

Introducing

DURATORQUE[®]

by Roper Pump Company

**MUD MOTOR POWER SECTIONS
ELASTOMER GUIDE**



THE LEADING FORCE behind liquids[®]



American Ingenuity

Roper Pump Company has developed and marketed elastomer compounds for a variety of applications. The ER series of elastomers has been specifically designed with tough downhole drilling applications in mind. Virtually all of our downhole stators can be manufactured with a number of elastomers, so the number of potential configurations is extensive.

The ideal interference fit between the rotor and stator is calculated, tested, and verified for each power section design. This precise fit is almost always compromised to varying degrees when the stator is exposed to downhole conditions. Selecting the right elastomer and rotor/stator fit for the job is critical and the adjacent charts are designed to help.

Swell

Elastomers will swell when exposed to chemicals, temperature, or both. The best performing stators contain an elastomer that will not swell as much and maintains its mechanical & physical properties. The interference fit between the rotor and stator is precisely designed to meet performance and durability expectations. The exacting tolerances used to create this ideal fit are quickly compromised when the stator elastomer is attacked by the drilling fluid. Figure 1 depicts the stability of each of our elastomers in common drilling fluids extracted directly from the field.

Strength

DuraTorque®'s harder elastomers deflect less and create stronger seal lines between the rotor and stator. Hard rubber is less hysteretic and has more resistance to premature chunking. Softer rubber provides more resilience which is important in applications where solids content may be higher. Figure 2 shows a range of rubber hardnesses offered by Roper for various applications.

Power

The best performing power sections encompass not only dimensional stability and mechanical strength but also the highest power density. Everyone wants to increase the rate of penetration downhole, and Roper offers standard strength rubber, hard rubber, and patented steel reinforced stator profiles. Figure 3 shows the power advantages of these 3 options.

Figure 1: Effect of drilling fluids on stator elastomer at 300° F

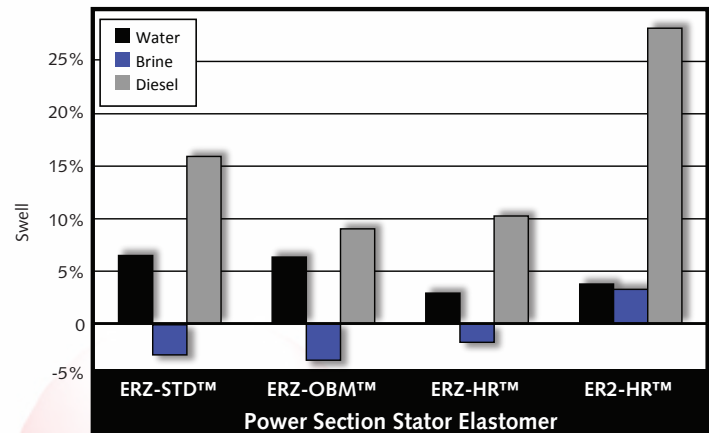


Figure 2: Relative Mechanical Strength at 260°F

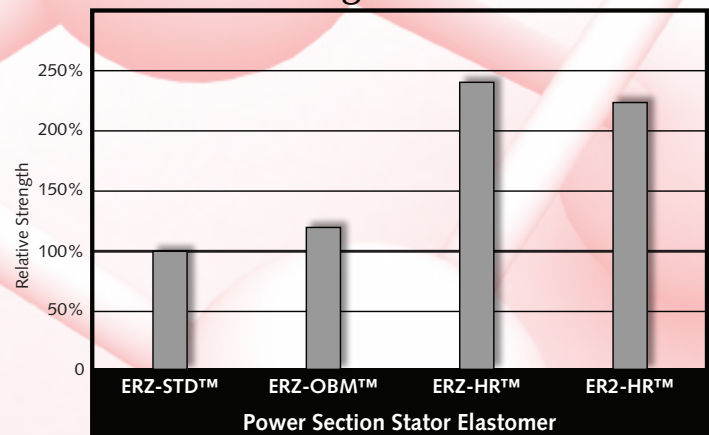
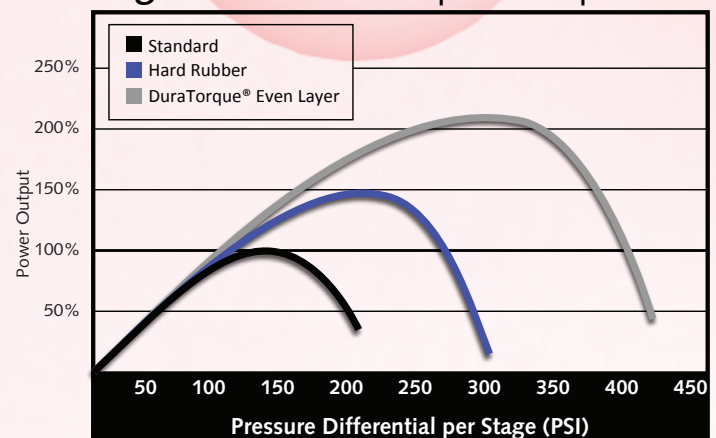


Figure 3: Power Output Comparison





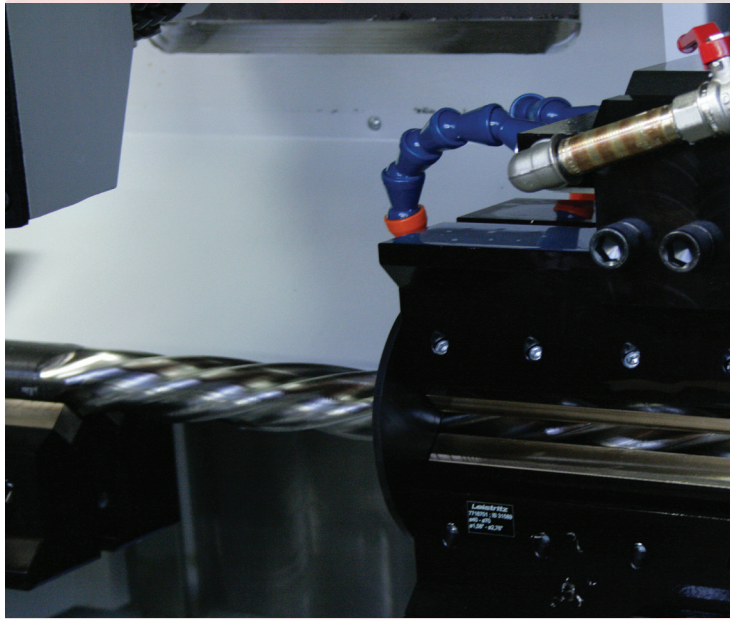
Elastomer Selection Guide

Elastomer	Strengths	Description	Sizing Guidelines Downhole Circulating Temperature				
			200°F ≤93°C	250°F 121°C	300°F 149°C	350°F 204°C	400°F 177°C
ERZ-STD™	<ul style="list-style-type: none"> ✓ Economical ✓ Multipurpose 	This multipurpose elastomer is ideal for the most common applications.	■	■	■		
ERZ-OBM™	<ul style="list-style-type: none"> ✓ Fluid Compatibility ✓ Value 	This elastomer was designed for reliability and provides excellent dimensional stability in harsh applications.	■	■	■		
ERZ-HR™	<ul style="list-style-type: none"> ✓ Fluid Compatibility ✓ Drill Faster ✓ Strength 	This elastomer delivers the most power and strength at elevated temperatures while providing the best fluid compatibility for most drilling fluids.	■	■	■		
ER2-HR™	<ul style="list-style-type: none"> ✓ Drill Faster ✓ Bond Strength ✓ Tear Strength 	This compound has a proven track record in the coiled tubing industry with exceptional rubber-to-metal bonding and thousands of runs. It is ideal for water-based drilling fluids and its superior mechanical strength has allowed many users to execute multiple nitrogen runs without relining.	■	■	■	■	

Standard Fit
 Single OS
 Double OS
 Triple OS

DuraTorque® engineered elastomers were specifically designed to withstand even the harshest subsurface environments while delivering significantly more power than conventional materials. These compounds outperform other materials in virtually every way including greater resistance to high temperature while at the same time experiencing significantly lower dimensional changes. Furthermore, ER2 elastomers are much less susceptible to hysteresis-induced failure and explosive decompression often associated with nitrogen drilling. Most importantly, the proprietary formulation at the heart of ER2 provides the highest level of rubber-to-metal bonding, thus greatly minimizing the possibility of catastrophic failure.

The information contained in this document is for reference only. Please consult Roper Pump Company to select the best elastomer for your drilling application.



Roper Pump Company is a global supplier of high quality positive displacement pumps, designed to handle a broad range of industrial applications. In addition to helical gear pumps and progressing cavity pumps, we design and develop numerous custom pumps for customers with unique and demanding applications.

From a small pump company founded in 1857, Roper Pump Company has grown into a technological leader. With a large installed base, we have both the knowledge and experience to help you solve your most challenging pumping problems...and our strong global distribution network ensures that your needs are met on time, every time.

Our Markets



INDUSTRIAL

Roper Pump Company's rugged and dependable range of positive displacement pumps provides versatile pumping solutions for even the most challenging industrial applications.



TRANSPORT

With over a century of experience in liquid cargo transfer, Roper Pump Company has always been trusted to load and unload your tankers quickly and safely.



POWER GENERATION

For reliable operation of engines, compressors and turbines, thousands of customers depend on Roper Pump Company fuel pumps, lube pumps and liquid fuel flow dividers.



OIL & GAS

Roper Pump Company has numerous pumping solutions from the well to the refinery. Our industry leading High Performance Power Sections™ allow mud motors to run longer at unprecedented temperatures and depths.

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