# Torlon® 4275
## polyamide-imide

Torlon® 4275 is a wear-resistant grade of polyamide-imide (PAI). This grade offers an excellent balance of mechanical properties and wear resistance. It offers high tensile strength and modulus with a low coefficient of friction and outstanding wear resistance at both high velocity and high pressure conditions.

Torlon® PAI has the highest strength and stiffness of any thermoplastic up to 275°C (525°F). It has outstanding resistance to wear, creep and chemicals.

Potential applications for Torlon® 4275 polyamide-imide include thrust washers, spline liners, valve seats, bushings, bearings, wear rings, cams and other applications requiring strength at high temperature and resistance to wear.

| General | | |
|---|---|---|
| Material Status | • Commercial: Active | |
| Availability | • Africa & Middle East<br>• Asia Pacific<br>• Europe | • Latin America<br>• North America |
| Additive | • PTFE + Graphite Lubricant | |
| Features | • Chemical Resistant<br>• Creep Resistant<br>• Flame Retardant<br>• High Heat Resistance<br>• High Temperature Strength | • Low Friction<br>• Self Lubricating<br>• Semi Conductive<br>• Wear Resistant |
| Uses | • Aerospace Applications<br>• Aircraft Applications<br>• Automotive Applications<br>• Bearings<br>• Bushings<br>• Gears<br>• Industrial Applications<br>• Industrial Parts | • Machine/Mechanical Parts<br>• Metal Replacement<br>• Rollers<br>• Sealing Devices<br>• Seals<br>• Thrust Washer<br>• Transmission Applications<br>• Washer |
| RoHS Compliance | • RoHS Compliant | |
| Automotive Specifications | • ASTM D4000 PAI000 L23 A22334 GA15 DZ1Z2Z3Z4Z5, Dwg 3C3P-7D019-BA<br>• STELLANTIS MS-DB-405 CPN3373 | |
| Forms | • Pellets | |
| Processing Method | • Injection Molding<br>• Machining | • Profile Extrusion |

| Physical | Typical Value | Unit | Test method |
|---|---|---|---|
| Density / Specific Gravity | 1.51 | | ASTM D792 |
| Molding Shrinkage - Flow | 0.25 to 0.45 | % | ASTM D955 |
| Water Absorption (24 hr) | 0.33 | % | ASTM D570 |

| Mechanical | Typical Value | Unit | Test method |
|---|---|---|---|
| Tensile Modulus | | | |
| -- | 8830 | MPa | ASTM D638 |
| -- [1] | 7790 | MPa | ASTM D1708 |
| Tensile Strength | 117 | MPa | ASTM D638 |
| Tensile Stress [2] | 131 | MPa | ASTM D1708 |
| Tensile Elongation | | | |
| Break | 2.6 | % | ASTM D638 |
| Break [1] | 7.0 | % | ASTM D1708 |
| Flexural Modulus | | | ASTM D790 |
| 23°C | 7310 | MPa | |
| 232°C | 5100 | MPa | |
| Flexural Strength | | | ASTM D790 |
| 23°C | 208 | MPa | |
| 232°C | 110 | MPa | |
| Compressive Modulus | 4000 | MPa | ASTM D695 |
| Compressive Strength | 123 | MPa | ASTM D695 |
| Coefficient of Friction | | | |
| -- [3] | 0.31 | | ASTM D3702 |
| -- [4] | 0.29 | | ASTM D3702 |
| -- [5] | 0.15 | | ASTM D1894 |
| -- [6] | 0.050 | | ASTM D1894 |
| Wear Factor | | | ASTM D3702 |
| 5.2 MPa, 0.38 m/sec [7] | 1.4 | 10^-8 mm³/N·m | |
| 6.9 MPa, 0.38 m/sec [7] | 14 | 10^-8 mm³/N·m | |
| 3.4 MPa, 0.25 m/sec [8] | 26 | 10^-8 mm³/N·m | |
| 0.22 MPa, 4.1 m/sec [8] | 35 | 10^-8 mm³/N·m | |

| Impact | Typical Value | Unit | Test method |
|---|---|---|---|
| Notched Izod Impact | 85 | J/m | ASTM D256 |
| Unnotched Izod Impact | 270 | J/m | ASTM D4812 |

| Thermal | Typical Value | Unit | Test method |
|---|---|---|---|
| Deflection Temperature Under Load | | | ASTM D648 |
| 1.8 MPa, Unannealed | 280 | °C | |
| Thermal Conductivity | 0.65 | W/m/K | ASTM C177 |
| Coefficient of Linear Thermal Expansion | 2.5E-5 | cm/cm/°C | ASTM D696 |

| Electrical | Typical Value | Unit | Test method |
|---|---|---|---|
| Surface Resistivity | 4.0E+17 | ohms | ASTM D257 |
| Volume Resistivity | 8.0E+15 | ohms·cm | ASTM D257 |

| Injection | Typical Value | Unit |
|---|---|---|
| Drying Temperature | 177 | °C |
| Drying Time | 3.0 | hr |
| Suggested Max Moisture | 0.050 | % |
| Rear Temperature | 304 | °C |
| Nozzle Temperature | 371 | °C |
| Mold Temperature | 199 to 216 | °C |
| Back Pressure | 6.89 | MPa |
| Screw Speed | 50 to 100 | rpm |
| Screw L/D Ratio | 18.0:1.0 to 24.0:1.0 | |

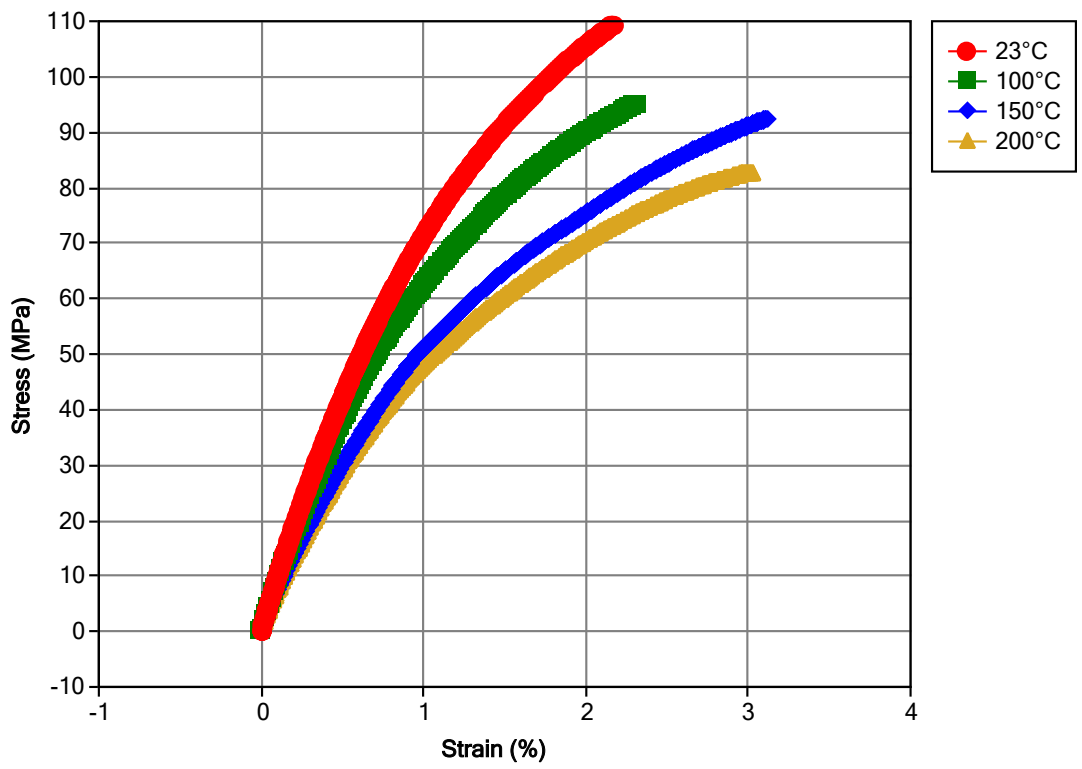
## Injection Notes

Minimum drying conditions: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C).
Compression Ratio: 1:1 to 1.5:1

Begin hold pressure at a high setting 6,000-8,000 psi (41.37-55.16 MPa), for several seconds, then drop off to 3,000-5,000 psi (20.69-34.48 MPa), for the duration of the hold pressure sequence.

Molded parts must be post cured.

## Isothermal Stress vs. Strain (ISO 11403)



## Notes

Typical properties: these are not to be construed as specifications.

[1] ASTM Test Method D1708 has been used to measure the tensile properties of PAI and similar materials because the small test specimen conserved material.
Today the most widely used specimen is the Type 1 bar of ASTM D638. These D1708 values are included for historical purposes and they should not be compared to the D638 values.

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[3] Dry: 0.25 m/s, 3.4 MPa (50 fpm, 500 psi)

[4] Dry: 4 m/s, 0.2 MPa (800 fpm, 31.25 psi)

[5] Lubricated: 0.25 m/s, 6.9 MPa (75 fpm, 1000 psi)

[6] Lubricated: 4 m/s, 5.2 MPa (800 fpm, 750 psi)

[7] Lubricated

[8] Dry

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Safety Data Sheets (SDS) are available by emailing us or contacting your sales representative. Always consult the appropriate SDS before using any of our products.