# Torlon® 4630
## polyamide-imide

Torlon® 4630 is an injection-moldable, wear-resistant grade of polyamide-imide (PAI), that has been formulated to give outstanding wear resistantance in non-lubricated applications. 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® 4630 polyamide-imide include thrust washers, seal rings, sliding vanes, bobbins, bushings, clutch rollers and pistons.

| 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 | • High Stiffness<br>• High Temperature Strength<br>• Low Friction<br>• Wear Resistant |
| Uses | • Automotive Applications<br>• Bearings | • Bushings |
| RoHS Compliance | • Contact Manufacturer | |
| Forms | • Pellets | |
| Processing Method | • Injection Molding<br>• Machining | • Profile Extrusion |

| Physical | Typical Value | Unit | Test method |
|---|---|---|---|
| Density / Specific Gravity | 1.56 | | ASTM D792 |
| Water Absorption (24 hr) | 0.18 | % | ASTM D570 |

| Mechanical | Typical Value | Unit | Test method |
|---|---|---|---|
| Tensile Modulus | 7450 | MPa | ASTM D638 |
| Tensile Strength | 81.4 | MPa | ASTM D638 |
| Tensile Elongation (Break) | 1.9 | % | ASTM D638 |
| Flexural Modulus | 6830 | MPa | ASTM D790 |
| Flexural Strength | 131 | MPa | ASTM D790 |
| Compressive Strength | 99.3 | MPa | ASTM D695 |
| Coefficient of Friction | | | |
| -- [1] | 0.32 | | ASTM D3702 |
| -- [2] | 0.32 | | ASTM D3702 |
| -- [3] | 0.15 | | ASTM D1894 |
| -- [4] | 0.030 | | ASTM D1894 |

| Mechanical | Typical Value | Unit | Test method |
|---|---|---|---|
| Wear Factor | | | ASTM D3702 |
| Dry: 0.25 m/s, 3.4 MPa (50 fpm, 500 psi) | 6.00 | in³·min^-10/ ft·lb·hr | |
| Dry: 4 m/s, 0.2 MPa (800 fpm, 31.25 psi) | 13.5 | in³·min^-10/ ft·lb·hr | |
| Lubricated: 0.375 m/s, 6.9 MPa (75 fpm, 1000 psi) | 11.0 | in³·min^-10/ ft·lb·hr | |
| Lubricated: 4 m/s, 5.2 MPa (800 fpm, 750 psi) | 1.00 | in³·min^-10/ ft·lb·hr | |

| Impact | Typical Value | Unit | Test method |
|---|---|---|---|
| Notched Izod Impact | 48 | J/m | ASTM D256 |
| Unnotched Izod Impact | 160 | J/m | ASTM D4812 |

| Thermal | Typical Value | Unit | Test method |
|---|---|---|---|
| Deflection Temperature Under Load | | | ASTM D648 |
| 1.8 MPa, Unannealed | 279 | °C | |
| Coefficient of Linear Thermal Expansion | 3.6E-6 | cm/cm/°C | ASTM D696 |

| 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 times are: 3 hours at 350°F (177°C), 4 hours at 300°F (149°C), or 16 hours at 250°F (121°C).

Compression Ratio between 1:1 and 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.

## Notes

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

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

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

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

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

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