

Quadrant EPP Duratron® PAI T4301 Polyamide-imide, extruded bearing grade (ASTM Product Data Sheet)
Categories: Polymer; Thermoplastic; Polyamide-imide (PAI); Polyamide-Imide, Extruded

Material Notes: Duratron® T4301 extruded PAI is primarily used for wear and friction parts. It offers a very low expansion rate, low coefficient of friction and exhibits little or no slip-stick in use. Duratron® T4301's flexural modulus of 1,000,000 psi is higher than most other advanced engineering plastics. This grade excels in severe service wear applications such as non-lubricated bearings, seals, bearing cages and reciprocating compressor parts.

Duratron® PAI is the highest performing melt processable plastic. It has superior resistance to elevated temperatures. It is capable of performing under severe stress conditions at continuous temperatures to 500°F (260°C). Parts machined from Duratron® PAI stock shapes provide greater compressive strength and higher impact resistance than most advanced engineering plastics. Its extremely low coefficient of linear thermal expansion and high creep resistance deliver excellent dimensional stability over its entire use range. Torlon is an amorphous material with a T_g (glass transition temperature) of 537°F (280°C).

Quadrant EPP's extruded Duratron® PAI stock shapes are post-cured using the latest technology and procedures developed by Quadrant EPP eliminating the need for additional curing by the end user in most situations. A post-curing cycle is recommended for components fabricated from extruded shapes where optimization of chemical resistance and/or wear performance is required.

Data provided by Quadrant Engineering Plastic Products from tests on stock shapes and parts produced by Quadrant EPP.

Formerly Torlon® 4301.

- Maintains strength and stiffness to 500°F (260°C)
- Minimal expansion rate to 500°F (260°C)
- Excellent wear resistance in bearing grades
- Able to endure harsh thermal, chemical and stress conditions

Physical Properties	Metric	English	Comments
Specific Gravity	1.45 g/cc	1.45 g/cc	ASTM D792
Water Absorption	0.40 %	0.40 %	Immersion, 24hr; ASTM D570(2)
Water Absorption at Saturation	1.5 %	1.5 %	Immersion; ASTM D570(2)

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell E	70	70	ASTM D785
Hardness, Rockwell M	106	106	ASTM D785
Tensile Strength	103 MPa	15000 psi	ASTM D638
Elongation at Break	3.0 %	3.0 %	ASTM D638
Tensile Modulus	6.21 GPa	900 ksi	ASTM D638
Flexural Strength	159 MPa	23000 psi	ASTM D790
Flexural Modulus	5.52 GPa	800 ksi	ASTM D790
Compressive Strength	152 MPa	22000 psi	10% Def.; ASTM D695
Compressive Modulus	6.55 GPa	950 ksi	ASTM D695
Shear Strength	113 MPa	16400 psi	ASTM D732
Izod Impact, Notched	0.427 J/cm	0.800 ft-lb/in	ASTM D256 Type A
Coefficient of Friction, Dynamic	0.20	0.20	Dry vs. Steel; QTM55007
K (wear) Factor	20.1 x 10 ⁻⁸ mm ³ /N-M	10.0 x 10 ⁻¹⁰ in ³ -min/ft-lb-hr	With post-machine cure cycle; QTM 55010
Limiting Pressure Velocity	1.40 MPa-m/sec	40000 psi-ft/min	4:1 safety factor; QTM 55007

Electrical Properties	Metric	English	Comments
Surface Resistivity per Square	>= 1.00e+13 ohm	>= 1.00e+13 ohm	EOS/ESD S11.11
Dielectric Constant	6.0	6.0	ASTM D150
	@Frequency 1e+6 Hz	@Frequency 1e+6 Hz	
Dissipation Factor	0.037	0.037	ASTM D150
	@Frequency 1e+6 Hz	@Frequency 1e+6 Hz	

Thermal Properties	Metric	English	Comments
CTE, linear	25.2 µm/m-°C	14.0 µin/in-°F	ASTM E831
	@Temperature -40.0 - 149 °C	@Temperature -40.0 - 300 °F	
Thermal Conductivity	0.533 W/m-K	3.70 BTU-in/hr-ft ² -°F	ASTM F433
Maximum Service Temperature, Air	260 °C	500 °F	Long Term
Deflection Temperature at 1.8 MPa (264 psi)	279 °C	534 °F	ASTM D648
Glass Transition Temp, T _g	275 °C	527 °F	ASTM D3418
Flammability, UL94	V-0	V-0	1/8 inch (Estimated Rating)

Compliance Properties	Metric	English	Comments
3A-Dairy	No	No	

Canada AG	No	No
FDA	No	No
NSF	No	No
USDA	No	No
USP Class VI	No	No

Chemical Resistance Properties	Metric	English	Comments
Acids, Strong (pH 1-3)	Limited	Limited	
Acids, Weak	Acceptable	Acceptable	
Alcohols	Acceptable	Acceptable	
Alkalies, Strong (pH 11-14)	Unacceptable	Unacceptable	
Alkalies, Weak	Limited	Limited	
Chlorinated Solvents	Acceptable	Acceptable	
Conductive / Static Dissipative	No	No	
Continuous Sunlight	Acceptable	Acceptable	
Hot Water / Steam	Limited	Limited	
Hydrocarbons - Aliphatic	Acceptable	Acceptable	
Hydrocarbons - Aromatic	Acceptable	Acceptable	
Inorganic Salt Solutions	Acceptable	Acceptable	
Ketones, Esters	Acceptable	Acceptable	

Descriptive Properties

Machinability	5	1-10, 1=Easier to Machine
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