



Thermoplastics

All thermoplastics are resins designed to soften and melt when exposed to heat. Utilizing an injection molding process, thermoplastics are melted at high temperature and injected into the mold. It is then cooled causing the plastic to solidify. If high heat is introduced again, the molded part will melt. The molecules of thermoplastics are held together by physical bonds rather than chemical bonding.

Elastomers — Polyurethane (TPU)

Polyurethanes exhibit outstanding mechanical and physical properties in comparison with other elastomers. Specifically, its wear and extrusion resistance make it a popular choice for hydraulic applications. Its temperature range is generally -65°F to +200°F (-54°C to +93°C), with some compounds, such as Resilon HT, having higher temperature ratings up to +275°F (+135°C). Polyurethanes are highly resistant to petroleum oils, hydrocarbon fuels, oxygen, ozone and weathering. On the other hand, they will deteriorate quickly when exposed to acids, ketones and chlorinated hydrocarbons. Unless specifically formulated to resist hydrolysis (Resilon WR), many types of polyurethanes are sensitive to humidity and hot water. Other acronyms polyurethane may be known by are AU, EU, PU, and TPU or may simply be known as urethanes. For typical physical properties, see Table.

P4300A90 – Resilon HT

90 Shore A hardness polyurethane manufactured by Parker specifically for sealing applications. This proprietary compound was developed to offer extended temperature capability, excellent resistance to compression set and high rebound characteristics that are unparalleled in the industry.

P4301A90 – Resilon WR

90 Shore A hardness polyurethane formulated for water resistance. This Parker proprietary compound can be used for both water and petroleum based fluids.

P4304A60 – Resilon ER

60 Shore D hardness polyurethane formulated to resist extrusion. This compound offers higher extrusion resistance for seals and anti-extrusion devices.

P4311A90 – Resilon HR

90 Shore A hardness polyurethane with high resilience. This formulation resists internal heat generated through hysteresis making this compound ideal for shock applications such as bumpers.

P4500A90 - Polyurethane

90 Shore A hardness polyurethane with good abrasion and extrusion resistance to improve the life of the seal. It also has excellent rebound which enhances response time to shock and side loading.

P4615A90 & P4617D65 - Molythane

P4615A90 is a 90 Shore A hardness, general purpose polyurethane, offering high abrasion and extrusion resistance and is an industrial standard sealing compound. P4617D65 is a harder, 65 Shore D, version of Molythane ideal for use in anti-extrusion devices.

P4622A90 - Ultrathane

90 Shore A hardness polyurethane formulated with internal lubricants for lower friction to help reduce heat build-up and wear.

P4700A90 - Polyurethane

90 Shore A hardness polyurethane formulated to offer enhanced physical properties over Molythane with improved sealing capabilities due to lower compression set and higher rebound.

P5065A88 – Low Temperature Polyurethane

88 Shore A hardness polyether based polyurethane formulated for an improved low temperature range and higher resilience than Molythane. This compound offers a softer feel for easy installation and is a more cost effective option when compared to P4700A90.

P4700A94 - Polyurethane

94 Shore A hardness polyurethane formulated for an improved abrasion, extrusion, and compression set resistance, as well as higher temperature range than P4700A90.

Elastomers — PolyMyte (TPCE)

PolyMyte is a Parker proprietary polyester elastomer. It has exceptionally high tear strength, abrasion resistance, modulus, and a wide temperature range of -65°F to +275°F (-54°C to +135°C). PolyMyte is resistant to petroleum fluids, some phosphate ester and chlorinated fluids, common solvents and water below 180°F. It is not compatible with cresols, phenols, and highly concentrated acids. Due to its higher hardness and modulus, seals made from this material can be difficult to install. Also, care must be taken not to damage the seal lips during assembly into the gland.

Z4651D60 - PolyMyte

60 Shore D hardness PolyMyte is used for seals in applications requiring extended extrusion resistance and/or fluid compatibility.

Z4652D65 - PolyMyte

65 Shore D hardness PolyMyte is ideal for back-ups and other anti-extrusion devices.

Z4752D55 - Hytrel

Standard 55 Shore D hardness Hytrel for back-ups and other anti-extrusion devices.

Table 3-1. Typical Physical Properties: Thermoplastics — Elastomers

| Parker Material Code | Material Trade Name (Color) | Typical Applications & Description | Service Temperature Range °F (°C) | Tensile Strength at Break psi (MPa) | Ultimate Elongation | Shore Hardness | | 100% Modulus psi (MPa) | Compression Set | | Rebound | Abrasion Rating Best = 10 |
|---|-------------------------------------|---|-----------------------------------|-------------------------------------|---------------------|----------------|----|------------------------|-----------------|-----------|---------|---------------------------|
| | | | | | | A | D | | Set | at°F (°C) | | |
| Thermoplastic Elastomers — TPU, Polyurethanes | | | | | | | | | | | | |
| P4300A90 | Polyurethane Resilon HT (Tan) | Proprietary compound offering extended temperature range, high rebound. | -65 to +275 (-54 to +135) | 8625 (59.5) | 560% | 92 | - | 1793 (12.4) | 28.9% | 212 (100) | 63% | 10 |
| P4301A90 | Polyurethane Resilon WR (Aqua Blue) | For water or petroleum based fluids. | -35 to 225 (-37 to +107) | 7129 (49.2) | 514% | 90 | - | 2029 (13.9) | 24.8% | 158 (70) | 45% | 8.1 |
| P4304D60 | Polyurethane Resilon ER (Brown) | Offers higher extrusion resistance for seals and anti-extrusion devices. | -65 to +275 (-54 to +135) | 6521 (44.9) | 556% | - | 55 | 2940 (20.3) | 32.2% | 158 (70) | 46% | 7.3 |
| P4311A90 | Polyurethane Resilon HR (Red) | Formulation resists internal heat generated through hysteresis, ideal for shock applications. | -65 to +275 (-54 to +135) | 7229 (49.8) | 632% | 91 | - | 1732 (11.9) | 33.3% | 212 (100) | 63% | 8.2 |
| P4615A90 | Polyurethane Molythane (Black) | General purpose industrial polyurethane offering high abrasion resistance | -65 to +200 (-54 to +93) | 8134 (56.1) | 565% | 95 | - | 1755 (12.1) | 30.8% | 158 (70) | 34% | 9.4 |
| P4617D65 | Polyurethane Molythane (Black) | General purpose industrial polyurethane offering high extrusion resistance. | -65 to +250 (-54 to +121) | 5973 (41.2) | 544% | - | 62 | 3914 (26.9) | - | - | - | 6.7 |
| P4622A90 | Polyurethane Ultrathane (Yellow) | Formulated with internal lubricants for lower friction to help reduce heat build up. | -65 to +225 (-54 to +107) | 6757 (46.6) | 466% | 94 | - | 1755 (12.1) | 31.0% | 158 (70) | 34% | 7.6 |
| P4500A90 | Polyurethane (Light Green) | Offers good abrasion and extrusion resistance with excellent rebound. | -65 to +200 (-54 to +93) | 6740 (46.5) | 586% | 92 | - | 1774 (12.2) | 32.9% | 158 (70) | 42% | 7.6 |
| P4700A90 | Polyurethane (Green) | Enhanced properties over 4615 to improve sealing capabilities from lower compression set. | -65 to +200 (-54 to +93) | 5660 (39.0) | 511% | 92 | - | 1665 (11.5) | 24.7% | 158 (70) | 35% | 6.3 |
| P5065A88 | Polyurethane (Dark Blue) | Formulated for an improved low temperature range and higher resilience than 4615. | -70 to +200 (57 to +93) | 5033 (34.7) | 660% | 86 | - | 1073 (7.4) | 27.2% | 158 (70) | 50% | 5.5 |
| P6000A90 | Polyurethane (Dark Gray) | Improved abrasion, extrusion and compression resistance as well as higher temp. than 4700. | -31 to +230 (-35 to +110) | 6513 (44.9) | 491% | 93 | - | 1941 (13.4) | 26.2% | 158 (70) | 44% | 7.3 |
| Thermoplastic Elastomers — TPCE, PolyMyte | | | | | | | | | | | | |
| Z4651D60 | PolyMyte (Orange) | Used in applications requiring extended extrusion resistance and fluid compatibility. | -65 to +275 (-54 to +135) | 5748 (39.6) | 775% | - | 58 | 2231 (15.4) | 43.0% | 158 (70) | - | 6.4 |
| Z4652D65 | PolyMyte (Orange) | Primarily used for back-up rings and other anti-extrusion devices. | -65 to +275 (-54 to +135) | 6175 (42.6) | 700% | - | 62 | 2611 (18.0) | 45.4% | 158 (70) | - | 6.9 |
| Z4729D65 | Hytrel (Tan) | Primarily used for back-up rings and other anti-extrusion devices. | -65 to +275 (-54 to +135) | 5609 (38.7) | 837% | - | 56 | 2212 (15.2) | 46.0% | 158 (70) | - | 6.9 |