specially developed to cope with pressures up to 55 MPa / 7,975 psi at both sides of the seal and at temperatures up to + 120 °C / + 248 °F.

The seal therefore offers long service life, even under demanding conditions. Giving excellent mechanical and elastic properties, the seal loses none of its resilience and can be used in cylinders with lower quality inner walls.

Physical Properties

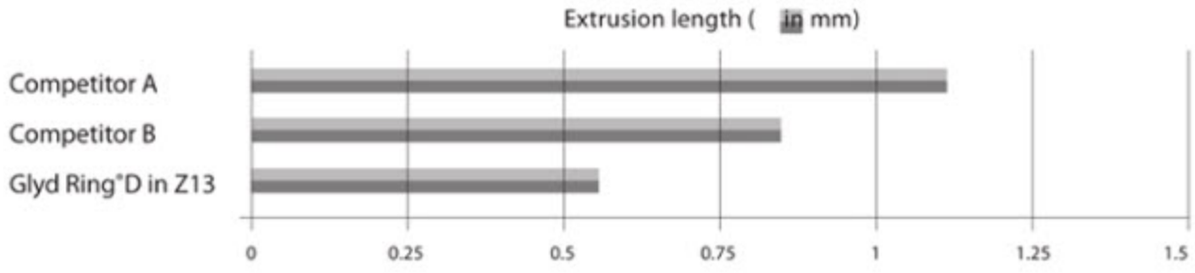
Type	Standard	Unit	Material Specification
Hardness	DIN 53 505	Shore D	60 + / -2
Modulus 100%	DIN 53 504	N/mm2	> 25
Temperature Range*		°C °F	-30 °C to +120 °C -22 °F to +248 °F
Tensile Strength	DIN 53 504	N/mm2	> 50
Elongation at Break	DIN 53 504	%	> 350

**Depending on O-Ring material*

Chemical Compatibility

Fluid Type	DIN / ISO Code	Temperature		Results
Mineral Oils	HLP / HVLP / HLPD	+110 °C	+230 °F	Excellent
Synthetic fluids	HEES	+80 °C to +100 °C	+176 °F to +212 °F	Excellent
	HEPG (PAG)	+60 °C	+140 °F	Good
	HEPR (PAO)	+100 °C	+212 °F	Excellent
Water-based fluids	HFA	+ 50 °C to +60 °C	+122 °F to 140 °F	Good
	HFC	+60 °C	+140 °F	Excellent
Synthetic water-free fluids	HFDU	+100 °C	+212 °F	Excellent

Outstanding Extrusion Resistance



Static: 24 hours at 60 MPa / 8,700 psi and +100 °C / +212 °F

Solving Mobile Hydraulic Sealing Challenges

Delivering a superb combination of elasticity and tensile strength without compromising on sliding friction properties, the Glyd Ring®D in Zurcon®Z13 is the recommended choice for double-acting piston seals in various high pressure hydraulic cylinder applications such as construction machinery, mobile cranes, earth moving equipment, agricultural machinery and fork lift trucks.

Single sealing element with O-Ring energizer
Optimized contact pressure provides excellent sealing performance with minimum friction
Innovative design prevents blow-by effects
Completely new Zurcon®Z13 polyurethane material compatible with latest hydraulic fluids
High abrasion resistance offers extended service life
Excellent extrusion characteristics allow operation at sustained pressures up to 40 MPa / 5,800 psi with peak up to 55 MPa / 7,975 psi
Simple groove design for ease of installation with high radial gaps possible
Suitable for one piece piston designs

The information in this article is based on many decades of experience in the manufacture and application of sealing systems for hydraulic applications. However, unknown parameters and conditions may restrict general statements. For a complete design consultation on sealing solutions for hydraulic applications, contact your local Trelleborg Sealing Solutions Marketing Company.