# QUANTUM® PTFE SEALING PRODUCTS

**PTFE (polytetrafluoroethylene) boasts a unique combination** of outstanding material properties that makes it one of the best-performing materials in the field of sealing technology. Significant characteristics of PTFE include:

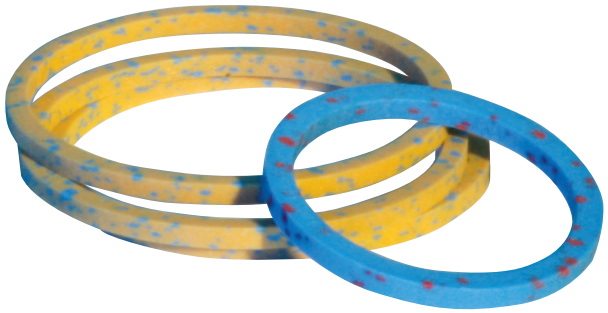
- Broad operating temperature range –200 °C to 260 °C (–328 °F to +500 °F)
- Optimum electrical insulating properties and great dielectric properties
- Superior longevity, weather-resistant
- Excellent frictional characteristics; no “stick-slip” effect
- PTFE is self-lubricating, which means that bearings and dynamic seals can run dry under certain conditions
- Anti-adhesive behavior
- Non-flammable
- Extremely low water absorption

## APPLICATIONS

- Compressor pistons
- Gas direct injection
- Engine cams
- Engine crankshafts
- Pneumatic and hydraulic cylinders and actuators
- Shock and strut-banded pistons
- Spring-energized seals
- Transmission Seal
- Power Steering Seals

## VALUES FOR THE CUSTOMER

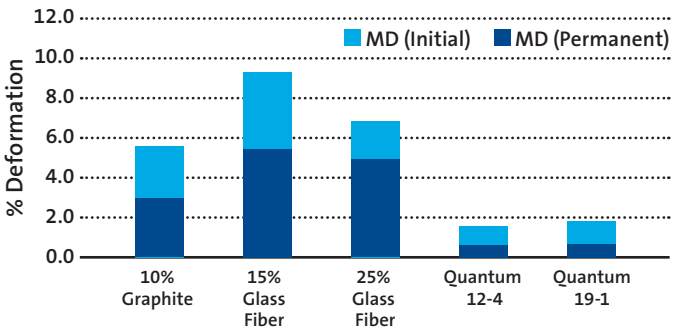
- **PTFE is a partially crystalline polymer** with an extremely high melting viscosity
- **Filled PTFE compounds extend the range** of low-friction applications in which pure PTFE provides high temperature resistance, low deformation under load, and enhanced wear characteristics
- **The use of standard fillers (like carbon, glass, and bronze)** or special fillers allow scientists to make specific changes to PTFE’s material properties
- **Unfilled PTFE’s universal chemical resistance** means that the PTFE is not affected by aggressive acids, alkali, nitrides, highly polarized and halogenated organic solvents, ketones, esters, and ethers
- **PTFE has one of the lowest coefficients of friction** of all solid materials, giving PTFE outstanding non-stick properties (no ”stick-slip” effect)



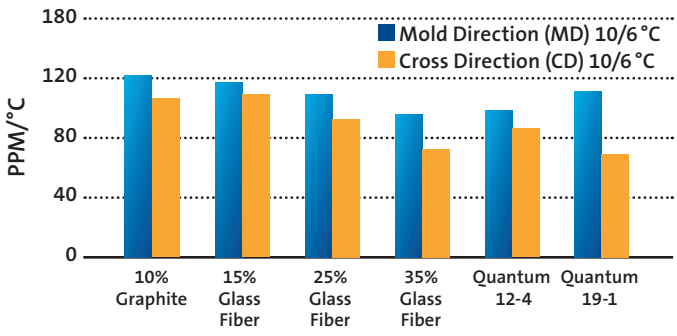
# FEATURES AND BENEFITS

| Measured Property | Unit | Test Method | Test Data Values | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 10% Graphite | 5% Glass Fiber | 25% Glass Fiber | 35% Glass Fiber | Quantum PTFE 12-4 | Quantum PTFE 19-1 |
| **Fundamental Properties :** | | | | | | | | |
| Density | g/cc | ASTM D-4745 | 2.118 | 2.191 | 2.211 | 2.169 | 2.518 | 2.566 |
| Tensile Strength | bar (psi) | ASTM D-4745 | 2020 (2925) | 223 (3231) | 178 (2578) | 124 (1796) | 166 (2410) | 134 (1940) |
| Elongation | % | ASTM D-4745 | 226 | 243 | 220 | 175 | 170 | 227 |
| Hardness, Initial | Shore D | ASTM D-2240 | 64 | 63 | 64 | 65 | 69 | 65 |
| **Compressive Strength** | | | | | | | | |
| 0.2% Offset, Compressive Strength | bar (psi) | ASTM D-695 | 370 (5370) | 343 (4980) | 348 (5050) | – | 478 (6940) | 345 (5000) |
| 0.2% Offset, Compressive Modulus | bar (psi) | ASTM D-695 | 3413 (49500) | 3275 (47500) | 3951 (57300) | – | 5109 (74100) | 4468 (64800) |
| 10% Deformation, Compressive Strength | bar (psi) | ASTM D-695 | 156 (2260) | 140 (2030) | 152 (2200) | – | 238 (3450) | 200 (2900) |
| 10% Deformation, Compressive Modulus | bar (psi) | ASTM D-695 | 158 (2300) | 143 (2070) | 155 (2250) | – | 239 (3470) | 203 (2940) |
| **Compressive Creep (Deformation Under Load), 13.7 MpA, 25 °C, 24 hours (1987 psi, 73 °F, 24 hours)** | | | | | | | | |
| Total Deformation (MD) | % | Based on ASTM D-621 | 5.9 | 9.9 | 7.2 | 7 | 1.6 | 2 |
| MD (Permanent) | % | Based on ASTM D-621 | 3.2 | 5.9 | 5.3 | 3 | 0.7 | 0.7 |
| **Tribological, .92 MpA, .76 m/s, 5 days (150 f/m , 133 psi , 5 days)** | | | | | | | | |
| Friction Coefficient | – | ASTM D-3702 | 0.213 | 0.303 | 0.29 | – | 0.381 | 0.264 |
| Wear Coefficient | K Factor | ASTM D-3702 | 31.3 | 7.6 | 16 | – | 14.6 | 6.7 |
| Running Temperature | °C (°F) | ASTM D-3702 | 163 (235) | 135 (274.8) | 142.2 (286.3) | – | 184.4 (364) | 115.5 (240) |
| **Coefficient of Thermal Expansion 25 °C to 155 °C (77 °F to 311 °F)** | | | | | | | | |
| Mold Direction (MD) 10/6°C (43°F) | ppm/°C | ASTM E-831 | 127.65 | 122.73 | 113.87 | 99.23 | 102.22 | 116.74 |
| Cross Direction (CD) 10/6°C (43°F) | ppm/°C | ASTM E-831 | 110.88 | 115.14 | 95.75 | 75.79 | 90.14 | 72.5 |

**Percent Deformation Under Load 13.7 MPa, 25 °C 24 hrs.**




**Thermal Expansion 25 °C to 155 °C**



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