

Resilon® Polyurethane

Most advanced thermoplastic urethane for absorbing impact energy



Superior properties of Resilon® polyurethane extend service life

Resilon® polyurethane was developed by Parker's scientists and engineers to provide improved wear resistance and compression set resistance in demanding applications. The patented PPDI-based material is considered one of the best hydraulic sealing materials available – delivering increased strength and resilience. Its exceptionally low hysteresis delivers more cycles and longer life in dynamic impact and energy absorbing applications such as energy absorbing bumpers, seals and pads found in a broad range of applications for industrial hydraulics, heavy duty mobile equipment, automotive, and oil and gas drilling.



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- Exceptionally low hysteresis means more cycles and longer life in dynamic impact applications
- Over 8,000 psi tensile strength to resist extrusion over a broad pressure range and shock loads
- Maintains shape and contact force under rapid changes to pressure and load due to excellent compression set resistance
- Extended temperature service range of -65°F to +275°F



ENGINEERING YOUR SUCCESS.

PPDI-based Resilon® Formulation

Delivers best overall performance for major hydraulic sealing concerns

Three Basic Types of Sealing-grade Polyurethane Materials

There are three base formulations or chemical backbones used in compounding modern thermoplastic polyurethane (TPU) seal materials. They are:

- MDI (diphenylmethane diisocyanate)
- TODI (diphenyldiisocyanate)
- PPDI (p-phenylenediisocyanate)

All three produce the abrasion resistance and long wear benefits that are typical of any good polyurethane seal material. There are other physical properties though, such as heat resistance, compression set resistance, and rebound/resilience, which are major concerns in critical hydraulic applications which require effective, long-term sealing. It is in these latter performance areas that the characteristics inherent in

MDI, TODI or PPDI formulations become most apparent. This unique Parker-developed PPDI-based formulation - Resilon - yields the best over-all sealing performance of all commercially available TPU formulations currently on the market.

Superior Heat Resistance

Rheometric examination of the dynamic behavior of MDI, TODI, and PPDI (4300) were measured under tensile mode and produced the data shown in the chart at right. The low tangent delta, $\tan \delta$, values of Resilon PPDI across the practical application range indicate a lower ratio of energy absorbed as heat to energy returned as resilience. In addition, the higher temperature upturn of the $\tan \delta$ value verifies the higher softening temperature for the Resilon PPDI formulation.

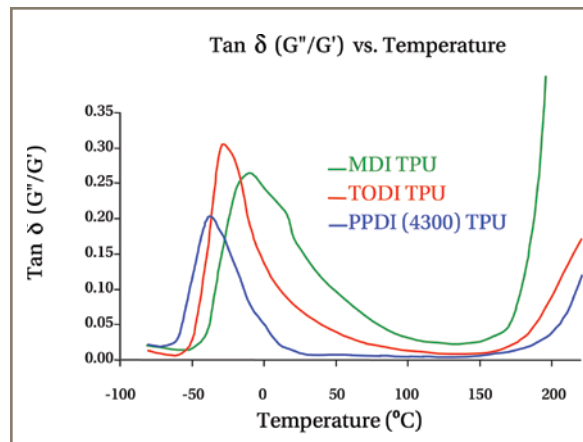


Fig. 1: Resilon® polyurethane's internal heat build-up (hysteresis) is much lower across the entire temperature range of operation (-40° to +275°F)

Superior Resilience/Rebound

Resilon (4300) also has superior resilience/rebound characteristics compared to other available TPU materials. Quick rebound is a major advantage in applications likely to experience severe shock loads and momentary pressure spikes. In addition, Resilon's enhanced resilience/rebound characteristics allow the sealing lips of a rod or piston seal profiles to conform to the moving seal interface with greater rapidity, maintaining critical sealing lip contact.

Applications

Recommended for piston seals, rod seals, wipers and O-rings for all types of light, medium and heavy-duty hydraulic cylinders, shock absorbers, off-road, industrial and construction equipment.

Resilon® Polyurethane Materials

Typical Physical Properties	4300A90	4301A90	4304D60
Hardness, Shore A, pts	90	92	(D) 56
Modulus @ 100% psi (MPa)	1674 (11.5)	1958 (13.5)	2949 (20.3)
Ultimate Tensile Strength, psi (MPa)	8021 (55.3)	7188 (49.6)	6896 (47.5)
Elongation, %	638	548	571
Specific Gravity	1.17	1.19	1.16
Rebound, %	61	41	56
Compression Set, %, 70 hrs @ 100°C *70 hrs @ 70°C	30.9	22.3*	40.9*

